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Program of Study for the Degree of Bachelor of Arts
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African American Studies, Center for
African Studies, Program in
American Studies, Program in
Anthropology, Department of
Applications of Computing, Program in
Applied and Computational Mathematics, Program in
Architecture and Engineering, Program in
Architecture, School of
Art and Archaeology, Department of
Astrophysical Sciences, Department of
Biophysics, Program in
Chemical and Biological Engineering, Department of
Chemistry, Department of
Civil and Environmental Engineering, Department of
Classics, Department of
Comparative Literature, Department of
Computer Science - A.B., Department of
Computer Science - B.S.E., Department of
Contemporary European Politics and Society, Program in
Creative Writing, Program in
Dance, Program in
East Asian Studies, Department of
East Asian Studies, Program in
Ecology and Evolutionary Biology, Department of
Economics, Department of
Electrical Engineering, Department of
Engineering Biology, Program in
Engineering Physics, Program in
Engineering and Applied Science, School of
Engineering and Management Systems, Program in
English, Department of
Environmental Studies, Program in
European Cultural Studies, Program in
Film Studies, Committee for
Finance, Program in
French and Italian, Department of
Freshman Seminars in the Residential Colleges, Program of
Geological Engineering, Program in
Geosciences, Department of
German, Department of
Global Health and Health Policy, Program in
Hellenic Studies, Program in
History, Department of
Human Values, University Center for
Humanistic Studies, Program in
Information Technology and Society, Program in
Jazz Studies, Program in

http://www.princeton.edu/ua/
Judaic Studies, Program in
Language and Culture, Program in
Latin American Studies, Program in
Latin Studies, Program in
Lewis Center for the Arts
Linguistics, Program in
Materials Science and Engineering, Program in
Mathematics, Department of
Mechanical and Aerospace Engineering, Department of
Medieval Studies, Program in
Molecular Biology, Department of
Music, Department of
Musical Performance, Program in
Near Eastern Studies, Department of
Near Eastern Studies, Program in
Neuroscience, Program in
Operations Research and Financial Engineering, Department of
Philosophy, Department of
Physics, Department of
Planets and Life, Program in
Politics, Department of
Psychology, Department of
Quantitative and Computational Biology, Program in
Religion, Center for the Study of
Religion, Department of
Renaissance Studies, Committee for
Robotics and Intelligent Systems, Program in
Russian and Eurasian Studies, Program in
Slavic Languages and Literatures, Department of
Sociology, Department of
South Asian Studies, Program in
Spanish and Portuguese Languages and Cultures, Department of
Statistical Studies, Committee for
Sustainable Energy, Program in
Teacher Preparation, Program in
Theater, Program in
Translation and Intercultural Communication, Program in
Urban Studies, Program in
Values and Public Life, Program in
Visual Arts, Program in
Nondiscrimination Statement. In compliance with Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, and other federal, state, and local laws, Princeton University does not discriminate on the basis of age, race, color, sex, sexual orientation, gender identity, religion, national or ethnic origin, disability, or status as a veteran in any phase of its employment process, in any phase of its admission or financial aid programs, or other aspects of its educational programs or activities. The vice provost for institutional equity and diversity is the individual designated by the University to coordinate its efforts to comply with Title IX, Section 504 and other equal opportunity and affirmative action regulations and laws. Questions or concerns regarding Title IX, Section 504 or other aspects of Princeton’s equal opportunity or affirmative action programs should be directed to the Office of the Vice Provost for Institutional Equity and Diversity, Princeton University, 205 Nassau Hall, Princeton, NJ 08544 or (609) 258-6110.

Notice. Plans of study, course descriptions, mastheads, and assignments of lecturers apply to the academic year 2010–11 to the best of our knowledge as of June 1, 2010. The University reserves the right to change programs of study, academic requirements, assignment of lecturers, teaching staffs, or the announced academic calendar without prior notice, in accordance with established procedures.

Accreditation. Princeton University is accredited by the Middle States Association of Colleges and Schools. Requests to review documentation supporting this accreditation should be directed to the dean of the college. In addition, the School of Architecture is accredited by the National Architecture Accreditation Board. Of the programs of study offered by the departments of chemical engineering, civil and environmental engineering, computer science, electrical engineering, mechanical and aerospace engineering, and operations research and financial engineering of the School of Engineering and Applied Science, the following are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700: aerospace engineering, chemical engineering, civil engineering, electrical engineering, and mechanical engineering. Supporting documentation may be reviewed by contacting the deans of these schools.
Fall Term, 2010-11

*September 7, Tuesday.* Online registration for returning students via SCORE website, 7 a.m. Registration must be completed by 5 p.m., Wednesday, September 15.

*September 11, Saturday.* Freshman dormitory check-in, 8 a.m. to 5 p.m., Baker Rink.

*September 12, Sunday.* Opening Exercises, 3 p.m., University Chapel.

*September 16, Thursday.* Classes of the fall term begin.

*October 25-29, Monday-Friday.* Midterm tests. (Not every midterm test is set in this week. Students should consult course instructors for exceptions.)

*October 30, Saturday.* Fall recess begins.

*November 7, Sunday.* Last day of fall recess.

*November 25, Thursday.* Thanksgiving recess begins.

*November 28, Sunday.* Last day of Thanksgiving recess.

*December 14, Tuesday.* Final date for seniors to select spring term courses.

*December 15, Wednesday.* Final date for juniors to select spring term courses.

*December 16, Thursday.* Final date for sophomores to select spring term courses.

*December 17, Friday.* Final date for freshmen to select spring term courses.

*December 17, Friday.* Winter recess begins at conclusion of classes.

*January 2, Sunday.* Last day of winter recess.

*January 3, Monday.* First day of reading period.

*January 11, Tuesday.* Last day of reading period. "Dean's date" for written work (term papers, lab reports, final projects).

*January 12, Wednesday.* First day of fall term examinations.

*January 22, Saturday.* Last day of fall term examinations.

Spring Term, 2010-11

*January 31, Monday.* Classes of the spring term begin.

*March 7-11, Monday-Friday.* Midterm tests. (Not every midterm test is set in this week. Students should consult course instructors for exceptions.)

*March 12, Saturday.* Spring recess begins.

*March 20, Sunday.* Last day of spring recess.

*April 27, Wednesday.* Final date for juniors to select fall term 2011-12 courses.

*April 28, Thursday.* Final date for sophomores to select fall term 2011-12 courses.

*April 29, Friday.* Final date for freshmen to select fall term 2011-12 courses.

*May 2, Monday.* First day of reading period.

*May 10, Tuesday.* Last day of reading period. "Dean's date; for written work (term papers, lab reports, final projects).

*May 11, Wednesday.* First day of spring term examinations.

*May 11-12, Wednesday-Thursday.* Senior departmental/comprehensive examinations.

*May 21, Saturday.* Last day of spring term examinations.

*May 29, Sunday.* Baccalaureate.

*May 30, Monday.* Class Day (Memorial Day).

*May 31, Tuesday.* Commencement.

http://www.princeton.edu/ua/
Fall Term, 2011-12

September 7, Wednesday. Online registration for returning students opens.

September 10, Saturday. Freshman sign-in.

September 15, Thursday. Classes of the fall term begin.

October 29-November 6, Saturday-Sunday. Fall recess.

November 24-27, Thursday-Sunday. Thanksgiving recess.

December 17-January 8, Saturday-Sunday. Winter recess.

January 18-28, Wednesday-Saturday. Final examinations.

Spring Term, 2011-12

February 6, Monday. Classes of the spring term begin.

March 17-25, Saturday-Sunday. Spring recess.

May 16-26, Wednesday-Saturday. Final examinations.

June 3, Sunday. Baccalaureate.

June 4, Monday. Class Day (Memorial Day).

June 5, Tuesday. Commencement.

Fall Term, 2012-13

September 5, Wednesday. Online registration for returning students opens.

September 8, Saturday. Freshman sign-in.

September 13, Thursday. Classes of the fall term begin.

October 27-November 4, Saturday-Sunday. Fall recess.

November 22-25, Thursday-Sunday. Thanksgiving recess.

December 15-January 6, Saturday-Sunday. Winter recess.

January 16-26, Wednesday-Saturday. Final examinations.

Spring Term, 2012-13

February 4, Monday. Classes of the spring term begin.

March 16-24, Saturday-Sunday. Spring recess.

May 15-26, Wednesday-Saturday. Final examinations.

June 2, Sunday. Baccalaureate.

June 3, Monday. Class Day.

June 4, Tuesday. Commencement.

Fall Term, 2013-14

September 3, Wednesday. Online registration for returning students opens.

September 7, Saturday. Freshman sign-in.

September 12, Thursday. Classes of the fall term begin.

October 26-November 3, Saturday-Sunday. Fall recess.

November 28-December 1, Thursday-Sunday. Thanksgiving recess.

December 14-January 5, Saturday-Sunday. Winter recess.

January 15-25, Wednesday-Saturday. Final examinations.

Spring Term, 2013-14

February 3, Monday. Classes of the spring term begin.

http://www.princeton.edu/ua/
March 15-23, Saturday-Sunday. Spring recess.
May 14-24, Wednesday-Saturday. Final examinations.
June 1, Sunday. Baccalaureate.
June 2, Monday. Class Day.
June 3, Tuesday. Commencement.
*Schedules are subject to change.
University Administrators

**President**
Shirley M. Tilghman, Ph.D.

**Provost**
Christopher L. Eisgruber, J.D., M.Litt.

**Dean of the Faculty**
David P. Dobkin, Ph.D.

**Dean of the College**
Nancy Weiss Malkiel, Ph.D.

**Dean of the Graduate School**
William B. Russel, Ph.D.

**Dean for Research**
A. J. Stewart Smith, Ph.D.

**Vice President for Campus Life**
Cynthia Cherrey, Ph.D.

**Dean of Undergraduate Students**
Kathleen Deignan, M.S.

**Dean of the School of Engineering and Applied Science**
H. Vincent Poor, Ph.D.

**Dean of the Woodrow Wilson School of Public and International Affairs**
Christina H. Paxson, Ph.D.

**Dean of the School of Architecture**
Stanley T. Allen, M.Arch.

**Dean of Religious Life and the Chapel**
Alison L. Boden, Ph.D., M.Div.

**Registrar**
Polly Winfrey Griffin, M.S.

**University Librarian**
Karin A. Trainer, M.A., M.S.

**Dean of Admission**
Janet Lavin Rapelye, M.A.

**Director of Undergraduate Financial Aid**
Robin A. Moscato, B.A.

**Executive Director of University Health Services**
John Kolligian, Ph.D.

**Director of Athletics**
Gary D. Walters, B.A.

The provost is the general deputy of the president.

http://www.princeton.edu/ua/
The dean of the faculty has administrative oversight of departments and programs of instruction and is responsible for the effectiveness and well-being of all ranks of the faculty.

The dean of the college is responsible for the undergraduate academic program, including the curriculum, academic advising, academic regulations, and scholastic standing. The dean also has oversight responsibility for offices and services that promote the academic development of undergraduates, as well as for the residential college system.

The vice president for campus life has oversight responsibility for the dean of undergraduate students, and for athletics, career services, health services, religious life, and the Pace Center.

The dean of undergraduate students has oversight responsibility for undergraduate residential life, University centers, and student organizations, and is also responsible for matters relating to the conduct and discipline of undergraduates.

The main University website has more detailed information on University governance [http://www.princeton.edu/main/about/governance].
**Undergraduate Information**

This online publication presents the academic regulations, programs of study, and course offerings of Princeton University. Information about other important areas is available from various offices of the University, included in publications distributed to students, or found on the Princeton University website [http://www.princeton.edu/main](http://www.princeton.edu/main). A brief list of information sources is given below.

**Admission.** Visit the Admission and Aid [http://www.princeton.edu/admission/] website or contact the Admission Office by mail: Box 430, Princeton University, Princeton, New Jersey 08542-0430; phone: (609) 258-3060; or e-mail: uaoffice@princeton.edu [mailto:uaoffice@princeton.edu].

**Financial Aid.** Princeton’s groundbreaking financial aid program has replaced loans with grants — which do not have to be repaid — for all students who qualify for aid. Visit the Admission and Aid [http://www.princeton.edu/admission/] website, or contact the Office of Undergraduate Financial Aid by mail: Box 591, Princeton University, Princeton, New Jersey 08542-0591; phone: (609) 258-3330; or e-mail faoffice@princeton.edu [mailto:faoffice@princeton.edu].

**Housing and Dining.** Information is sent to matriculants in May of each year and is available from the Undergraduate Housing Office [http://www.princeton.edu/facilities/info/audiences/undergraduate/] , MacMillan Building, Princeton, New Jersey 08544-5264, and the Department of Dining Services [http://www.princeton.edu/food].

**Student Accounts.** Regarding payment of bills, contact the Office of the Treasurer, Box 35, Princeton University, Princeton, New Jersey 08543-0035; phone (609) 258-6378; e-mail studacct@princeton.edu [mailto:studacct@princeton.edu].

**Student Life.** The Student Guide to Princeton [http://www.princeton.edu/studentguide] is available online.

**Rights, Rules, Responsibilities.** This publication lays out policies and rules with respect to accepted standards of conduct for students. It includes the constitution of the Honor Committee and a detailed account of standards governing academic integrity and behavioral conduct.
The Undergraduate Program

Princeton University is a private, coeducational university located in Princeton, New Jersey, midway between New York City and Philadelphia. The 500-acre central campus is residential, and all buildings are within easy walking distance of one another. Founded in 1746 as the College of New Jersey, Princeton now has an undergraduate population of approximately 5,000 students working toward the bachelor of arts (A.B.) or bachelor of science in engineering (B.S.E.) degree. With its outstanding financial aid program, which provides grants rather than loans--which do not have to be repaid--the University ensures that a Princeton education is affordable to qualified students from all socioeconomic backgrounds. Students come from all 50 states and from more than 95 countries. The University plans to increase the size of its undergraduate student body to 5,200 students by the 2012-13 academic year. A single full-time faculty of 920 teaches both graduate and undergraduate students.

Nearly all undergraduates are in residence on the campus, and housing is guaranteed for all four years. The six residential colleges provide a vast array of educational and social activities. In housing and dining arrangements, extracurricular activities, and daily social life, undergraduates make up a single student body regardless of degree candidacy or program of study. With many lectures, classes, and laboratories in common, undergraduates enjoy a shared academic experience, no matter what their principal field of study.

The A.B. Degree

Programs of study in the humanities, the natural sciences, and the social sciences lead to the degree of bachelor of arts. Students select a concentration from the following academic departments:

- Anthropology
- Architecture
- Art and Archaeology
- Astrophysical Sciences
- Chemistry
- Classics
- Comparative Literature
- Computer Science
- East Asian Studies
- Ecology and Evolutionary Biology
- Economics
- English
- French and Italian
- Geosciences
- German
- History
- Mathematics
- Molecular Biology
- Music
- Near Eastern Studies
- Philosophy
- Physics
- Politics
- Psychology
- Religion
- Slavic Languages and Literatures
- Sociology
- Spanish and Portuguese Languages and Cultures
- Woodrow Wilson School of Public and International Affairs

The B.S.E. Degree

Programs of study in the School of Engineering and Applied Science lead to the degree of bachelor of science in engineering. Students select a concentration from the following academic departments:

- Chemical and Biological Engineering
- Civil and Environmental Engineering
- Computer Science
- Electrical Engineering
- Mechanical and Aerospace Engineering
- Operations Research and Financial Engineering

http://www.princeton.edu/ua/
Certificate Programs

In addition to their departmental concentration, students may earn a certificate by completing the requirements in one or more of the following programs:

- African American Studies
- African Studies
- American Studies
- Applications of Computing
- Applied and Computational Mathematics
- Architecture and Engineering
- Biophysics
- Contemporary European Politics and Society
- Creative Writing
- Dance
- East Asian Studies
- Engineering and Management Systems
- Engineering Biology
- Engineering Physics
- Environmental Studies
- European Cultural Studies
- Finance
- Geological Engineering
- Global Health and Health Policy
- Hellenic Studies
- Information Technology and Society
- Jazz Studies
- Judaic Studies
- Language and Culture
- Latin American Studies
- Latino Studies
- Linguistics
- Materials Science and Engineering
- Medieval Studies
- Musical Performance
- Near Eastern Studies
- Neuroscience
- Planets and Life
- Quantitative and Computational Biology
- Robotics and Intelligent Systems
- Russian and Eurasian Studies
- South Asian Studies
- Sustainable Energy
- Teacher Preparation
- Theater
- Translation and Intercultural Communication
- Urban Studies
- Values and Public Life
- Visual Arts
- Women and Gender, Study of
- Woodrow Wilson School of Public and International Affairs

Students may also take courses offered by the Program in Humanistic Studies, which does not grant certificates.

While methods of instruction vary widely, all areas of the academic program emphasize individual responsibility and the free interchange of ideas. This emphasis is demonstrated most notably in the wide use of preceptorials and seminars, in the provision of independent study for all upperclass students and qualified underclass students, and in the availability of a series of special programs to meet a range of individual interests. The undergraduate college encourages the student to be an independent seeker of information, and to assume responsibility for gaining both knowledge and judgment that will strengthen later contributions to society.

Undergraduate regulations, academic and social, are relatively few. They represent the expectation of appropriate behavior on the part of all students and require a reasonable standard of performance in scholarly achievement.
Admission

General Principles. Princeton seeks students of good character who have demonstrated scholastic achievement and capacity for further growth. The University and its facilities are open to all persons pursuant to the equal opportunity policy.

The Faculty Committee on Undergraduate Admission and Financial Aid, which meets with a parallel student committee, is responsible for advising the administration on admission policy. The Admission Office [http://www.princeton.edu/admission/] staff seeks to identify those candidates who seem best qualified to take advantage of Princeton's academic programs and to select from among them those who will form an undergraduate body with a wide representation of interests, backgrounds, and special abilities. The Admission Office staff considers each applicant individually. Those candidates who apply for admission to Princeton should have demonstrated significant academic potential, as well as strength of character and maturity, and show promise of contributing to the life of the University. Princeton welcomes applications from talented students of diverse backgrounds.

Entrance Standards. Princeton does not prescribe fixed secondary school course requirements for admission. The University recognizes the diversity of programs offered by various secondary schools and is primarily interested in the quality and breadth of the student's record. The school's testimony about academic ability and interest as well as motivation, reliability, and strength of character are very important.

Although the applicant's course program is but one of several elements taken into consideration by the admission committee, English, foreign languages, and mathematics are so necessary to intellectual growth and attainment that sustained study of each in secondary school is expected. The following program is desirable: English, four years with continued practice in writing; foreign languages, four years of one language (rather than two years each of two languages), preferably continued through the final year of secondary school; mathematics, four years of college preparatory mathematics, also preferably continued through the final year of secondary school.

In addition to these studies, the following are important components of strong preparation for work in the University: three to four years of science, including two years of laboratory science; three to four years of social studies, including two years of history, with some study of a country or region outside the United States; and some study of art and music, and, if possible, a second foreign language. Students seeking a B.S.E. degree should have a strong record in mathematics and in the natural sciences, including at least one year of physics.

The University will give full consideration to an applicant who has been unable to pursue the recommended studies to the full extent if the record otherwise shows clear promise.

Princeton grants advanced placement for some college-level studies completed prior to matriculation. For information, see the advanced placement section of this catalog.

Application Procedures. Students seeking entrance to Princeton in the fall of 2011 must submit the Common Application [https://www.commonapp.org/]. Students must also complete Princeton's Supplement to the Common Application. Detailed application instructions are available at the Admission Office website [http://www.princeton.edu/admission/]. Inquiries about admission can be made via e-mail [mailto:uaoffice@princeton.edu], by phone at (609) 258-3060, or by mail at Admission Office, Princeton University, Box 430, Princeton, New Jersey 08542-0430. The application deadline is January 1. We encourage applicants to submit their portion of the application by December 15, if possible.

Additional information concerning admission procedures, application fees, alumni interviews, standardized testing requirements, notification date, and deferred enrollment may be found in the admission viewbook. Copies are available on request from the Admission Office, Princeton University, Box 430, Princeton, New Jersey 08542-0430, or online [http://www.princeton.edu/admission/], and are included in the packet of application materials mailed to prospective applicants.

Transfer Admission. At this time, Princeton does not offer transfer admission. Any student who has enrolled as a full-time degree candidate at another college or university is considered a transfer applicant and is not eligible for undergraduate admission.

Undergraduate Financial Aid

Administered by the Undergraduate Financial Aid Office, the University's financial aid program provides assistance to all students who are judged to need aid. Princeton does not offer academic or athletic scholarships. Grants and campus jobs are the types of aid awarded to undergraduates. Student loans are available if requested for expenses not included in the basic budget, or to cover an earnings shortfall. A complete description of federal, state, and University aid funds, as well as detailed instructions on how to apply for aid [http://www.princeton.edu/admission/financialaid/], can be found on the Web. A student may receive assistance for each undergraduate year, so long as the family continues to need help and the student makes normal progress toward a degree. Annual applications for aid are required.

Under federal tax laws that became effective in 1987, scholarship or grant support in excess of tuition and related expenses (required books, fees, supplies, and equipment), regardless of the source, is considered taxable income. Proceeds from educational loans are not considered taxable income. Compensation from the University received under the Federal Work-Study Program or other employment arrangements is considered taxable income, but is not subject to Social Security taxes if earned during the academic year.

http://www.princeton.edu/ua/
For further information, contact the Undergraduate Financial Aid Office, Box 591, Princeton, NJ 08542-0591, (609) 258-3330.

**Fees and Expenses**

Current fees cover approximately one-half of the University's educational cost for a student. Costs for 2011-12 are expected to increase between 3 and 5 percent.

Fees and other charges for the 2010-11 academic year:

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition</td>
<td>$36,640</td>
</tr>
<tr>
<td>Room charge</td>
<td>$6,467</td>
</tr>
<tr>
<td>Board rate</td>
<td>$5,473</td>
</tr>
</tbody>
</table>

The list above represents the regular University charges. These charges are subject to change without prior notice. Changes in programs and in the academic calendar do not entitle students to any credits against established fees. Students who are not covered under their family's medical insurance can purchase a Princeton health plan for an additional charge of $1,270.

The budget that is used to make financial aid awards includes an allowance of $3,600 for other costs that a student will incur during the year. These expenses typically include books, laundry, clothing, recreation, incidentals, dues, and social fees. Class dues and the Undergraduate Student Government (USG) fee are expenses that are viewed somewhat differently since they are added to the University bill rather than paid for as an out-of-pocket expense. Freshmen and sophomores are charged a residential college fee of $660, which will also be included on the University bill.

The total student budget for the 2010–11 academic year, therefore, is approximately $52,180, not including travel expenses, which vary depending on a student's state or country of residence.

**Special Fees**

**Application.** Currently $65, payable at the time formal application is made for admission to the University.

**Late Registration.** $75.

**Change of Course.** No charge for changes during the first two weeks of classes. A fee of $45 per course is assessed beginning in the third week of classes.

**Failure to Preregister by Deadline.** Undergraduates who fail to file a choice of courses at the Office of the Registrar [http://registrar.princeton.edu/] by the specified deadlines are fined $10 for each day late.

**Submitting Late or Resubmitting Senior Thesis.** $250 assessed at the discretion of the Faculty Committee on Examinations and Standing. This fee must be paid before the thesis can be approved.

**Transcript and Certifications.** A one-time document fee of $75 will be assessed in the freshman year. This fee will cover all subsequent requests for academic transcripts and enrollment certifications.

**Student Car Parking.** Juniors and seniors may purchase a University parking permit for an annual charge of approximately $180. Freshmen and sophomores are not permitted to have cars on campus.

**Continuing Education Students.** For information about fees, inquire at the Office of Community and Regional Affairs [http://www.princeton.edu/community/], 22 Chambers Street, Suite 101.

**Payment of Fees and Charges**

Payment of the basic University charges for the academic year (tuition, room, meal contract, class dues, student health plan, and residential college and Undergraduate Student Government fees, less financial aid provided by Princeton) is due in full in two parts: half by August 21 and half by January 21. Electronic billing (E-billing) to students at their Princeton.edu e-mail account is the official method of distributing the University tuition bill. Paper bills will not be automatically sent home. New students will be sent enrollment instructions and steps on how to include parents/guardians in the notification process. Billing notices are sent in advance of the due date. Electronic payments from a U.S. checking/savings account and checks in U.S. dollars are acceptable forms of payment. Credit card payments are not accepted. Any balance that is unpaid beyond the due date will be assessed a late payment charge. This charge will be an annual rate of interest, to be established prior to the start of the academic year, and will be announced by the Office of the Treasurer in June. Failure to enroll in the billing process does not prevent the assessment of late fees. Billing notices will be sent monthly for any additional charges incurred. Account activity can be viewed online at any time by all authorized parties.

The University offers a Monthly Payment Plan, which allows payment of the basic fees (tuition, room, meals, class dues, student health plan, and residential college and Undergraduate Student Government fees, less financial aid provided by Princeton University), to be divided over 12 monthly payments due on the first of each month, September through August. This method of payment requires a promissory note to be signed by the parent(s) for the total amount borrowed. Interest will be charged on the amount disbursed each semester and will be calculated daily based on the outstanding balance disbursed. The interest rate will be announced in June. Additional interest will be charged on any amounts past due. This rate will be the same as the rate for late payment on the student account.

The University also offers the Princeton Parent Loan Program, which enables qualified families to borrow money from Princeton to pay their share of the student's budget over an extended period. Repayment begins with the first month of borrowing and continues for 10 years after graduation. There are two interest options: variable, which is adjusted every six months, August and February, for the life of the loan and based on the six-month London interest bank offered rate.

http://www.princeton.edu/ua/
(LIBOR), and fixed, which is based on the U.S. Treasury note rate in August.

Students will not be registered for each term until all financial requirements are met. Students with past-due obligations will be referred to the Office of the Dean of the College [http://www.princeton.edu/odoc/] for review of their continued enrollment. A student otherwise entitled to graduate will not receive a diploma, nor will a transcript be issued, until all financial obligations to the University have been met. If balances remain due following graduation, the University may secure legal assistance to obtain payment. All legal fees and collection expenses will be added to the obligation due Princeton.

Students withdrawing from the University within the first two weeks of classes in either term, whether voluntarily or by dismissal (with special consideration for medical cases), will be charged 10 percent of the tuition for the term; during the third week of classes, 20 percent; during the fourth week of classes, 30 percent; during the fifth week of classes, 40 percent; and during the sixth and seventh week of classes, 50 percent. If a student withdraws after the seventh week of classes, 80 percent of the tuition for that term will be charged; after the end of week nine, the full amount for the term will be charged. Students withdrawing after the beginning of a term also incur room and board charges in accordance with the terms of their contracts; ordinarily, board charges will be adjusted on a pro rata basis, while the full amount of the room charges for that term will be charged. The fees set by student organizations, residential colleges, and other dining or living units are established on a semester-by-semester basis and will not be refunded to students who withdraw after the beginning of a term.

Although financial assistance is awarded for the entire academic year, it is credited to a student's bill on a semester basis. If a student withdraws before completing the year, aid credits will be available to pay expenses in proportion to actual charges. Financial aid will be used to pay for room and board consistent with the terms of the contracts. The residential college fee, student government fee, and class dues will be charged by semester; they also may be paid by aid once tuition, room, and board charges have been satisfied.

If not used to cover the charges mentioned above, remaining aid credits will be returned to the sources from which they came as specified by program requirements. Withdrawing students receive detailed information about refunds and aid credits from the Financial Aid Office.

Students who are required to repeat a semester for other than disciplinary reasons are eligible for financial aid as described above. Students who leave Princeton for disciplinary reasons, however, will not be eligible to receive University grant aid if they must repeat a term as a result.

Upon withdrawal or graduation, the net balance of the student's account will be determined by first applying all payments and available credits to the account against all outstanding amounts due to the University.

Students who withdraw without meeting all financial obligations to the University will have their transcripts withheld and will not be eligible for readmission to Princeton. If balances remain due following withdrawal, the University may secure legal assistance to obtain payment. All legal fees and collection expenses will be added to the obligation due Princeton.

While the University recognizes that continuity in its payment policies will best help parents plan to meet the educational costs of their children, due to changing financial circumstances, the University must reserve the right to alter the terms and means of payment required from year to year.
The Undergraduate Honor System

Jurisdiction over Undergraduates for Violations of Academic Rules and Regulations

Jurisdiction over violations of academic rules and regulations rests with two distinct committees at Princeton. All written examinations, tests, and quizzes that take place in class are conducted under the honor system. All violations of the honor system are the concern of the Undergraduate Honor Committee. Violations of rules and regulations pertaining to all other academic work, including essays, term papers, and laboratory reports, fall under the jurisdiction of the Faculty/Student Committee on Discipline. Should there be any uncertainty regarding which body is responsible for the adjudication of a particular case, clarification should be requested from the Office of the Dean of Undergraduate Students and the chair of the Honor Committee.

Introduction

At Princeton all in-class written examinations, tests, and quizzes are conducted under the honor system. Its constitution is printed in full below. A letter from the chair of the Honor Committee explaining the honor system is included in the online matriculation packet sent to each newly admitted student, who then signs by submitting the honor code statement that he or she understands and will abide by the conditions under which the honor system is conducted. Final entrance to the University is contingent upon the committee's receipt of this letter. Status as a student "in good standing"; and graduation from the University are contingent upon continued participation in the honor system. The Honor Committee consists of 12 members. The current and former presidents of the first-year, sophomore, and junior classes serve on the committee. The remaining positions are filled by undergraduates selected by application from the student body at large.

Under the honor system, the students assume full responsibility for honesty in written examinations. Examinations are not supervised. The instructor in charge distributes the examination papers, waits for a short time for any questions, and then leaves the room, returning at the end of the stated period to collect the answer books. On each examination paper, the student writes out and signs the following statement: "I pledge my honor that I have not violated the Honor Code during this examination."

Every student acknowledges the obligation to report any suspected violation of the honor system that he or she has observed. It is the common understanding among Princeton students that, where the honor system is concerned, an individual's obligation to the undergraduate student body as a whole transcends any reluctance to report another student. Thus, under the honor system students have a twofold obligation: individually, they must not violate the code, and as a community, they are responsible to see that suspected violations are reported.

Violations of the honor system are the concern of the Undergraduate Honor Committee. When a report of a suspected violation of the honor system is received, the Honor Committee immediately conducts an investigation. If the investigation indicates that it is warranted, the full Honor Committee is convened and a confidential hearing is held. If the student in question is acquitted, all records of the hearing are destroyed. If a student is found guilty, the committee recommends an appropriate penalty to the dean of undergraduate students. Normally, a student found guilty of violating the Honor Code can expect to be suspended from the University for one, two, or three years. A second offense will result in expulsion. Censure may be added to all penalties to underscore the seriousness of the violation.

Procedures during the course of an examination are determined by the faculty member present. Students may not leave the examination room without the specific permission of the faculty member. Such permission must be granted uniformly; that is, if one student is allowed to leave the room, no other may be denied such permission upon request. Students may not take their examinations with them outside of the examination room. Students are advised to sit one seat apart from other students, to refrain from bringing notes and books into the examination room, and if possible, to avoid sitting near those with whom they have studied. Laptop computers as well as hand-held electronic communication devices (e.g., cell phones, BlackBerry devices, etc.) are forbidden in final examination rooms. Additionally, students may not wear headphones attached to audio devices during examinations. The faculty member, who is present only briefly to answer questions and to pick up the completed examinations, has the responsibility to make sure the examinations are turned in by students at the appropriate time.

Princeton's honor system was established by the undergraduates in 1893 and has been in effect without interruption since that time. It has been successful because generations of undergraduates have respected it, and by common agreement have given it highest place among their obligations as Princeton students.

Current Procedure

Much of the internal organization and virtually all of the operating procedures of the Honor Committee are determined by the committee itself. The tone and style of each year's committee may vary, but there is continuity in procedure from year to year. Generally there are at least three members on the committee who have served previously.

A typical case would be conducted as follows:

A suspected violation of the honor system is brought to the attention of the Honor Committee by a reporting witness. The reporting witness is typically a faculty member, a student, or the violator. The member of the committee receiving the report calls the chair. On a rotating basis, two members of the committee conduct a preliminary investigation of the allegation. The meeting in which investigators notify the student in question of the alleged violation will be recorded for possible use by the committee or the accused student if a hearing is held. If the evidence warrants it, the chair sets a time and place for a hearing. A representative from the Office of the Dean of Undergraduate Students will serve as procedural adviser for the student in question. The two investigators and/or the chair inform the student in question of the charge at least 24 hours before the hearing and may also ask potential witnesses to appear at the hearing. As much confidentiality as possible is maintained during the investigation in order to protect the principals from rumor.

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Evidence for the hearing usually includes the examination(s) in question and any other relevant material, which are duplicated, if necessary, for use by the individual members of the committee during the hearing. If a faculty member reports the alleged violation, or if consultation with the professor administering the examination or the preceptor or section leader of the student in question seems helpful, the committee may call that person or persons to the actual hearing to discuss the facts as then known. The committee may also have present, during the hearing, a student or faculty member who is knowledgeable in the field of the examination in question.

After a report of a suspected violation is received, the chair normally consults with the dean of undergraduate students or the dean's designee concerning the general character of the suspected violation, the nature of the investigation in progress, and any questions that may arise during the course of the investigation. The chair may also, if he or she deems it necessary, consult with the dean during the course of the hearing. The chair also informs an associate dean of undergraduate students of the name of the person under investigation. The associate dean of undergraduate students provides the chair and the two investigators, prior to any scheduled hearing, whatever information he or she determines is appropriate concerning the student in question for consideration by the committee. This might include any special or extraordinary circumstances affecting the student. While an investigation or hearing is underway, an administrative hold may, in situations where necessary, be added to the transcript of the student in question.

In the hearing, witnesses provide information about the possible violation that has been observed and are questioned by the committee. Next, the student in question is called before the committee. The student in question is urged to choose a peer representative who will be present throughout the hearing. Only a current undergraduate member of the University community who is not a member of the Honor Committee may serve as the peer representative. The peer representative may ask questions of all witnesses. Though investigators do not participate in deliberations, they will have an opportunity to contribute information pertaining to the investigation following each witness's testimony. At the conclusion of all testimony, the investigators may, in the presence of the peer representative, present a summary of the case. Before the committee begins deliberations on guilt or innocence, the peer representative and the student in question will have the option of delivering a final defense summary to the committee. The identities of the student in question, reporting witness, and any other student witnesses are kept completely confidential. This helps to ensure that Honor Code-related cases will not lead to prejudice outside the hearing room.

The only adequate defense for a student accused of an Honor Code violation is that his or her actions did not, in fact, constitute a violation. In determining whether an Honor Code violation has occurred or the severity of such a violation, the committee may take into account whether the student should have reasonably understood that his or her actions were in violation of University policy and/or exam room procedures. Neither the defense that the student was ignorant of the regulations concerning the exam nor the defense that the student was under pressure at the time the violation was committed is considered an adequate defense.

The principals and witnesses may be called for testimony several times before the committee renders a judgment. The committee deliberates in private and arrives at a decision by individual vote. If the student is found to have intentionally misled the committee during the course of the hearing, the committee may take that fact into account in reaching a conclusion and assigning a penalty. When a decision is reached, the student in question is called and informed of the judgment. Then the reporting witness is informed of the judgment, thanked for the exercise of a responsibility that is difficult but necessary, and cautioned against discussion of the case. If the student in question is acquitted, all written record of his or her involvement in the case is destroyed. Records of cases that are retained by the committee aid future committees by the precedents they contain, although for the most part the committee is likely to consider each case as unique rather than search for a decision in a similar case.

If a person is found guilty, he or she is informed of the punishment, which is, at the committee's discretion, a one-, two-, or three-year suspension, or in the case of a second offense, permanent expulsion. The committee shall also have recourse, in the presence of extenuating circumstances, to probation up to four years, which becomes a part of the student's permanent record. Only the dean of the college may review the final penalty. An appeal of a decision of the Honor Committee should be directed to the Office of the Dean of the College. Such appeals can only be made on the grounds of procedural unfairness or harmful bias. The penalty levied by the Honor Committee may not be increased upon appeal. If the dean of the college determines that a penalty of the Honor Committee should be reduced, the dean will make a recommendation to the president, describing the reasons for the proposed modification, and the president will decide whether or not to implement the recommendation.

**Constitution of the Honor System**

Adopted by the undergraduates in 1893. Amended in 2010.

**Article I**

1. There shall be a committee consisting of twelve members who shall represent the student body and deal with all cases involving suspected violations of the honor system.

2. The members of this committee shall be the presidents of the first-year, sophomore, and junior classes, former class presidents, and members to be appointed by the committee from the student body at large until the committee consists of twelve members.

3. Every academic year a subcommittee composed of the senior class members of the Honor Committee and the Undergraduate Student Government president shall convene after the first of April to select a sophomore member of the committee to serve as clerk for the committee during the upcoming academic year. This subcommittee will interview all interested sophomore members of the committee and shall appoint one sophomore by a unanimous vote to serve as the clerk of the Honor Committee for the upcoming academic year. This sophomore member will automatically become a member of the committee the following year.

4. The president of the junior class and the former sophomore class president will normally serve until the end of their junior year and will automatically become members of the committee at the beginning of their senior year.

5. The member of the committee who serves as clerk junior year will become chair of the committee during his or her
Undergraduate Announcement

Article I

1. The committee shall have power to summon the student or students in question, witness or witnesses, documents, and articles of material evidence, and to seek to obtain any information bearing on the accusation. Only the seven voting members of the committee who participate in the hearing shall meet to determine whether the student or students in question be guilty or not guilty of violating the honor system.

2. Following the conviction of a student, the voting members of the committee who determined guilt shall meet to determine whether or not a hearing is warranted. If a hearing is not warranted, all records of the case shall be immediately required for such a dismissal.

3. If action of the committee becomes necessary before the selection of this new member or before the fall election of the first-year class president, the members of the committee at that time shall constitute a temporary committee for the particular case with the same regulations of power, procedure, and penalties as adopted in this constitution.

Article II

1. The committee may dismiss a member for neglect of duty. A vote of nine of the eleven other members would be required for such a dismissal.

2. If any member shall for any reason become unable to serve or be dismissed, a new member shall be appointed by the Honor Committee subject to approval by the Undergraduate Student Government.

3. If action of the committee becomes necessary before the selection of this new member or before the fall election of the first-year class president, the members of the committee at that time shall constitute a temporary committee for the particular case with the same regulations of power, procedure, and penalties as adopted in this constitution.

Article III

1. The committee shall have power to summon the student or students in question, witness or witnesses, documents, and articles of material evidence, and to seek to obtain any information bearing on the accusation. Only the seven voting members of the committee who participate in the hearing shall meet to determine whether the student or students in question be guilty or not guilty of violating the honor system.

2. Following the conviction of a student, the voting members of the committee who determined guilt shall meet to determine the penalty. A decision on the penalty shall require a majority vote. The convicted person or persons may not attend this meeting. The committee shall assign a penalty and report it to the dean of undergraduate students. The penalty shall take effect upon imposition by the dean of undergraduate students.

3. Under normal circumstances, individuals convicted of cheating shall be subject to the following penalties in accordance with Rights, Rules, Responsibilities: The first offense will result in a penalty of suspension for one year or, if perjury occurs, suspension for two or three years. The second offense will result in expulsion from the University. In the absence of perjury, the committee shall also have recourse to suspension for two or three years. In all cases, the committee may exercise the option of suspension with conditions and/or censure. When there are extenuating circumstances, the first offense may result in a penalty of probation. Extenuating circumstances include, but are not limited to, instances in which the committee fails to conclude that a student should reasonably have understood that his or her actions were in violation of the Honor Code. Under this probation, a second violation of the Honor Code will result in suspension or expulsion.

4. Under normal circumstances, when a violation requiring suspension occurs during the fall term, the convicted person or persons shall not be eligible to return until the following fall term. When a violation requiring suspension occurs during the spring term, the convicted person or persons shall not be eligible to return until the following spring term. If a senior is involved in a violation during the spring term, the student's degree may be withheld until the spring of the following year. Only the dean of the college may review the final penalty. An appeal of the decision of the Honor Committee should be directed to the dean of the college. Such appeals can only be made on the grounds of procedural unfairness or harmful bias. The penalty levied by the Honor Committee may not be increased upon appeal. If the dean of the college determines that a penalty of the Honor Committee should be reduced, the dean will make a recommendation to the president, describing the reasons for the proposed modification, and the president will decide whether or not to implement the recommendation.

5. Under extreme, exceptional circumstances, the committee may allow a student to complete the term in which the violation occurred and be removed from the University for the following two semesters. In such cases the Honor Committee would recommend that the student receive a failing grade in the course in which the violation occurred.

Article IV

1. The place and time of all hearings shall be determined by the chair of the committee.

2. The hearing shall be conducted in the following manner with the chair presiding. The reporting witness will first report his or her suspicion to the committee. Additional witnesses may also appear before the committee. The student in question will then be heard and given the opportunity to present evidence and witnesses. Members of the committee may ask questions at any point, seek additional materials or testimony, visit any relevant location, recall or review evidence or testimony provided earlier, and in general seek to obtain any information bearing on the accusation. Investigators will have an opportunity to contribute information pertaining to the investigation following each witness's testimony. At the conclusion of all testimony, the investigators may, with the peer representative present, present a summary of the case. The committee will deliberate in private, and a determination that the honor code has been violated shall require the presence of overwhelmingly convincing evidence. Documented evidence and plausibility of method, in the absence of demonstrated intent, may be enough to convict.

3. On a rotating basis, the chair shall appoint two members of the committee to conduct a preliminary investigation. After conducting this preliminary investigation, the two investigators in consultation with the chair shall determine whether or not a hearing is warranted. If a hearing is not warranted, all records of the case shall be immediately

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destroyed. If a hearing is warranted, the student in question is urged to choose a peer representative. Only a current undergraduate member of the University community may serve as the peer representative. The peer representative may present a summary of the case prior to the committee's deliberations. The investigators will, at the conclusion of the hearing, write a casebook summary and/or the summary directed to the dean of undergraduate students.

4. The chair will preside over each case and will select six available members to hear each case. The number of votes necessary for conviction shall be as follows: six of seven, or seven of seven.

5. All evidence shall be procured in every case, and in no event shall a student be tried a second time for the same offense, except in light of new and important evidence to be determined by a majority vote of the committee. The testimony of one individual by itself shall not be sufficient to warrant another hearing.

6. The student in question shall learn of the charges brought against him or her through a letter, which need not be signed, written in some reasonable detail by the witness who reported the suspected violation. The investigators shall explain the charges and enumerate the rights of the student in question as hereinafter provided in Article IV, Section 7. The student in question shall be asked to sign a statement prior to a hearing saying he or she has been informed of his or her rights under the Honor Code Constitution. Upon receipt of the letter of accusation, the student may exercise his or her right of up to seven days of preparation for the Honor Committee hearing.

7. The rights of the student in question shall include:
   a) The right to have a witness present during the initial interview with investigators;
   b) the right to review in advance all documents constituting direct material evidence;
   c) the right to call witnesses;
   d) the right to have a representative from the Office of the Dean of Undergraduate Students serve as a procedural adviser prior to the hearing to advise the student in question of matters concerning Honor Committee procedures;
   e) the right to choose a current undergraduate member of the University community to serve as a peer representative to speak on the behalf of the student in question and to question all witnesses. The student in question may not serve as his or her own peer representative;
   f) the right, in the event of a conviction, to receive a copy of a summary statement of the grounds for the committee's decision, and to poll the votes of the individual committee members; this summary statement must outline the charge made against the student, describe the evidence and testimony provided in support of this charge, and provide the rationale for the committee's finding, both in terms of verdict and punishment assigned; and
   g) the right, in the event of a conviction, to receive a record of the hearing.

8. It is incumbent upon the Honor Committee members to investigate all possible connections between the student in question and all witnesses, and any potential ulterior motives involved in the case, while protecting the confidentiality of all parties involved.

9. All those involved in the investigation and hearing process are expected to maintain the confidentiality of all persons involved in the case.

Article V

1. Violations of the honor system shall consist of any attempt to receive assistance from written or printed aids, or from any person or papers, or of any attempt to give assistance, whether the one so doing has completed his or her own work or not. This rule holds both inside and outside of the examination room. Other violations include, but are not limited to, any attempt to gain an unfair advantage in regard to an examination, such as tampering with a graded exam or claiming another's work to be one's own.

2. Violations shall also consist of obtaining or attempting to obtain, previous to any examinations, copies of the examination papers or the questions to appear thereon, or to obtain any illegal knowledge of these questions.

3. Termed perjury, lying before the committee or purposely misleading the committee shall also constitute a violation of the Honor Code.

4. Any undergraduate not signing the pledge placed upon the examination paper will be notified by the instructor holding the examination, and, if unable then to sign, he or she will be reported to the committee for investigation. Inability to sign the pledge to an examination paper upon notification by the instructor or by the committee shall be prima facie evidence of violation of the honor system.

5. The pledge is as follows: "I pledge my honor that I have not violated the Honor Code during this examination." This must at all times be written in full and signed by the student.

6. Every student is obligated to report to the Honor Committee any suspected violation of the Honor Code that he or she has observed.

Article VI

1. The committee may use recording devices to tape the proceedings of each case.

2. The committee will keep a written record of all cases acted upon. These records, together with the constitution, shall be preserved by the chair of the committee each year, for the instruction of the committee. In the case of an acquittal, all record of a person's involvement is destroyed.
Article VII

The constitution may be amended (a) upon the initiative of ten of the twelve members of the committee, followed by a three-fourths vote of the Undergraduate Student Government members present at a meeting of the Undergraduate Student Government; or (b) upon the initiative by petition of 200 members of the undergraduate body, followed by a three-fourths vote in a student referendum as conducted by the Elections Committee of the Undergraduate Student Government. Article VII can be amended only by a student referendum.

Article VIII

The constitution shall be published during the first week of each college year. It shall also be printed in Rights, Rules, Responsibilities, copies of which shall be issued to all students upon matriculation at the University, as well as to new members of the teaching staff. Article V of this constitution shall be published immediately before midterm and final examinations begin.
**Advising**

**Academic Advising**

Academic advising of undergraduates in the A.B. program is centered in the six residential colleges. The dean and director of studies in each college have primary responsibility for the academic advising of freshmen and sophomores and for the non-departmental academic advising of juniors and seniors, whether or not they continue to reside in the colleges. Every freshman in the A.B. program is assigned to a faculty adviser who assists with course selection and other academic matters throughout the year, and who normally continues as the student's adviser through the sophomore year. Freshmen in the B.S.E. program are advised by faculty members in the School of Engineering and Applied Science. Each B.S.E. sophomore is assigned an adviser whose area of specialization matches the student's area of interest. In the upperclass years, all students are advised by members of their academic departments who also supervise their junior and senior independent work.

All students are encouraged to make full use of the academic resources of the University and to seek advice on specific academic matters from professors and departmental representatives in their particular areas of interest. The masters, deans, directors of studies, and directors of student life in the residential colleges are available for academic advising and for counseling about matters pertaining to other aspects of undergraduate life. The staff of the Office of the Dean of the College is available for discussion of academic questions or problems, and the staff of the Office of the Dean of Undergraduate Students is available for discussion of questions about undergraduate life outside the classroom.

**Residential College Advisers**

Every year approximately 80 students are selected to serve as residential college advisers (RCAs) who live in each of the six colleges. Under the supervision of the college masters and directors of student life, the RCAs are responsible for advising freshmen and sophomores on many aspects of University life, including those related to diversity and multiculturalism. RCAs are assigned approximately 12 to 15 freshman advisees, whom they assist in their adjustment to the University. They are also available to sophomores who wish to seek the counsel of an older student. While the RCA is immediately responsible for the first- and second-year students in his or her advising area, he or she also works as part of a small adviser team in order to combine adviser's strengths and give the students a choice of advisers in whom to confide. During the year, RCAs are expected to initiate a variety of activities, to facilitate friendships among advisees, and to foster a safe, inclusive, and welcoming community within the college. Through programming and counseling efforts, the RCA also promotes the community's sensitivity toward the experience of underrepresented groups, as defined by ethnicity, race, religion, disability, sexual orientation, and other personal characteristics. RCAs are familiar with University resources and can refer students to appropriate people and offices as necessary.

**McGraw Center for Teaching and Learning**

Princeton is a community of teachers and learners, and the McGraw Center for Teaching and Learning [http://www.princeton.edu/mcgraw/] located on the third floor of the Frist Campus Center, is a resource for all undergraduates, as well as graduate students and faculty. The center offers workshops and individual consultations to support undergraduates as they make critical academic transitions, confront new academic challenges, and develop as learners. Workshops focus on processes of learning and individual consultations assist students in designing integrated sets of strategies that enable them to take full advantage of lectures, precepts, and readings.

McGraw's Study Hall @ Frist offers academic support in a number of introductory courses with a quantitative emphasis. Experienced, trained undergraduate tutors are available four evenings a week to guide students through learning strategies for course material, thinking through problem sets and the concepts underlying them, and preparing for exams. Study Hall also provides a good space for study groups to meet, or for informal group work with classmates. The McGraw Center also works closely with the residential colleges to organize targeted course support (e.g., weekly collaborative problem solving groups for introductory chemistry, physics, math, and economics).

**The Writing Center**

The Writing Center [http://www.princeton.edu/writing/center/] offers student writers free, one-on-one conferences with experienced fellow writers trained to consult on assignments in any discipline.

Located in South Baker Hall, the Writing Center welcomes all Princeton students, including: undergraduates working on essays for courses; juniors and seniors working on independent research projects; international students not used to the conventions of American academic writing; graduate students working on seminar papers or dissertations; students writing essays for graduate school applications or fellowships; and students crafting oral presentations.

Writing fellows can help with any part of the writing process: brainstorming ideas, developing a thesis, structuring an argument, or revising a draft. The goal of each conference is to teach strategies that will encourage students to become astute readers and critics of their own work. Although the Writing Center is not an editing or proofreading service, fellows can help students learn techniques for improving sentences and checking mechanics. Writing Center conferences complement, but do not replace, the relationships students have with their teachers and advisors.

Appointments may be scheduled online.

**Counseling and Psychological Services**

[http://www.princeton.edu/ua/]
Counseling and Psychological Services (CPS) is a division of University Health Services (UHS) that serves as a focal point for students' mental health concerns and provides psychological and psychiatric care for all students. CPS is located on the third floor of McCosh Health Center, (609) 258-3285. CPS collaborates with students to help them overcome difficulties that may interfere with the accomplishments of their educational, personal, and other life goals. CPS strives to provide students with opportunities to develop greater self-understanding, identify and solve problems, and improve academic performance through the alleviation of psychological, emotional, and cognitive impediments. In addition to direct clinical services, CPS also seeks to promote mental health and wellbeing through outreach activities, partnerships, and consultation with faculty, staff, parents, and many campus agencies. CPS offers a range of time-sensitive psychological and psychiatric services that attempt to balance the unique needs of individual students with the broader demands of a diverse campus community. Service offerings include psychological evaluations, short-term psychotherapy, and referral; psychopharmacological assessment and medication follow-up; on-call services; campus psychoeducation and community consultation; and urgent care assessment and intervention. More information about facilities and services is provided at the UHS [http://www.princeton.edu/uhs/] website.

**International Students**

Princeton welcomes students from across the globe. Currently, students from more than 95 countries are enrolled at the University. The particular needs of Princeton undergraduates who are citizens of other countries are the concern of the Davis International Center. The center's associate director for student programs is responsible for the issuance of immigration documents and the maintenance of the legal status of non-U.S. citizens. The associate director also coordinates and implements the annual pre-orientation program designed for first-year students from abroad.

Following matriculation, the staff of the Davis International Center works closely with academic advisers, the residential college staff, the Financial Aid Office, and other related University offices to continue to provide support for students as they transition into the University community.

**Career Services**

Staff members in the Office of Career Services assist undergraduate and graduate students and alumni in exploring their career-related interests and developing effective strategies when searching for summer or permanent employment, seeking admission to graduate schools, or changing careers. In addition to individual counseling, the staff conducts and hosts an assortment of workshops and industry panels to prepare students to effectively pursue post-college goals. Additional services include: career and self-assessment inventories and computer-assisted career exploration programs; the hosting of business, law, and other graduate school admissions visits to campus; information on corporate and nonprofit organizations; an On-Campus Recruiting Program for current undergraduate and graduate students seeking summer and permanent employment; sponsorship of career and graduate school fairs; access to alumni through the Princeternship career exploration program and the Alumni Careers Network; and online internship, fellowship, and employment listings. Additional resources and guides for a variety of post-graduation options are available through the Career Services [http://www.princeton.edu/career] website.

**Advising for Major Fellowships**

Responsibility for advising for major fellowships rests with the director of fellowship advising, who is located in the Office of International Programs. Designated faculty members and administrators are available to counsel students who are interested in applying for the Churchill, Dale, Deutscher Akademischer Austauschdienst, Fulbright, Gates, Goldwater, Hertz, Labouisse, Luce, Marshall, Mitchell, National Science Foundation, Rhodes, Rotary, Sachs, Truman, and other scholarships or fellowships. All except a handful like the Dale, Labouisse, and Sachs, which are available only to Princeton seniors, are awarded on the basis of national competition. Applications are generally made early in the fall of the senior year, except for the Rotary fellowships, for which students in any year may apply; the Goldwater scholarships, which are available to sophomores and juniors; and the Truman scholarships, which are available only to juniors. Further information and the names of the advisers for each fellowship are available from the Office of International Programs [http://www.princeton.edu/quip/home/].

**Preparation for Teaching**

The Program in Teacher Preparation, 41 William Street, provides information and advice on the numerous pathways to enter teaching at the secondary level, in both public and private schools. Students should visit the office or consult the program's website [http://teacherprep.reuniontechnologies.com/] for information about Princeton's undergraduate program and the courses required for certification to teach in the public schools.

Students considering teaching either as summer interns during college or full time after graduation should confer with a program staff member. Information on a wide range of teaching opportunities is available in the office files and the office provides workshops to help students find teaching jobs. Seniors should inquire at the office for information on job opportunities.

**Preparation for Graduate Study**

In general, for admission to a Ph.D. or academic master's degree program in a particular discipline, candidates must show scholarly distinction or definite promise in their undergraduate studies in that discipline or in a closely related one. Moreover, as fields of study become more interdisciplinary in nature, applicants from a relatively wide variety of disciplinary backgrounds may be encouraged to apply. (Check directly with the department or program.) Graduate programs normally require official transcripts of all prior undergraduate and previous graduate work, three letters of recommendation from faculty who know the applicant well, a detailed statement of academic purpose, and scores from the Graduate Record Examination General Test. Individual departments may additionally require scores from a relevant subject test. International students whose native language is not English may be asked to take and submit scores from an English language test such as TOEFL or IELTS, or may be required to submit a "proficiency in
Students applying to joint Ph.D. and professional school programs may also be asked to take the GMAT or LSAT, or other similar exam. Many programs also require a reading knowledge of at least one foreign language. Increasingly, graduate admissions committees require, in the case of humanities and social science disciplines, samples of the applicant's written work and, in the case of science and engineering disciplines, evidence of prior research experience.

Students intending to pursue graduate studies should seek guidance from faculty advisers and departmental representatives early in their undergraduate careers, preferably in their sophomore year as they consider their choice of major, and certainly no later than the beginning of their junior year.

**Preparation for Law School**

The staff in the Office of Career Services maintains extensive information on law schools, including requirements for admission, scholarships, joint degree programs, specializations, and admission statistics. Acceptance results are updated annually and include median GPA and Law School Admissions Test (LSAT) scores for matriculated or admitted Princeton applicants. Prelaw programs include fall and spring orientations, guest lectures, panel presentations, admission representative visits, and individual counseling sessions with the prelaw adviser.

A database of alumni volunteers in the legal profession (Alumni Careers Network) is maintained by Career Services for those students who wish to speak directly with practicing lawyers about their law school experience and/or legal careers.

Admission to the better-known law schools is highly competitive, and a strong scholastic record is desirable. Because there is no specific "prelaw" course of studies, students may pursue their own academic interests. Applicants are urged to review the "Prelaw"; material under the Graduate School section of the Career Services website.

**Preparation for Business School**

The Masters in Business Administration (MBA) is a professional degree that provides course work and training in a variety of business disciplines. Most full-time MBA programs are two years. While there are a number of institutions that offer the MBA, the more competitive universities do not commonly accept applicants without several years of relevant post-undergraduate work experience.

Business schools do not require a specific undergraduate course of study. However, they do place value on well-developed oral and written expression, and demonstration of analytical and quantitative abilities. Applicants should also possess experience gained from internships, study abroad, fellowships, or post-college employment.

The Graduate Management Admissions Test (GMAT) is required for many schools, and students often take the exam at some point in their senior year. The score for this test is valid for a period of five years, and there are official test centers throughout the world where the test may be administered. It should be noted that the test measures skills and abilities that have been developed over time. Because there is some emphasis on verbal and quantitative abilities, students should consider these factors as they plan their academic curriculum.

Students considering an MBA should make use of the individual counseling, library resources, panel presentations, and admission representative visits that are available at Career Services. Additional business school information can be found in the Graduate School section of the Career Services website.

**Preparation for Medical, Dental, and Veterinary School**

The Office of Health Professions Advising encourages all students who are considering a career in the health professions to familiarize themselves with the resources of the office as soon as possible. A strong application will demand careful planning, both of one's curriculum and one's academic year and summer activities.

Health professional schools require for entry a set of science courses that must be taken, regardless of major:

- Chemistry 201(207)-202, or 215 (if one unit of AP)
- Organic Chemistry
- Ecology and Evolutionary Biology 211 and Molecular Biology 214 or 215
- Physics 101-102 or 103-104

Students with advanced placement in any of the areas above should contact their dean or director of studies about possible substitution.

In addition, two semesters of English (which may also be comparative literature or literature in translation) and two semesters of mathematics are required. The premedical requirement in mathematics may be satisfied by completing calculus through Mathematics 101-102 or 103. It is recommended that students who complete Mathematics 103 at Princeton (or who receive the equivalent AP credit) also take either Mathematics 104 or a course in computer science or statistics, with the approval of a health professions adviser. A copy of "Planning for a Career in the Health Professions" is available in the Office of Health Professions Advising or on its website.

http://www.princeton.edu/ua/
Special Features of the Undergraduate Program

Structure of the Program of Study

Instruction is offered at Princeton during the fall and spring semesters. Each semester lasts 15 weeks, and consists of 12 weeks of scheduled classes, a 10-day reading period, and an 11-day final exam period.

Term-Time Instruction

Most social science and humanities courses feature two hours of class lectures and an hour-long preceptorial each week. Alternatively, courses meet for two 90-minute sessions, which incorporate significant class discussion. The weekly preceptorial supplements the lectures and is intended to provide an opportunity for wide-ranging exploration of the subject matter of the course in a small-group setting. The role of the preceptor is neither to lecture nor to test the student's ability to marshal facts but rather to encourage each member of the group to grasp and evaluate the subject and its implications. Members of the faculty of all ranks serve as preceptors, as do selected graduate students. Precept participation is regarded as an integral component of a course and, as such, can influence a student's grade to a significant extent.

Many courses in the sciences and engineering also feature laboratory work. Laboratory meetings provide an opportunity for the interchange of ideas between the students and the instructor. Working in small groups and under faculty supervision, students investigate the underlying principles of the subject they are studying and gain firsthand experimental knowledge of scientific methods.

In addition to the more standard courses described above, students may also participate in specially designed courses that offer a variety of different formats. These include:

Reading Courses

With the support and guidance of a faculty member, a student may propose a reading course in an area not normally offered as a regular part of the curriculum if it complements his or her academic program. Such courses are set up as tutorials and count as regular courses. Students develop syllabi for such courses in consultation with the instructor, and are expected to meet weekly with the instructor--generally for two to three hours per week. Such courses are not a rubric for departmental independent work. They do not satisfy distribution requirements but may be counted as departmental courses. Students are normally limited to one per term. Students interested in applying for a reading course must do so through the Office of the Dean of the College.

Seminars

Seminars are offered in numerous departments and interdisciplinary programs. They have limited enrollment, usually by application, and they emphasize active participation by students in the investigation of a particular topic or problem. Seminars are most commonly offered as upper-level courses, except for the freshman seminars and the writing seminars, designed specifically for entering students. The Program of Freshman Seminars in the Residential Colleges offers approximately 75 seminars a year in the humanities, the social sciences, the natural sciences, and engineering.

Student-Initiated Seminars

Students may propose seminars on topics of special interest to them to the Faculty Committee on the Course of Study. In making such applications, the initiators develop reading lists and formal structures for the course and solicit the participation of a member or members of the faculty. If approved, student-initiated seminars count as regular courses within an individual's program of study. They do not satisfy distribution requirements. Inquiries should be directed to the Office of the Dean of the College.

Recent seminars have been offered on the following topics: "Southeast Asia," "Women's Issues in a Global Context," "Contemporary American Indians," "Computer Animation," "Toward an Ethical CO2 Emissions Trajectory for Princeton," and "Farm to Fork: The State of America's Food System Today."

Reading Periods

A period of approximately 10 days immediately preceding final examinations in each term is set apart to give students time in which to consolidate course work or to extend reading and investigation in accordance with their interests. The "dean's date" for final submission of written work (term papers, lab reports, final projects) falls on the last day of reading period. Individual faculty members may choose to continue instruction during reading period.

Final Examination Periods

The registrar schedules final examinations at the end of each term for all courses offering such an exercise. Students should plan to be available on campus throughout the examination period and should not make any plans to be away from campus until the final exam schedule has been published.
Advanced Placement

The advanced placement policy at Princeton is designed to give recognition to college-level academic achievement prior to matriculation and to allow students to pursue their studies at a level appropriate to their preparation.

There are two bases on which individual departments may award advanced placement: (1) official score reports from Advanced Placement Examinations, College Board SAT Reasoning Test and SAT Subject Tests, the International Baccalaureate higher level, or British A-level examinations. (Please note: No student test scores will be recorded post-graduation.) (2) Results of placement tests offered by departments at Princeton. Departmental placement tests are offered in foreign languages, physics, and chemistry prior to course registration in September.

Students normally will not receive advanced placement for college courses taken prior to matriculation unless they take an approved standardized examination or a placement test offered by the appropriate department at Princeton.

The advanced placement policy for most departments appears in the departmental information sections of this catalog.

The principal features of advanced placement are:

1. A student who has been granted advanced placement by Princeton may enroll in appropriate advanced courses. The advanced placement is granted whether or not the student decides to enroll in such courses. If a student takes a course deemed equivalent to one for which advanced placement was granted, the student forfeits the use of the advanced placement unit(s) for advanced standing at Princeton.

2. Advanced placement in a foreign language, that is, placement in a 200-level course, satisfies the A.B. foreign language requirement.

3. Advanced placement cannot be used to fulfill the University writing or distribution requirements. Students who have two units of advanced placement in biology, chemistry, or physics will have the option of taking one science and technology laboratory course and one upper-level science and technology course without laboratory from an approved list of STX courses, instead of two introductory laboratory courses, to fulfill the distribution requirement in science and technology. Students who elect this option may not take a laboratory course deemed equivalent to one for which the science advanced placement was granted.

4. Advanced placement cannot be used to make up course deficiencies or to reduce the course load during a given semester.

5. Advanced placement can be used to reduce the number of terms needed for graduation, provided that the student is eligible for advanced standing. Eligibility depends upon the number and the subject areas of the advanced placement units presented by the student. An advanced placement unit is the equivalent of one Princeton course, except in foreign language, where the maximum number of advanced placement units is two, regardless of the number of Princeton courses that are replaced. Students may apply for advanced standing under the following conditions:

   a) Candidates for the A.B. degree who have eight advanced placement units (equivalent to eight Princeton courses) will be eligible to apply for one year of advanced standing. These eight units must be distributed in at least three subject areas. (Subject areas are defined as foreign languages; historical analysis; literature and the arts; quantitative reasoning; science and technology; social analysis.)

   b) Candidates for the A.B. degree who have four advanced placement units (equivalent to four Princeton courses) in at least two subject areas will be eligible to apply for one term of advanced standing.

   c) Candidates for the B.S.E. degree who have eight advanced placement units, among them two in physics, two in mathematics, and one in either chemistry or computer science, will be eligible for a full year of advanced standing.

   d) Candidates for the B.S.E. degree who have four advanced placement units, including two in physics, one in mathematics, and one in chemistry or computer science, will be eligible for one term of advanced standing.

Advanced Standing

Students who have been granted sufficient advanced placement to qualify for advanced standing may apply to the Faculty Committee on Examinations and Standing for graduation in either three years or with three and one-half years of study. Students must submit applications for a year of advanced standing no later than the beginning of spring semester of the freshman year and must use the advanced standing prior to the start of the junior year.

Students eligible for one year of advanced standing may apply to become second-semester sophomores in the spring of their first year of residence, or first-term juniors in the fall of their second year of residence. The Faculty Committee on Examinations and Standing will review the academic records of all applicants to determine the appropriateness of graduating in three years and to verify that the minimum grade requirement established by the committee has been met. The committee may rescind advanced standing if, in its judgment, the student has not made satisfactory academic progress. Students who apply for one year of advanced standing normally will have completed the writing requirement, the foreign language requirement, and all prerequisites for concentration in a department before the start of their second year of residence.

Students eligible for one term of advanced standing may apply to spend one term of their sophomore year away from the University. The Faculty Committee on Examinations and Standing will review the academic records of all applicants to determine the appropriateness of completing the degree requirements in three and one-half years of residence and to verify that the minimum grade requirement established by the committee has been met. Freshmen who expect to be away in the fall term of the sophomore year should meet with their residential college dean or director of studies by April 1 to discuss their plans; those who expect to be away in the spring of the sophomore year should discuss their plans with their residential college dean or director of studies by December 1 of the sophomore year.
Community-Based Learning Initiative

The Community-Based Learning Initiative (CBLI) [http://www.princeton.edu/~cbli/] is a curricular effort to connect students' academic work with their interest in and concern for the communities around the University. CBLI's mission is to make learning itself a genuine form of service. Community-based learning enriches course work by encouraging students to apply the knowledge and skills learned in the classroom to the pressing issues that affect our local communities. Working with faculty members and community leaders, students develop research projects, collect and analyze data, and share their results and conclusions, not just with their professors, but also with organizations and agencies that can make use of the information. Students can do such community-based work both in courses and, in a more in-depth manner, as part of junior independent work or the senior thesis.

Early Departmental Concentration

A student may begin to concentrate in a department in the sophomore year. Early concentrators who are qualified to do so engage in independent work during the second term of the sophomore year in addition to the usual four courses. Participation in early concentration does not bind students to a department, and they are free as juniors to enter any other department for which they may be qualified. A grade for the junior paper written in the sophomore year will appear on the transcript. This grade will remain on the transcript even if the student ultimately enters a different department. A student interested in this option should discuss course selection and independent work topics with the appropriate departmental representative and the residential college dean or director of studies.

Independent Concentration

Students with academic interests that cannot adequately be served by existing departmental concentrations and interdepartmental programs may apply to the Independent Concentration Program. An independent concentrator designs a rigorous and coherent program of studies with the support of at least two faculty advisers, choosing eight or more upper-level courses in the major field. The applicant for the program must have a strong overall academic record and is expected to develop a sound rationale for his or her concentration. Independent concentrators must fulfill the writing, foreign language, and distribution requirements. Individual proposals are submitted to the Faculty Committee on Examinations and Standing for approval. Inquiries should be directed to the Office of the Dean of the College. Applications are due by April 1.

Independent Work

Junior and senior independent work are defining features of undergraduate education at Princeton. Junior independent work in the A.B. program varies by department and may include a single long paper or project or a series of essays or projects. The junior paper is a valuable preliminary exercise for the senior thesis since it provides most students with their first experience of significant independent or original research in a specialized field. Several B.S.E. departments also offer opportunities for independent work in the junior year.

In the senior year, each A.B. student and most B.S.E. students complete a senior thesis or a substantial independent research project. The thesis gives students the opportunity to pursue original scholarship on topics of their own choice under the guidance of faculty advisers.

A copy of each senior thesis is forwarded to the Seeley G. Mudd Manuscript Library to be stored for archival purposes. University policy gives researchers access to theses on deposit in Mudd Library. Fair-use copying, as defined by copyright law, is allowed for all theses on deposit.

Auditing a Course

A student is permitted to audit one or more courses in any term. Prior to enrolling in a course on an audit basis, a student should discuss with the course professor the requirements for receiving audit credit. This typically involves writing a course paper or successfully completing the final examination, but requirements vary from course to course. If the requirements are satisfied, the course will appear on the transcript with the grade of "Audit." If a student fails to meet the audit credit requirements, the course is automatically dropped from the student's academic record. Courses completed in this way may not be included in the basic departmental program of study, may not be used to satisfy University distribution requirements, and do not count toward the number of courses required for graduation, for advancement to the next year of study, or for the minimum number of courses needed in a term.

Graduate Courses

Undergraduates of high academic standing are encouraged to enroll in graduate courses that are well suited to their programs of study. A student wishing to enroll in a graduate course should obtain approval from the instructor of the course, as well as from the appropriate departmental representative and dean. Undergraduates must submit written graded work for graduate courses, and all assignments must be complete by dean's date unless prior approval for an extension is granted by a residential college dean. Graduate courses do not satisfy undergraduate distribution area requirements.

Study Abroad Program

http://www.princeton.edu/ua/
The Study Abroad Program [http://www.princeton.edu/oip/sap/] enables qualified students to spend either one term or a full academic year abroad for Princeton credit. The program is open to spring term sophomores, juniors in either or both terms, and fall term seniors. Students pursue their academic interests and enhance their understanding of another culture by studying at a foreign university, in an American college or university program abroad, or with an approved foreign study group. To qualify, an applicant must meet the minimum grade requirement established by the Faculty Committee on Examinations and Standing, specifically a grade point average of 3.00 for the two semesters prior to studying abroad, and present evidence of competence in a foreign language when applying to most programs in non-English-speaking countries. Approval to study abroad may be withheld because of an unsatisfactory University disciplinary record. Students on financial aid at Princeton will continue to receive aid while participating in the Study Abroad Program.

Students should discuss their proposals for study abroad with the staff of the Office of International Programs [http://www.princeton.edu/oip/] and, when appropriate, with their departmental representative, no later than the beginning of the term prior to the proposed period of foreign study. The Faculty Committee on Examinations and Standing approves requests for study abroad. The deadlines for submitting proposals for study abroad are May 1 for students applying to study abroad for the fall and full year and November 1 for sophomores and juniors applying to study abroad for the spring term.

Students must submit a written statement that explains the reasons for wishing to study abroad, a list of proposed courses, and, if an upperclass student, a plan for completing independent work. Foreign study during upperclass years is generally compatible with departmental programs and objectives. As part of the application process, the departmental representative must approve the program of study and arrangements for completing independent work.

Credit for study abroad depends on the completion of approved courses with the grade of C or better, as certified by a transcript or similar report. Independent work, if required, must also be submitted by the assigned deadline.

Study abroad for Princeton credit is also possible during the summer either through Princeton-sponsored programs or in programs offered by other institutions, provided the courses that are taken have been preapproved. International experiences also can be pursued through the International Internship Program [http://www.princeton.edu/oip/iip/], which offers summer placements around the world.

Off-Campus Study--Field Study

The Field Study Program allows a very small number of students per term either to work full time or conduct full-time research in areas closely related to their academic interests. Field study substitutes for one term at Princeton. Students accepted in the program who wish to pursue a work experience are expected to hold responsible positions in a government agency or private firm or organization; they must secure the position themselves and may undertake nonpaying as well as salaried work. Individual projects differ widely; recent ones have included campaigning in local elections, conducting biological research in a private laboratory, and interning in a congressional office. The academic component of a field study proposal is as important as the job assignment. Students are expected to work closely with an academic adviser, both in preparing proposals and while engaged in the program, and will normally complete several papers or projects analyzing their experiences and demonstrating their knowledge of the relevant theoretical literature.

Field study applications are available from the Office of the Dean of the College [http://www.princeton.edu/odoc/]. Proposals should be developed in consultation with the academic adviser and the academic dean responsible for the program. Admission to the program is granted by the Faculty Committee on Examinations and Standing. Applications are due by May 15 for fall-term proposals and by December 1 for spring-term proposals.

Off-Campus Study--Rutgers/Princeton Theological Seminary/Westminster Choir

On recommendation of the dean of the college, students may take courses at any of these three schools for Princeton credit and free of charge if such courses are not offered at Princeton. Courses taken at these schools do not satisfy distribution area requirements, but they may be used to satisfy departmental requirements and do count toward the number of courses needed in a term, to advance to the next year of study, and to meet the overall number of courses needed to graduate.

Off-Campus Study--Full-Time Study at Other U.S. Colleges and Universities

In exceptional circumstances, one term of academic study in the junior year or the fall term of senior year at another college and university in the United States may be counted toward the Princeton degree. Such approval is rarely granted and is restricted to those situations in which a student's program of study cannot be met by Princeton courses.

Students wishing to explore this option must obtain the approval of their departmental representative and present a proposal to the Faculty Committee on Examinations and Standing prior to enrolling at another school. Under no circumstances will permission be granted retroactively.

Off-Campus Study--Individual Courses at Other U.S. or Foreign Schools

Students may, with prior approval, take courses at other accredited four-year colleges and universities in the U.S. to remove course deficiencies, satisfy certain distribution area requirements, and, with special permission, satisfy departmental or program requirements. These courses may be taken either during the summer or in terms when the student is not enrolled at Princeton. Except for students participating in special programs, such as study abroad, an A.B. student may take no more than three of the 31 courses required for graduation at another school, while a B.S.E. student may take no more than four of the required 36 at another school. All such courses must be approved by a residential college dean or a director of studies prior to enrollment. Courses taken at other schools under these provisions will not under any circumstances reduce the number of terms of study needed to graduate from Princeton.

http://www.princeton.edu/ua/
student may not take more than two such courses in a given summer and may not enroll in such courses while simultaneously taking courses at Princeton. Applications for course approvals are available in the residential college offices.

Students may, subject to these same provisions, enroll in courses in foreign countries for Princeton credit. Students taking courses in other countries must obtain the prior approval of their departmental representative and Dean Nancy Kanach in the Office of International Programs [http://www.princeton.edu/oip/].

**University Scholar Program**

The University Scholar Program is designed for a small group of students with outstanding and demonstrated talent in an academic or creative area that requires a substantial commitment of time and that cannot be pursued within the regular curriculum. Applicants are asked to submit a statement describing in detail the studies they propose to carry out to the Faculty Committee on Examinations and Standing. Normally, students are not admitted to the program until they have successfully completed their first year. The requirements for admission to the program are:

1. Evidence of outstanding scholastic achievement and a strong academic record at Princeton.
2. Evidence of exceptional talent and accomplishment in an academic or creative field the student wishes to pursue either within or outside the field of his or her concentration.
3. A program of study that does not fit within the requirements of the normal curriculum.
4. Strong support of the student's program by three faculty members, one of whom will serve as adviser.

A University scholar completes the normal departmental program but may have a reduced course schedule in any given term. A candidate for the A.B. degree may, with the approval of the Faculty Committee on Examinations and Standing, be exempt from some distribution requirements and from the foreign language requirement. Comparable privileges are extended to University scholars who are candidates for the B.S.E. degree, including the opportunity to begin departmental work in the freshman year.

An interim University scholar holds appointment for one term only, in order to pursue special projects while carrying a reduced course load. He or she is not relieved of University requirements. The application procedure is the same as for the regular program described above. Further information is available in the Office of the Dean of the College [http://www.princeton.edu/odoc/].

A University scholar must complete a minimum of 25 Princeton courses (with a minimum of three courses in each term of the first three years and a minimum of five courses in the senior year). A University scholar who is eligible for advanced standing may take only one term away from Princeton and must complete a minimum of 22 courses at Princeton.

**Graduation and Honors**

The degree of bachelor of arts is awarded to undergraduates who have completed the A.B. program of study, including departmental concentration. The degree of bachelor of science in engineering is awarded to students who have completed the requirements of the B.S.E. program of study, including departmental concentration.

**Honors**

Honors are awarded at graduation by the departments of concentration. Departments determine honors on the basis of the grades received by the student in departmental studies in the sophomore, junior, and senior years (including junior independent work, the senior thesis, and, for students in the A.B. program, the senior departmental examination). Each department chooses the weight to be assigned to the various components in the honors calculation. The degree may be awarded with honors, high honors, or highest honors.

**Phi Beta Kappa**

The Phi Beta Kappa Society, founded in 1776 and the oldest of all national honorary scholastic societies, has a chapter at Princeton. Election to this chapter is based on scholastic standing and is open to candidates for the A.B. and B.S.E. degrees in their senior year. The chapter generally includes in its membership the highest-ranking tenth of each graduating class. A small group is elected in the fall of the senior year based on their academic record in the first three years; a larger group is elected at the end of the senior year and is inducted at a ceremony on Class Day.

**Sigma Xi**

The Society of Sigma Xi was founded in 1866 to encourage scientific research. The society has a chapter at Princeton, to which members and associate members are elected annually. Election to associate membership is based on promise of marked achievement in scientific research, as judged not on the basis of classroom work but by actual research attempted. Each year a number of seniors meet this requirement in their thesis work. Election to full membership is based upon positive accomplishment in research, as evidenced, for example, by published work.

**Tau Beta Pi**

The Tau Beta Pi Association, a national engineering honor society founded in 1885 to offer appropriate recognition for
superior scholarship and exemplary character to technical students and professional persons, has a chapter at Princeton. Engineering students whose academic standing is in the upper eighth of the junior class or the upper fifth of the senior class are considered for membership.

**Commencement Speakers**

The Valedictory and the Latin Salutatory are awarded by vote of the faculty to two of the highest-ranking members of the graduating class. The special qualifications of a student as valedictorian or salutatorian are taken into account as well as scholastic standing.
Academic Standing and Regulations

In keeping with a liberal arts philosophy, Princeton students are expected to be fully engaged members of an intellectual community, immersing themselves in the simultaneous study of a variety of disciplines before concentrating in one academic department. A Princeton undergraduate degree is grounded in a common experience of full-time residential study. The curriculum is designed in such a way that all students carry a similar course load and make adequate progress toward the degree (as described below). The first two years of study prepare students for the required independent work in the department of concentration, which is the hallmark of a Princeton education. Students are expected to be active participants in their education; the development of critical study and life skills, such as working independently, managing competing obligations, and completing work in a timely fashion, is an essential educational goal. Students are expected to observe all University deadlines (as described below) and may not carry incompleted courses into a subsequent semester. Undergraduates pursuing an A.B. degree must complete all required junior independent work and a minimum of 24 courses before beginning senior year and embarking on the senior thesis; all B.S.E. students must complete a minimum of 26 courses, to include any independent work, before beginning senior year.

The following provisions provide the basic framework for undergraduate academic life at Princeton. Students are responsible for knowing these regulations and for observing them in the planning and completion of their programs of study.

The Faculty Committee on Examinations and Standing administers these academic regulations on behalf of the faculty. Requests made under the following provisions, as well as petitions for exceptions to them, should first be discussed with a student’s residential college dean or director of studies. The final request or petition should be delivered in writing to Dean Claire Fowler, secretary to the Faculty Committee on Examinations and Standing, 406 West College, for presentation to the committee. Students do not appear in person before the committee.

Registration

All undergraduates who plan to matriculate for either the fall term or the full academic year are required to register online (www.princeton.edu/score) at the beginning of the fall term at a time determined by the registrar. Students who plan to resume their studies in the spring term after a leave or withdrawal must register at the beginning of the spring term. A student who, without an approved excuse, fails to register at the designated time incurs a fine of $75.

Selecting Courses

Each term, at a time specified by the registrar, all enrolled students submit their course choices online for the following term. To assist in this selection, Course Offerings [http://registrar.princeton.edu/course-offerings/] indicates the courses available and the meeting times. The registrar maintains a website with instructions and forms for completing course selection. Students are expected to discuss their course selection with their academic advisers prior to submitting final course choices. A student may not select a course that conflicts with the meeting times of any other course in which he or she is enrolled.

There is a fine of $10 for each day of lateness in submitting an approved set of courses. Students wishing to appeal this fine must discuss the reasons for lateness with the deputy registrar, who acts for the Faculty Committee on Examinations and Standing in this matter.

Normal Course Load

A.B. Program. The normal course load for freshmen, sophomores, and juniors is four courses each semester, with the exception of one semester in freshman or sophomore year when a student typically will need to take five courses in order to meet the expectation that 17 courses will have been completed by the start of junior year.

Regardless of the number of courses completed prior to entering senior year, all seniors must, with the exception of the two programs listed below, complete a minimum of six courses in senior year. This is most often accomplished by enrolling in three courses each term but students may take four courses in one term and two courses in the other. Students in the Program in Teacher Preparation who have taken an extra course in an earlier year or a student who is participating in the University Scholar Program may be permitted to reduce their course load by one course in the senior year.

B.S.E. Program. Students in the B.S.E. program normally enroll in four courses in the fall of freshman year and in four or five courses in each succeeding term, in a sequence appropriate to their individual programs of study.

Minimum Course Load

Under exceptional circumstances and in consultation with an academic adviser and either a residential college dean or director of studies, a student may be allowed to fall one course short of the normal course load for a term, subject to the following guidelines:

A.B. Program. All freshmen, sophomores, and juniors must complete a minimum of three courses each term.

Seniors may enroll in two courses in one term, as long as they complete four courses in the other term and have no course deficiencies entering senior year.
B.S.E. Program. A freshman may, with special permission, complete a minimum of seven courses in the academic year and a summer school course to meet the minimum of eight successfully completed courses needed to start sophomore year. Sophomores, juniors, and seniors must complete at least four courses each term.

Minimum Progress Required for Advancement

Any student who, by the start of the fall term, has not completed the minimum number of courses required for advancement must withdraw from the University and either successfully complete a sufficient number of pre-approved courses at another four-year college or university or, when mandated by the Faculty Committee on Examinations and Standing, repeat a semester at Princeton.

A.B. Program. In order to advance to sophomore year, all A.B. students must have successfully completed a minimum of seven courses. Sixteen courses are required to achieve junior standing, while 24 courses are required to begin senior year.

B.S.E. Program. A freshman may, with special permission, enroll in a minimum of seven courses during the academic year. However, in such a case, he or she must, through a combination of Princeton courses and pre-approved summer school courses, successfully complete a minimum of eight courses to begin sophomore year. Seventeen courses are required to begin junior year, and 26 are required to begin senior year. A student who has not completed the stated minimum number of courses required for advancement will not be permitted to remain in the B.S.E. program and may be required to leave school.

Selecting a Department

At times designated by the registrar, all students select a departmental concentration. Unless granted special permission by the departmental representative, a student may enter a department only if the courses designated as prerequisites for the concentration have been successfully completed. Prerequisites normally must be taken as graded courses.

All A.B. students must select a departmental concentration prior to enrolling for the fall term of junior year. This choice is made in consultation with the departmental representative and most often occurs when signing up for fall term courses in the spring of sophomore year.

All B.S.E. students must select a departmental concentration prior to enrolling for the fall term of sophomore year. The selection process takes place late in the spring of freshman year, following conversations with the designated departmental adviser.

Students are required to meet all of the stated requirements of the concentration existing at the time they enter the department. Those students requesting exceptions to any departmental requirement must obtain the written permission of the departmental representative.

A student may transfer from one department to another only with the approval of the new department and the student's residential college dean or director of studies, acting for the Faculty Committee on Examinations and Standing. While some exceptions do exist, such transfers must normally be made by the start of the second term of junior year. A junior transferring to a new department must complete all required junior independent work by the start of senior year and must be capable of completing all departmental and University requirements within the normal eight-semester program. The grades for any independent work completed prior to transferring to a new department will remain on the student's transcript.

While students are encouraged to explore diverse academic interests through a wide range of course choices and interdisciplinary certificate programs, the undergraduate degree is offered in just one academic department. Put another way, Princeton does not offer a double major.

The Rule of 12

A student in the A.B. program is limited to 12 one-term courses (plus independent work) in a given department, plus up to two departmental prerequisites taken during freshman or sophomore year. Students concentrating in departments without specific prerequisites may add up to two departmental courses taken during freshman or sophomore year to their total of 12 departmental courses. Foreign language courses at the 100-level do not count toward the departmental course limit of 12. Any student who exceeds the 31 courses required for graduation will be permitted to take extra departmentals. Exceptions to departmental course limits will be made on a case-by-case basis for students studying abroad, with the approval of Dean Nancy Kanach. Please note that for accounting purposes, cross-listed courses should be identified with the home department, which is the first department listed in the course identification number.

Course and Independent Work Requirements for Graduation

Except for those students who have been awarded a term or a year of advanced standing or who have been admitted to the University Scholar Program, all students must successfully complete the following course requirements:

A.B. Program. All A.B. students must successfully complete a minimum of 31 courses. Courses must be chosen in such a way as to meet the University general education requirements for A.B. students and the departmental requirements for the chosen field of concentration. In addition to 31 courses, all A.B. students must successfully complete departmental junior independent work, a senior thesis, and the departmental examination.

B.S.E. Program. All B.S.E. students must successfully complete a minimum of 36 courses. Courses must be chosen in such a way as to meet the University general education requirements for B.S.E. students and the departmental requirements for the chosen field of concentration. The independent work requirements for the B.S.E. program are set

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forth in the descriptions of the departmental programs of study. Independent work in the School of Engineering and Applied Science is awarded a course designation and counts toward the overall requirement of 36 courses.

**Dropping and Adding Courses**

Except under very unusual circumstances, the last date on which a student may add a course is the last day of the second week of classes.

A student who wishes to drop a course must request permission from his or her residential college dean or director of studies no later than the end of the ninth week of classes. No course, including courses taken in excess of the normal course load, may be dropped after that point. After the end of the ninth week of classes, students are held responsible for completing all courses in which they are enrolled and are assigned final grades in those courses. An upperclass student wishing to drop a departmental course after the second week of the term also must obtain permission from his or her departmental representative.

**Failed Courses**

A failed course does not count toward the number of courses needed for graduation or advancement with one's class, nor can it be used to satisfy any of the University requirements.

A failed course may result in a course deficiency if the student does not have an extra course to offset the failure. A course deficiency must be made up by taking an extra Princeton course in a subsequent semester or by successfully completing a pre-approved course at another school.

While the grade of F in a course normally does not mean that the particular course must be repeated, there are several instances in which a failed course must be retaken and successfully completed. This is the case for a foreign language course taken to complete the language requirement; for the courses in mathematics, physics, chemistry, and computer programming that are part of the B.S.E. degree requirements; for specific courses needed as prerequisites to enter a department or program; and for any course the successful completion of which is required of the concentrators in a given department. If a student chooses or is required to repeat a failed course, the failing grade remains on the transcript.

Failing grades may result in required withdrawal, failure to qualify for graduation, academic probation, or academic warning.

**Course Deficiencies**

A student who is making normal academic progress and who has not taken any extra courses incurs a course deficiency by failing a course, by dropping below the normal course load, by repeating a course in which he or she previously had earned a passing grade, or by failing to take the second course in an introductory-level foreign language sequence.

Course deficiencies may result in required withdrawal, failure to qualify for graduation, or inability to progress to the next year of study.

A student may remove a course deficiency either by taking an extra Princeton course in a subsequent semester or by successful completion of a pre-approved course at another school.

Advanced placement or college-level work completed prior to entering Princeton cannot be used to make up a course deficiency.

**Grading**

The same standards for judging academic performance apply to all students in a course, whether it is taken by an upperclass or underclass student, as a departmental or an elective course, or as an undergraduate or graduate course. A student may not, for example, submit extra work or revised work unless this opportunity is explicitly extended to all students in the course.

A student who wishes to appeal a course grade should begin by discussing the grade with the course professor. If necessary, the appeal may then be pursued with the chair or departmental representative of the department in which the course is offered. Finally, if the student believes that the grade was reached unfairly or in a manner not consistent with the stated grading policies of the course, an appeal should be brought to Dean Claire Fowler, acting for the Faculty Committee on Examinations and Standing. It is important to note that the committee judges only the fairness or consistency of the grading process; it does not make an independent assessment of the quality of the course work.

**Grading Symbols**

Final grades for undergraduate courses and independent work are reported at the end of each term in the following way:

A+ Exceptional; significantly exceeds the highest expectations for undergraduate work
A Outstanding; meets the highest standards for the assignment or course
A- Excellent; meets very high standards for the assignment or course
B+ Very good; meets high standards for the assignment or course
B Good; meets most of the standards for the assignment or course
A grade of D is the minimum acceptable passing grade in all courses. There are five exceptions to this general rule: (1) most departments require at least a C average in departmental courses, and therefore a D in a departmental course or courses may lead to failure in the area of concentration; (2) the accumulation of two or more Ds in a term is regarded by the Faculty Committee on Examinations and Standing as evidence of serious academic weakness, for which letters of academic warning or academic probation may be issued; (3) a student may be required to withdraw if he or she receives two Ds while on academic probation; (4) a student who is required to repeat a term for academic reasons will not receive credit for a course in the repeated term in which he or she received a D; (5) a student taking a preapproved course outside Princeton must earn at least a C to receive credit for the course.

**Pass/ D/ Fail Option**

The intent of the pass/D/fail option is to encourage exploration and experimentation in curricular areas in which the student may have had little or no previous experience. The pass/D/fail option also may be used by the student in completing distribution courses. Students are permitted to elect the pass/D/fail option between the beginning of the seventh and the end of the ninth week of classes.

1. As part of his or her regular academic program, each undergraduate may elect pass/D/fail grading in as many as four courses. Courses designated pass/D/fail only ("pdfo") do not count against this total, nor do any courses taken above the number required for graduation (31 for A.B. candidates; 36 for B.S.E. candidates).

2. A student may elect only one pass/D/fail course per term, regardless of the number of courses in which the student is enrolled or how many pass/D/fail options he or she has remaining; courses designated pass/D/fail only ("pdfo") do not count against this limitation.

3. Any course, including courses to fulfill distribution requirements, may be taken pass/D/fail, with the following exceptions:
   a) A student's own departmental courses, as well as technical course requirements in the School of Engineering and Applied Science, may ordinarily not be taken on a pass/D/fail basis.
   b) Courses designated "No pass/D/fail" by the instructor may not be taken on a pass/D/fail basis.
   c) Courses taken outside Princeton may not be taken on a pass/D/fail basis.

4. A student must declare a pass/D/fail election between the beginning of the seventh and the end of the ninth week of classes. No further changes in grading options will be permitted after 5 p.m. on the Friday of the ninth week of classes.

**Recording Grades for Independent Work in More than One Department**

Students may have only one concentration at Princeton. The degree and departmental honors are granted in one department only. Under special circumstances, however, a student may receive permission to complete independent work in more than one department. A student hoping to pursue this option must have completed the prerequisites for entry into the second department, and must have both the permission of the departmental representative in the second department and the permission of the Office of the Dean of the College. Such a student may then write junior papers and a senior thesis in the second department and have that work recorded on the transcript. Such additional independent work will not count toward a student's graduation requirements. Independent work written to fulfill the requirements of a certificate program is not recorded on the transcript.

**Completion of Academic Work**

Undergraduate courses are offered on a term basis. Required written work is subject to deadlines set by course instructors, departments, and the Faculty Committee on Examinations and Standing. Final examinations are scheduled by the registrar at the conclusion of each term. Failure to submit work or complete examinations by published deadlines will normally result in a failing grade for the missing work. Course professors may, at their discretion, require that a student earn a passing grade in each component of a course to earn an overall passing grade in the course. Certain exceptions to these practices are allowed under special provisions described below.

**Attendance**

Students are expected to attend all scheduled course meetings and exercises and to be present promptly at the start of instruction, unless prevented from doing so by illness or another compelling cause. An unexcused absence from class may adversely affect a student's grade and may lead to failure in a course, a student is expected to notify the course instructor of any absence and to arrange to make up any missed work.

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Participation in a regularly scheduled varsity athletic contest constitutes an excused absence. This does not, however, include practices, team meetings, or other team functions. Students are required to notify course professors of these absences in advance of the scheduled dates and to make arrangements to make up any missed work.

Students who will miss a class or any course requirement because of religious observance will be excused that absence. However, students must notify their course professors of these conflicts and make arrangements to complete any missed work.

Tests and Other Work Scheduled during the Term

Students are expected to take all tests and quizzes at the scheduled times during the term. A student who is absent from a test because of illness or an equally compelling reason must inform the course instructor of the reason for the absence at the first opportunity. The instructor then decides whether the test is to be waived or a make-up test is to be given. An unauthorized absence from a test or quiz will normally result in a failing grade for that portion of the course.

An examination may be given more than 24 hours earlier than the scheduled time only when specifically authorized by the student's residential college dean or director of studies, acting for the Faculty Committee on Examinations and Standing.

A student who becomes ill or otherwise incapacitated at the time of a scheduled examination should report immediately to University Health Services and then notify the deputy registrar, as soon as possible. If a student elects to take the examination at the scheduled time, his or her residential college dean or director of studies, as soon as possible. If a student elects to take the examination at the scheduled time, his or

A student who fails to take a scheduled examination or a rescheduled examination will receive a failing grade for that portion of the course.

Examinations will normally be rescheduled during the 24 hours after the scheduled examination time. Appropriate reasons for granting such extensions beyond the University deadline.

If the request for an extension of the deadline is approved, the student and the course professor will be notified of the new due date. Normally, only short-term extensions are granted, and the new deadline will not extend past the last date of the examination period. In exceptional cases, a longer-term extension may be granted at the discretion of the residential college dean.

A student who is unable to complete written work by the University deadline because of illness or another equally compelling reason beyond his or her control may apply for permission to submit the work late. This application must be made to the appropriate residential college dean or director of studies. The application must be made on or before the due date, and the endorsement of the course professor is required. Course professors may not independently grant extensions beyond the University deadline.

A student whose request for an extension is approved may receive the symbol of Incomplete (INC), which is converted to the appropriate grade on submission of the written work on or before the new deadline. Failure to submit work by the extended deadline will result in a failing grade for that component of the course.

A student whose request is denied must submit the written work by the University deadline or receive a failing grade for that component of the course.

Final Exams

Each term, the registrar schedules final examinations during an 11-day final examination period. Examinations must be taken at the assigned times, so students should be prepared to be available throughout the examination period and should not schedule personal travel until the examination schedule has been published.

The registrar, acting for the Faculty Committee on Examinations and Standing, may authorize a student to take an examination up to 24 hours before or after the scheduled examination time. Appropriate reasons for granting such requests are religious days, personal emergencies, and more than one examination scheduled in a single calendar day. Examinations will normally be rescheduled during the 24 hours after the scheduled examination time; examinations will be rescheduled during the 24-hour period before the regularly scheduled time only in the most unusual and compelling circumstances.

A student who, because of illness or another compelling reason outside his or her control, wishes to postpone a final examination more than 24 hours beyond the scheduled time may apply for authorization of a postponed examination. The request must be made prior to the scheduled examination time and must include the endorsement of the course professor. Students apply through their residential college deans or directors of studies. Rescheduled fall-term examinations are administered only during the third week of spring term classes; rescheduled spring-term examinations are given in the week preceding the beginning of the next fall term.

A student who has received authorization for a postponed final examination will receive the symbol of Incomplete (INC) until the examination has been completed and a final grade reported.

A student who fails to take a scheduled examination or a rescheduled examination will receive a failing grade for that portion of the course.

An examination may be given more than 24 hours earlier than the scheduled time only when specifically authorized by the student's residential college dean or director of studies, acting for the Faculty Committee on Examinations and Standing.

A student who becomes ill or otherwise incapacitated at the time of a scheduled examination should report immediately to University Health Services and then notify the deputy registrar, as well as his or her residential college dean or director of studies, as soon as possible. If a student elects to take the examination at the scheduled time, his or
her grade will not subsequently be altered on the grounds of poor health or other problems.

A student who arrives late at an examination but within 30 minutes of the scheduled start time will be given the examination and permitted to complete as much work as possible during the remaining time.

A student who arrives at an examination more than 30 minutes late must report to the registrar immediately. A student who misses an examination entirely, for any reason, must report that fact to the registrar as soon as possible. In these cases, upon review of the circumstances, the student may be allowed to make up the examination in the next available examination period. Such a make-up examination is permitted only once in a student’s undergraduate years. Failure to report a missed examination within 24 hours of the scheduled examination time will result in a failing grade for the exam.

**Independent Work**

The Faculty Committee on Examinations and Standing establishes deadlines each term for the submission of junior independent work and in the spring for submission of the senior thesis. While individual departments may set earlier deadlines for this work, departmental deadlines may not be later than those set by the committee. A student who will not be able to meet a departmental deadline may request an extension within the department to submit work no later than the University deadline.

Students who are unable to complete independent work by the University deadline because of illness or another compelling reason essentially outside their control may apply for permission to submit their work late. Students should apply to their residential college dean or director of studies on or before the due date and must include the endorsement of the adviser. An unauthorized failure to submit independent work by the University deadline or by an extended due date established by a residential college dean or director of studies will result in the assignment of a failing grade. In such cases, a second grade is added to the transcript when the late work is submitted. Both grades remain on the transcript.

No student will be permitted to enroll as a senior unless junior independent work has been successfully completed.

A senior who fails to submit an acceptable senior thesis will not be permitted to graduate until that requirement has been met.

**Academic Standing and Regulations**

**Academic Standing**

The Faculty Committee on Examinations and Standing reviews the academic records of all students at the end of each term. A student is considered to be making satisfactory progress if the program of study for the degree of bachelor of arts or the program of study for the degree of bachelor of science in engineering has been followed and if the student is eligible to continue in the University. A student making satisfactory progress will advance with his or her class, subject to the following qualifications:

1. A student who has not successfully completed the writing requirement by the end of the fall term of sophomore year will be placed on a special form of academic probation called writing probation (see below). If such a student fails to complete the writing seminar in the spring of sophomore year, he or she will be required to withdraw from the University and must apply to repeat the spring term of sophomore year. Failure to complete the requirement in the repeated term will result in a second, and final, required withdrawal.

2. A candidate for the A.B. degree who has not completed the foreign language requirement by the end of junior year may be required to withdraw from the University. If permitted to remain in school, the student must present a plan for completion of the requirement in senior year.

3. A student who is absent from the University or unable to attend classes for a substantial period of time, as determined by the Office of the Dean of the College, must withdraw from the University and apply for readmission to repeat the term.

4. A student must have successfully completed all of his or her degree requirements by the end of the spring term of senior year to be eligible to graduate.

**Academic Probation and Academic Warning**

The Faculty Committee on Examinations and Standing reviews the records of all students at the end of each term and, when appropriate, places students on academic probation or issues letters of academic warning.

1. Those students whose records, while not making them eligible for required withdrawal, indicate either poor overall standing or particular weaknesses, for example, in departmental work, are placed on academic probation. Eligibility for intercollegiate athletic participation may be withheld for a student on academic probation.

2. A student will be placed on writing probation at the end of the third term of enrollment for failure to complete the writing requirement regardless of overall performance, and may be placed on writing probation in addition to academic probation for poor overall standing. A student on writing probation who fails to complete the writing requirement by the end of sophomore year will be required to withdraw from the University.

3. The committee reviews the records of all students on academic probation at the end of the following term and reports its judgment to those students. A student whose record does not improve substantially while on academic probation may be required to withdraw. A single failing grade or a record with two or more Ds while on academic probation will
normally result in a required withdrawal.

4. Letters of academic warning are issued to students whose records for the preceding term, while not warranting academic probation, indicate weak academic performance. Academic warning letters are intended to alert students to the need for improvement and to suggest ways in which performance might be improved.

5. Additionally, letters may be sent during the term to students who are reported to be absent without excuse from portions of a course, or who are performing below expectations in any aspect of a course.

**Required Withdrawal**

1. A student ordinarily will be required by the Faculty Committee on Examinations and Standing to withdraw from the University at the end of a term or year on the basis of the following provisions:

   a) A freshman who receives the grade of F in three or more courses or incurs three deficiencies in one term or incurs a total of four deficiencies during the year.

   b) A student who receives a grade of F in two or more courses in any term of sophomore, junior, or senior year; or the grade of F in three consecutive terms in sophomore, junior, and senior years; or the grade of F in a total of four or more courses in sophomore, junior, and senior years.

   c) A student who has been placed on academic probation (see above) and whose record fails to improve substantially during the term.

   d) A student on writing probation during the spring of sophomore year who, regardless of performance in other courses, fails to complete the writing requirement.

   e) A student who, prior to the start of any given academic year, has not successfully completed the minimum number of courses needed for advancement.

2. A student may be required to withdraw at the end of a term if he or she receives a grade of F in one or more courses and the grade of F in independent work for the term. A student whose overall departmental performance has been only marginal ordinarily will be required to withdraw if withdrawal is recommended by the department.

3. A student who has been required to withdraw may, at the discretion of the Faculty Committee on Examinations and Standing, be required to apply for readmission to repeat the unsuccessful term at Princeton, or, in exceptional circumstances, be allowed to remove deficiencies incurred by failed courses and return without having to repeat the unsuccessful term. In either case, all grades received during the failed term will be recorded on the Princeton transcript.

4. Readmission to Princeton is never guaranteed to a student who has been required to withdraw, but the Faculty Committee on Examinations and Standing may grant a second opportunity after a student has demonstrated readiness to resume academic work. In general, the committee will insist on a strong record of performance in a demanding work experience or successful completion of courses at another school. Specific requirements may be established by the committee.

5. A student who has left the University twice for academic reasons should not expect a third opportunity to qualify for a degree.

**Failure to Qualify for Graduation**

A senior will be considered to have failed to qualify for the bachelor's degree unless he or she has completed all of the stated requirements for graduation in his or her degree program. Such a failure may result from the failure to complete the number of courses required for graduation, failure to satisfy all departmental and general education requirements, failure to meet the minimum departmental grade point average, failure to submit an acceptable senior thesis, any grade of Incomplete on the transcript, and, depending on departmental policy, failure to complete successfully the departmental examination.

A senior who fails to qualify for graduation may attend the Commencement ceremony with the graduating class. However, only the names of those students who have successfully completed all of the degree requirements will appear in the Commencement program. Diplomas will be issued only to those students who have completed all graduation requirements.

The Faculty Committee on Examinations and Standing will notify any student who has failed to qualify for the degree what must be done to satisfy any remaining degree requirements.

**Rights of Rehearing and Appeals**

A student concerning whom the Faculty Committee on Examinations and Standing has taken any action has the right to request a second consideration of the case by that committee in the light of any new evidence that can be submitted.

An action of the Faculty Committee on Examinations and Standing may be appealed on procedural grounds to the faculty. Review and final determination of an appeal is assigned to the Faculty Advisory Committee on Policy. A student who decides to appeal a decision with respect to academic standing must promptly notify the dean of the faculty in writing. A student may continue to attend classes and use other University facilities while a rehearing or appeal is being considered. However, during the appeal period the student is not considered to be a student in good standing.

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Leave of Absence

Upon the satisfactory completion of any term, undergraduates are eligible to take leaves of absence at the discretion of the dean of the college for one, two, or three years, but not less than one year. Students placed on academic or disciplinary probation at the end of a term are eligible to apply for a leave of absence, but they will be on academic or disciplinary probation for the first term after their return. An individual on leave of absence from Princeton is assured readmission to continue his or her program of study from the point at which it was interrupted. The dean of the college must receive notification at a specified date well in advance of the beginning of the term in which the individual intends to resume studies.

Voluntary Withdrawal

An undergraduate who leaves the University during the period from midterm week to the end of reading period is considered to have withdrawn voluntarily. Readmission is normally not guaranteed to a student who withdraws voluntarily. However, the Faculty Committee on Examinations and Standing generally gives favorable consideration to a request for readmission supported by a record of productive activity while away from Princeton that indicates readiness to resume full-time study without further difficulty or interruption. The dean of the college or the dean of undergraduate students also may establish specific additional requirements for readmission if the circumstances of the withdrawal warrant this action. All requests for voluntary withdrawal and applications for readmission must be presented to the Office of the Dean of the College for approval. A student who has had a total of three withdrawals from the University, whether voluntary or required for academic reasons, should not expect a further opportunity to qualify for a degree.

Readmission after Time Away

Students planning to apply for readmission should contact their residential college dean if they have not received materials by March 15 for the fall term and November 15 for the spring term.

Students with Disabilities and Requests for Reasonable Accommodation

The Office of Disability Services (ODS) facilitates the provision of academic accommodations to ensure equal access to academic and co-curricular experiences for qualified students with disabilities. The Americans with Disabilities Act (ADA) of 1990 as amended, Section 504 of the Rehabilitation Act of 1973 (504), and the New Jersey Law Against Discrimination (NJLAD) prohibit discrimination against individuals with disabilities and entitle individuals with disabilities to reasonable accommodations. The term "disability" may include learning, physical, sensory, psychological, medical, and certain temporary disabilities. To establish that an individual meets the legal requirements, documentation must be submitted that confirms the existence of a specific disability and functional limitations caused by the disability, in relation to most people. A diagnosis of a disorder or submission of documentation does not automatically qualify an individual for accommodations. Documentation must be provided by a qualified professional, meet currency requirements, include information about diagnosis and functional limitations, and support the requested accommodation(s). The documentation must meet the requirements outlined by ODS, which are available by contacting the office or visiting the website [http://www.princeton.edu/ods/]. In some cases, the evaluation process may include a review of the documentation by an outside consultant engaged by Princeton University. All requests are reviewed on an individual basis and must adhere to University requirements. Accommodations and academic adjustments must be justified by the documentation and are determined through an interactive process that includes an intake interview.

Students with disabilities who seek accommodations must register with ODS (327 Frist Campus Center, 609-258-8840). Registration through self-identification is a voluntary process that is treated confidentially and may occur at any time during the student's course of study.
Other Academic Resources

University Library

Princeton undergraduates have access to a world-class academic research library with millions of books, journals, manuscripts, and microforms; tens of thousands of electronic journals, digital texts, sound recordings, musical scores, DVDs, and videos; and over a thousand online databases covering all fields of human knowledge. The Library’s website [http://library.princeton.edu/] is a 24/7 gateway to information resources and services. More importantly, librarians are always available in person, or by phone, e-mail, or IM to help students find relevant information and reliable print or online sources among this wealth of materials.

The Princeton University Library includes a central building, the Harvey S. Firestone Memorial Library, the Lewis Library, and nine other branch libraries, plus two off-campus storage facilities. Most of the humanities and social science collections are in Firestone, one of the largest open-stack libraries in the world. The Lewis Library consolidates research collections and expert staff for the physical and life sciences. Except for materials that need special protection due to rarity or fragility, books and journals in all Princeton libraries are housed on open shelves, allowing users to browse and discover sources on their own.

Staff throughout the library system, including subject specialists representing all the major academic disciplines, are available to guide students through the various phases of the library research process. Within Firestone, staff at the Trustee Reading Room reference desk provide on-the-spot help or in-depth research consultations by appointment. This major service point is the best place for beginning undergraduates to start any library project. Other areas within Firestone house periodical and reserve collections, data and statistical support services, microforms, and depository collections for New Jersey, the United States, United Nations, and European Union official documents.

The Department of Rare Books and Special Collections, whose holdings are available to undergraduates for their research, is also within Firestone. Among its special strengths are early printed and rare books; children’s illustrated books (plus games, puzzles, and educational toys); a graphic arts collection; historic maps; prints and photographs; and the correspondence and literary manuscripts of a wide array of 19th- and 20th-century English, American, and Latin American authors. The Public Policy Papers and University Archives, located in the Seeley G. Mudd Manuscript Library, include the collections of major figures and organizations devoted to 20th-century American domestic and foreign policy, as well as memorabilia and material related to University history. The department also offers three galleries with rotating exhibitions of unique holdings that are open free of charge seven days a week, except at Mudd Library, which is closed on weekends.

University Art Museum

Museum [http://artmuseum.princeton.edu/] holdings range from ancient to contemporary art, with outstanding collections of prints, drawings, and original photographs. There is a fine collection of Greek and Roman antiquities, including early ceramics, small bronzes, and mosaics from the University’s excavations at Antioch. Medieval Europe is represented by sculpture, painting, metalwork, and stained glass.

A large collection of paintings and sculpture represents the art of the Renaissance, with emphasis on the Italian school. The French school predominates in 18th- and 19th-century painting and sculpture. American art is represented with painting, sculpture, and decorative arts. There is a growing collection of 20th-century and contemporary art.

In the Far Eastern field, Princeton has a notable collection of Chinese paintings, sculpture, bronze ceremonial vessels, and examples of the minor arts such as bronze mirrors, clay tomb figures, and a celebrated collection of snuff bottles. Japanese, Korean, and Indian pieces augment the selection. There is a superb collection of art from the Pre-Columbian Americas; African art and an important collection of Northwest Coast Indian art, on loan from the Department of Geosciences, are also on view.

On view throughout the campus is the John B. Putnam Jr. Memorial Collection of contemporary sculpture, including works by Moore, Lipchitz, Calder, Noguchi, and Picasso, and the Princeton Portraits Collection.

Special exhibitions are presented throughout the year and include many coordinated with the curriculum of the Department of Art and Archaeology. The museum encourages faculty from all disciplines to take advantage of self-guided tours and preceptorial exhibitions. Undergraduate and graduate students can become actively involved in the museum through internships, the student guide program, work study, and volunteer opportunities.

Office of Information Technology

Princeton students are given access to a varied and powerful computing environment supported by the Office of Information Technology [http://www.princeton.edu/oit/] (OIT). The cornerstone of student computing is Dormnet, a fiber-optic-based network that brings a high-speed data connection into every undergraduate dorm room on campus; wireless networking is also available in dorm rooms. All undergraduates residing on campus are able to take advantage of this connection to Princeton and Internet resources.

The University, working with strategic computer vendors, offers a Student Computer Initiative (SCI), a program that provides students the opportunity to purchase a fully configured laptop computer at competitive prices. SCI computers are configured for the Princeton environment and are fully supported by OIT's support services, providing the quickest resolution of problems and warranty repair when needed.

All students can take advantage of a full range of OIT support services. The Support and Operations Center offers

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consulting 24 hours a day, seven days a week, by telephone, online chat, or e-mail. Residential computing consultants provide assistance in campus dorms. The Solutions Center, located in the Frist Campus Center, offers a variety of technology-related services. It includes the Tech Clinic, where students may receive in-person software and hardware support for their computers. The Tech Clinic also arranges for computer repair from the hardware repair center. Across the hall is the Tech Depot where students may purchase specially priced software as well as computer accessories. The Tech Depot also houses Student Telephone Services.

Students have access to more than 250 workstations in the two dozen OIT-supported campus clusters. High-quality printing is also available in the clusters or over the campus network from students' own computers. Software on cluster computers includes basic productivity tools such as word processors, information access tools used to explore the World Wide Web and the Internet, special software needed for the many classes in which computing is integral to learning, and sophisticated programs for use in research.

Each student receives a netID, an identifier that allows the use of e-mail and access to the campus network for central printing service and specialized resources such as the online library systems. Multiple high-speed connections to the Internet permit students to take full advantage of the wide range of networked resources.

Additional OIT services include support in the use of selected software packages, maintenance of the University Humanities Resource Center and video library, and support for instructional technologies in classrooms and over the campus network. Clusters around campus provide students with access to high-speed resources, such as streaming video, for use in language and other courses. The New Media Center provides state-of-the-art computing resources and walk-in consulting support for the development of multimedia documents and applications.

A course management system server (Blackboard) provides a Web page for every University course. OIT provides a number of information-access servers, including Web servers, on which students can have their own Web pages.

Foreign language and educational programming and selected cable TV channels are broadcast over the campus network to dorm rooms on a subscription basis, and to public viewing rooms, classrooms, and the Humanities Resource Center.

OIT also provides local telephone service and voice mail service to the campus, including dormitory rooms.

For information about campus and network resources, contact OIT’s Help Desk at (609) 258-4357 (258-HELP) or visit the OIT website [http://www.princeton.edu/oit/].

**Survey Research Center**

The [Survey Research Center](http://www.princeton.edu/~psrc/) (SRC) is a resource for Princeton students, faculty, and administration. The center has 12 telephone interviewing stations; a library of questionnaires, books, and journals; and an advanced self-service utility for designing and managing web-based surveys and online experiments. The SRC provides guidance on study design, sampling, and project management for students who are completing senior theses, junior papers, or class projects that require collection of original survey data. SRC was established in 1992 with a grant from the Andrew W. Mellon Foundation. The center's main facility is at 169 Nassau Street.
General Education Requirements

Princeton is committed to offering an academic program that allows each student to achieve a truly liberal education. Although each department and school has its own requirements, the University requirements for graduation transcend the boundaries of specialization and provide all students with a common language and common skills. It is as important for a student in engineering to engage in disciplined reflection on human conduct, character, and ways of life or to develop critical skills through the study of the history, aesthetics, and theory of literature and the arts as it is for a student in the humanities to understand the rigors of quantitative reasoning and to develop a basic knowledge of the capabilities and limitations of scientific inquiry and technological development.

General Education Requirements for A.B. Students

- Writing Seminar--one course
- Foreign Language--one to four terms to complete, depending on the language students study and the level at which they start
- Epistemology and Cognition (EC)--one course
- Ethical Thought and Moral Values (EM)--one course
- Historical Analysis (HA)--one course
- Literature and the Arts (LA)--two courses
- Quantitative Reasoning (QR)--one course
- Science and Technology, with laboratory (ST)--two courses
- Social Analysis (SA)--two courses

General Education Requirements for B.S.E. Students

In addition to the School of Engineering and Applied Science requirements of four terms of mathematics, two terms of physics, and one term each of chemistry and computer science, candidates for the B.S.E. degree must fulfill the writing requirement by taking a writing seminar in the first year and take a minimum of seven courses in the humanities and social sciences. The humanities and social science courses must include one course in four of the six areas listed below:

- Epistemology and Cognition (EC)
- Ethical Thought and Moral Values (EM)
- Foreign Language (at the 107/108 level or above)
- Historical Analysis (HA)
- Literature and the Arts (LA)
- Social Analysis (SA)

Language courses beyond the first year (for example, German 105, Russian 105, Japanese 105) also count toward the seven; a language course at the 107/108 level or above counts toward the seven and satisfies one of four distribution requirements.

Writing

Undergraduates at Princeton are expected to develop the ability to write clearly and persuasively. Toward this end, all students, without exception, must fulfill the University writing requirement by taking a writing seminar in the freshman year. Writing seminars have a common goal--for students, through practice and guidance, to master essential strategies and techniques of college-level inquiry and argument. In addition to writing frequently and completing several major assignments of increasing complexity, students receive intensive instruction in academic writing, submit drafts for review, and attend one-on-one conferences with the instructor. While writing seminars focus on the skills necessary for effective critical reading and writing, they differ in the topics and texts assigned. Students select their seminar based on their interests.

Foreign Language

Proficiency in a foreign language is required for graduation under the A.B. program. Many undergraduates satisfy the foreign language requirement by demonstrating proficiency when they enter the University; proficiency is demonstrated by documenting the results of AP tests or SAT Subject Tests, or by taking placement tests administered by academic departments at Princeton. Those tests can also determine whether a student is eligible to elect advanced courses (200 and 300 level). See the individual department entries for further information.

Foreign language study is required through successful completion of courses numbered 107 (or 108) in Arabic, Chinese, Czech, French, German, modern or classical Greek, Hebrew, Hindi, Italian, Japanese, Korean, Latin, Persian, Russian, Spanish, Swahili, or Turkish if taken at Princeton, or through demonstration of an equivalent level of competence. When an undergraduate begins a language at Princeton, three or four terms of study will usually be necessary. If continuing a language begun elsewhere, the student is placed at an appropriate level. At the end of any term beyond the first, a student may take a departmentally administered test and may thereby fulfill the language requirement. All A.B. candidates should begin meeting this requirement as soon as possible because students are
expected to develop proficiency in a foreign language by the end of junior year.

Foreign language competence is usually necessary for any student who proposes to earn graduate degrees in arts and sciences. Certain professional schools also expect applicants to have ability in one or more foreign languages. There are also increasing opportunities to study a language in a country in which it is spoken through term-time and summer study abroad programs. For these reasons, each student should anticipate language needs and plan a program of study accordingly. Many descriptions of departmental programs of study make reference to the languages appropriate for graduate study in that field.

Distribution Areas

The distribution areas described below should serve as a broad intellectual map for students to follow as they work their way through the curriculum. These distribution areas mark the boundaries of what the faculty believes are the important substantive fields of inquiry and methodological approaches that are integral to a rich and lasting undergraduate education. There are no required courses; instead, the areas encourage students to make choices that best suit their intellectual curiosity and academic goals.

Courses that fulfill specific distribution areas will be identified by the alphabetical letters that appear as part of the course information provided in this catalog or in Course Offerings [http://registrar.princeton.edu/course-offerings/] for a given semester. Where two courses are required within a distribution area, they need not be from the same academic department or program.

Science and technology area courses must include a laboratory component. Students who have two terms of advanced placement in science may elect to take one laboratory and one approved nonlaboratory science and technology course. (Students who elect this option may not take a laboratory course deemed equivalent to one for which the science advanced placement was granted.) A list of approved nonlaboratory ST courses is published each term in Course Offerings; those courses carry the designation STX in Course Offerings. Such courses tend to be advanced courses, not introductory courses.

Courses elected on a pass/D/fail basis will satisfy distribution areas; however, audit-pass courses do not. Student-initiated seminars, reading courses, and graduate courses do not fulfill distribution area requirements. A student may, for sound educational reasons and with the prior approval of the residential college dean or the director of studies and the appropriate departmental representative, complete certain distribution courses at another college or university. Approvals will be limited to one course in each of two of the following distribution areas: literature and the arts, social analysis, and science and technology. Students participating in the study abroad program during the academic year may, with proper approvals, fulfill up to two distribution requirements abroad, provided that the total number of distribution requirements fulfilled by the courses taken outside of Princeton does not exceed two.

Students usually complete their distribution courses by the end of junior year. Most undergraduates find that the distribution requirements are met simply through electing courses in a variety of departments and programs. Questions about the distribution areas should be discussed with the residential college dean or the director of studies.

Epistemology and Cognition

The requirement in epistemology and cognition introduces students to the critical study of the nature, sources, and bounds of human knowledge. While courses in other areas examine important modes of cognition or methods of inquiry in application to a particular subject matter, courses in this category take cognition itself as their subject matter, and explore its mechanisms, potential, and limitations from a wide variety of theoretical, historical, and empirical perspectives. The topics they examine range from the basic perceptual capabilities that humans share with other animals to the distinctively human capacity for language; from theoretical models of human knowledge to empirical models of an individual’s cognitive abilities; from the historical record of collective inquiry in the sciences and elsewhere to informed speculations on the outer limits of what is knowable.

Courses in this category are drawn largely from the Departments of Anthropology, Philosophy, and Psychology, and the Program in Linguistics. They introduce students to the critical study of human knowledge and thought processes. Their focus is on human beings as seekers of knowledge and builders/creators of knowledge systems. These courses raise questions about the conditions, limits, and validity of our claims to “know” and approach critically the various claims about what we know and how we know.

Ethical Thought and Moral Values

The requirement in ethical thought and moral values is designed to engage students in disciplined reflection on human conduct, character, and ways of life. Through inquiry into questions of ethics and morality as presented in works from one or more cultural traditions, these courses will help students to discern, understand, and appreciate ethical issues and to articulate, assess, and defend moral judgments in an informed and thoughtful way. Source materials may include theoretical works in various disciplines, political deliberations, autobiographies, and utopian and dystopian novels, among others. Regardless of the particular genres and the traditions to which these works belong, courses in this area focus on the ethical thought and moral values that shape individual and collective life.

Every society draws distinctions between good and evil, right and wrong, noble and ignoble. Courses in this category focus on ethical questions and moral deliberations, regardless of the historical, cultural, or religious context in which they occur. They are drawn largely, though not exclusively, from the Departments of Philosophy, Politics, and Religion. The aim of these courses is to help students explore and understand different value systems, to think about the possibility of commonalities across historical and cultural boundaries, and to introduce ways of making reasoned moral judgments.

Historical Analysis
Historical analysis begins with the problem of understanding the differences between the world of contemporary experience and the worlds of the past. Some courses in historical analysis focus on the distinctiveness of one or another part of the past, with the intention of bringing students to an understanding of political, social, and cultural configurations quite different from their own. Others stress the processes of historical change through which one configuration of institutions, ideas, and behavior is supplanted by another. Common to all courses in historical analysis is the presumption that the categories of social analysis are themselves historical and historically contingent, and that to understand the past requires entering imaginatively into languages, institutions, and worldviews quite different from those of the present day.

Courses in this category are drawn largely, though not exclusively, from the Departments of Classics, East Asian Studies, History, Near Eastern Studies, and Religion. The aim of these courses is to explore the contingency, interconnectedness, and continuity of human institutions, and to introduce the complexities of historical interpretation. Some courses focus on a distinctive historical period or a specific region; others follow the development of ideas and institutions through time; and yet others focus on the inter-relatedness of events in many parts of the world.

**Literature and the Arts**

The requirement in literature and the arts allows students to develop critical skills through the study of the history, aesthetics, and theory of literature and the arts, and to engage in creative practice. Students may choose among courses in literature (in English, English translation, or other languages), visual and performing arts, music, architecture, film, and electronic media. In addition to courses emphasizing critical analysis, students may explore the creative arts through practice in creative writing; in the studio arts of architecture, painting, sculpture, drawing, and photography; in the performing arts of music, theater, and dance; and in the media of film and video.

Courses in this area fall into two groups: those that emphasize a variety of critical and analytic approaches to artistic expression and those that engage students in the creative practice of "making" art. Courses in the first group are drawn largely, though not exclusively, from the Departments of Art and Archaeology, Classics, Comparative Literature, East Asian Studies, English, French and Italian, German, Music, Near Eastern Studies, Slavic Languages and Literatures, and Spanish and Portuguese Languages and Cultures, and the School of Architecture. These courses emphasize the development of the skills of reading, observing, and hearing and frequently point to the complex interplay between individual talent, artistic tradition, and historical context. Courses in the second group are drawn largely from the Programs in Creative Writing, Dance, Theater, and Visual Arts, as well as from the Department of Music and the School of Architecture. These courses emphasize the interplay between technical discipline and creative imagination in the production of works of art.

**Quantitative Reasoning**

Quantitative reasoning is a process in which complex problems are described mathematically and solved within a structured mathematical framework. Courses in this area involve the manipulation and interpretation of numerical and categorical information and the quantification of inferences drawn from that information. Appropriate courses include those that address theoretical and empirical problems in the natural, social, computer, and engineering sciences.

The goal of courses in this category is to give students some understanding of basic mathematical methods and their applications; to provide them with an ability to understand and appreciate quantitative issues that have become part of everyday life; and to instill in them a lasting interest in quantitative methods and their applications. Courses in this category are drawn from the Departments of Computer Science, Mathematics, and Operations Research and Financial Engineering, as well as from other departments in the social sciences, the natural sciences, and engineering.

**Science and Technology with Laboratory**

The requirement in science and technology is designed to give all students a basic knowledge of the capabilities and limitations of scientific inquiry and technological development. Some understanding of the process by which science discovers new knowledge, and engineering applies that knowledge to practice, is essential to functioning effectively in modern society. Courses in this area are designed to foster an understanding of scientific concepts and to develop the student’s ability to use experimentation and measurement in exploring and testing ideas.

The common purpose of courses in this area is to instill in students a lasting interest in science and technology; to impart some understanding of the value of scientific thinking and its relation to societal issues; to foster an appreciation of the essential role of experimentation and measurement; and to convey the excitement of doing scientific research. The laboratory component is essential to an understanding of how scientific concepts are tested and of the limitations of the scientific method, including the concepts of error and reproducibility. Courses in this area are drawn largely from the Departments of Chemistry; Ecology and Evolutionary Biology; Geosciences; Molecular Biology; Physics; Psychology; and Civil and Environmental, Electrical, and Mechanical and Aerospace Engineering, as well as from the offerings of the Council on Science and Technology.

Students who have two terms of advanced placement in science may be eligible to take one approved nonlaboratory science and technology course.

**Social Analysis**

The requirement in social analysis is designed to familiarize students with different approaches to the study of social life and to introduce them to modes of thinking about social institutions and cultural norms and their
interconnectedness with forms of human behavior. Courses in this area examine how individuals interact with, and are shaped by, social groups and institutions, including those associated with politics, economics, religion, family, the arts, health, and education; how and why particular forms of social organization and social relations emerge within a group or culture; and the origins, characteristics, and consequences of social conflict and change.

Courses in this area introduce students to some of the central concepts and methods of the social sciences and show both the variety and the interconnectedness of social institutions. Courses are drawn primarily from the Departments of Anthropology, Economics, Politics, Religion, Sociology, and the Woodrow Wilson School. Some take a comparative approach to institutions across historical, political, social, or cultural divides; others focus on the interface of several institutions--political, economic, artistic--in a given social context; yet others analyze a single institution--be it democratic education, a free market economy, or the nuclear family structure--and assess its role in society. Courses in this category look at institutions as shaped by human behavior and at human behavior as shaped, in turn, by social institutions.
Program of Study for the Degree of Bachelor of Arts

The A.B. program at Princeton is intended to stretch students' minds and challenge their imaginations—to teach them to think and reason and document and prove, to cast a critical eye on conventional wisdom, to make sense of evidence, to read a text with care and critical insight, to conceptualize and solve problems, and to express themselves clearly and convincingly on paper and in discussion. Working within the general curricular framework, each undergraduate pursuing the A.B. degree is encouraged to develop an academic program in response to personal aspirations and interests. Each student’s program of study encompasses a combination of courses that satisfy general education and departmental requirements, and junior independent work and a senior thesis.

With the exception of students who receive one or two terms of advanced standing, all A.B. students must successfully complete a minimum of 31 courses and two years of departmental independent work in eight terms of study. An extra term or year of study is granted by the Faculty Committee on Examinations and Standing to a student making normal progress toward the degree only under extraordinary circumstances. However, a student who has been required to withdraw for academic reasons will, in most cases, be required to repeat the unsatisfactory term in order to meet the basic graduation requirement of eight successfully completed terms of study.

Successful completion of a prescribed number of courses is necessary for advancement to each subsequent year. These requirements, as well as minimum course loads in a semester, are delineated in the section "Minimum Progress Required for Advancement".

Freshman and Sophomore Years

Generally, the program of study during a student’s freshman and sophomore years is extensive in the sense that it typically includes course offerings from a range of academic departments, consistent with the exploration of academic interests and the preparation needed to enter an academic department at the start of junior year. During this time, it is expected that each student will also make significant progress toward the completion of the University’s general education requirements in writing, foreign language, and distribution areas.

Junior and Senior Years

The program of study in junior and senior years is generally more intensive in its focus, reflecting the requirements of the departmental concentration the student has chosen. Undergraduates declare their departmental concentration prior to the start of junior year and complete a program of study that combines a set of courses with junior and senior independent work. Independent work gives students the opportunity to work closely with faculty members on library, laboratory, and field-based research, and in sustained writing projects. The independent work requirement, culminating in the senior thesis, is the keystone of the Princeton academic experience. In senior year, students take a departmental examination that is focused on some aspect of their field of concentration or on the senior thesis.

Each academic department has established a program of study leading to the awarding of the A.B. degree. These programs are described in detail in the departments' entries in this book. Specific questions concerning departmental programs and requirements should be addressed to the appropriate departmental representative.
Program of Study for the Degree of Bachelor of Science in Engineering

B.S.E. students enroll in four courses for the first term of the freshman year and in four or five courses in each succeeding term, following a sequence appropriate to their individual programs. The school requirement for the B.S.E. degree is at least 36 courses in the four years of study. Sophomores, juniors, and seniors must complete at least four courses each term, with a minimum of 17 courses by the start of junior year and 26 courses by the start of senior year.

A student must obtain a background in mathematics, physics, and chemistry by successfully completing the following courses or their equivalents:

Mathematics (four semesters)

- 103 Calculus
- 104 Calculus
- 201 Multivariable Calculus, 203 Advanced Multivariable Calculus, or EGR 192 Integrated Introduction to Engineering, Mathematics, Physics
- 202 Linear Algebra with Applications, or 204 Advanced Linear Algebra with Applications, or equivalent

Physics (two semesters)

- 103 General Physics, 105 Advanced Physics, or EGR 191 Integrated Introduction to Engineering, Mathematics, Physics
- 104 General Physics or 106 Advanced Physics, or equivalent

Chemistry (one semester)

- 207 Advanced General Chemistry: Materials Chemistry, or 201 General Chemistry, or equivalent

While none of these requirements may be satisfied by a course taken under the pass/D/fail option, in many instances one or more may be met by advanced placement. Except under unusual circumstances, the physics, chemistry, and 100-level mathematics courses must be completed by the end of freshman year.

Computer proficiency is a requirement for the B.S.E. degree fulfilled by taking COS 126 General Computer Science, or by advanced placement. This requirement must be satisfied before the beginning of the junior year. This requirement may not be satisfied by a course taken under the pass/D/fail option. A course taken at another school may not be used to satisfy this requirement.

The choice of upperclass courses will reflect the student's individual interests, as well as the plan of study of the department in which the student is concentrating or any interdepartmental program in which the student is participating. Independent work opportunities are available for juniors and seniors.

A coherent program of courses in the humanities and social sciences, combining breadth and depth, is an essential part of every B.S.E. student's program of study. B.S.E. students must complete a minimum of seven courses in the humanities and social sciences. B.S.E. students are required to take one course in four of the following six areas: epistemology and cognition, ethical thought and moral values, foreign language (at the 107/108 level or above), historical analysis, literature and the arts, and social analysis. See General Education Requirements for full descriptions of these distribution areas. The remaining three required courses and additional courses may be taken in any fields in the social sciences and humanities.

The ability to write English clearly and precisely is a University requirement that must be satisfied by completing a writing seminar in the freshman year. The writing seminar does not count as one of the seven humanities and social science courses.
Academic Departments and Programs

African American Studies, Center for
African Studies, Program in
American Studies, Program in
Anthropology, Department of
Applications of Computing, Program in
Applied and Computational Mathematics, Program in
Architecture and Engineering, Program in
Architecture, School of
Art and Archaeology, Department of
Astrophysical Sciences, Department of
Biophysics, Program in
Chemical and Biological Engineering, Department of
Chemistry, Department of
Civil and Environmental Engineering, Department of
Classics, Department of
Comparative Literature, Department of
Computer Science - A.B., Department of
Computer Science - B.S.E., Department of
Contemporary European Politics and Society, Program in
Creative Writing, Program in
Dance, Program in
East Asian Studies, Department of
East Asian Studies, Program in
Ecology and Evolutionary Biology, Department of
Economics, Department of
Electrical Engineering, Department of
Engineering Biology, Program in
Engineering Physics, Program in
Engineering and Applied Science, School of
Engineering and Management Systems, Program in
English, Department of
Environmental Studies, Program in
European Cultural Studies, Program in
Film Studies, Committee for
Finance, Program in
French and Italian, Department of
Freshman Seminars in the Residential Colleges, Program of
Geological Engineering, Program in
Geosciences, Department of
German, Department of
Global Health and Health Policy, Program in
Hellenic Studies, Program in
History, Department of
Human Values, University Center for
Humanistic Studies, Program in
Information Technology and Society, Program in
Jazz Studies, Program in
Judaic Studies, Program in
Language and Culture, Program in
Latin American Studies, Program in
Latino Studies, Program in
Lewis Center for the Arts
Linguistics, Program in
Materials Science and Engineering, Program in
Mathematics, Department of
Mechanical and Aerospace Engineering, Department of
Medieval Studies, Program in
Molecular Biology, Department of
Music, Department of
Musical Performance, Program in
Near Eastern Studies, Department of
Near Eastern Studies, Program in
Neuroscience, Program in
Operations Research and Financial Engineering, Department of
Philosophy, Department of
Physics, Department of
Planets and Life, Program in
Politics, Department of
Psychology, Department of
Quantitative and Computational Biology, Program in
Religion, Center for the Study of
Religion, Department of
Renaissance Studies, Committee for
Robotics and Intelligent Systems, Program in
Russian and Eurasian Studies, Program in
Slavic Languages and Literatures, Department of
Sociology, Department of
South Asian Studies, Program in

http://www.princeton.edu/ua/
Spanish and Portuguese Languages and Cultures, Department of
Statistical Studies, Committee for
Sustainable Energy, Program in
Teacher Preparation, Program in
Theater, Program in
Translation and Intercultural Communication, Program in
Urban Studies, Program in
Values and Public Life, Program in
Visual Arts, Program in
Women and Gender, Program in the Study of
Woodrow Wilson School of Public and International Affairs
Writing Program, Princeton
The Center for African American Studies was founded on the assumption that the study of African American history and culture and of the role that race has played in shaping the life and the institutions of the United States is central to an American liberal education. Given the continuing and evolving centrality of race in American political, economic, social, and cultural life, and indeed, in every region of the world, reflection on race and on the distinctive experiences of black people is indispensable for all Princeton students as global citizens. Drawing on a core of distinguished faculty in areas such as anthropology, art and archaeology, English, history, philosophy, psychology, religion, and sociology, the center promotes teaching and research on race with a focus on the experience of African Americans in the United States.

The center's curriculum reflects the complex interplay between political, economic, and cultural forces that shape our understanding of the historic achievements and struggles of African-descended people in this country and their relation to others around the world. Toward that end, the certificate is organized into three thematic subfields:

1) Global Race and Ethnicity: Using race and ethnicity as a lens, students are introduced to a critical perspective and approach to the examination of American institutions (e.g., schools, families, prisons, etc.). They are also exposed to other related questions such as the formation of racial and ethnic identities and the nature of inequality in an increasingly global context.

2) African American Culture and Life: Drawing on the insights of cultural studies, broadly understood, students encounter the rich history, literature, religion, and the arts of African Americans. Moreover, pushing the boundaries of historical accounts of African American life beyond U.S. national borders to include the diaspora in all of its diversity and plurality, this subfield also familiarizes students with many of the contributions of African-descended peoples around the world.

3) Race and Public Policy: Exploring, among other things, the historical, cultural, political, and economic causes and consequences of problems facing African American communities, students examine the various initiatives that have defined American public policies in relation to race. In addition, they are challenged to assess the implications for creating and implementing effective public policies that directly relate to communities of color in the United States.

Admission to the Program

Students may apply for formal admission at any time once they have taken and achieved a satisfactory standing in the core course, AAS 201 Introduction to the Study of African American Cultural Practices.

Program Requirements

In addition to taking AAS 201, students seeking a certificate in African American studies are required to take two courses in the African American Culture and Life subfield. These two courses must be selected from the history (AAS 366, AAS 367) and literature (AAS 353, AAS 359) survey courses, one of which must be a pre-20th century course. Students must also take three additional courses in AAS or approved cognates in order to qualify for the certificate. Students are strongly urged to take at least two of these additional courses either in the Race and Public Policy subfield or in the Global Race and Ethnicity subfield. The center further suggests that race figure centrally in the student's senior thesis.
In addition to offering a certificate program, the Center for African American Studies provides an array of courses, programs, and internships, open to all students, that expand and deepen their understanding of race in the United States and in the world.

**Certificate of Proficiency**

Students who fulfill all the requirements of the program will receive a certificate in African American studies upon graduation.

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**Courses**

**AAS 201 Introduction to the Study of African American Cultural Practices**  
Fall SA  
An interdisciplinary examination of the complex array of African American cultural practices from slavery to postmodern times. Close readings of classic texts will seek to provide a profound grasp of the dynamics of African American thought and practices. Two lectures, one preceptorial. *C. West*

**AAS 202 Introductory Research Methods in African American Studies (also SOC 202)**  
Not offered this year  
SA  
The purposes of this course are to assist the student in developing the ability to critically evaluate social science research on the black experience and to do research in African studies. To accomplish these goals, the course will acquaint students with the processes of conceptualization and basic research techniques, and some of the unique issues in conducting research on the black experience. A variety of appropriate studies will be utilized. One three-hour seminar. *Staff*

**AAS 211 The American Dance Experience and Africanist Dance Practices (see DAN 211)**

**AAS 221 Inequality: Class, Race, and Gender (see SOC 221)**

**AAS 230 African American English and Syntactic Variation (see LIN 270)**

**AAS 262 Evolution of Jazz Styles (see MUS 262)**

**AAS 311 An Introduction to Black Women’s Studies (also WOM 313)**  
Fall SA  
An interdisciplinary introduction to the study of women of African descent in the United States, 1830 to the present, through sociology, history, law, religion, and film. This course discusses black women's identity as reflected in community, stereotype, and individuality. One three-hour seminar. *N. Rooks*

**AAS 317 Race and Public Policy (see WWS 317)**

**AAS 318 Black Women and Spiritual Narrative (also REL 318)**  
Spring LA  
Analyzes narrative accounts of African American women since the 19th century. Drawing on the hypothesis that religious metaphor and symbolism have figured prominently in black women's writing—and writing about black women—across literary genres, the class explores the various ways black women have used their narratives not only to disclose the intimacies of their religious faith, but also to understand and to critique their social context. Students will discuss themes, institutions, and structures that have traditionally shaped black women’s experiences, as well as theologies black women have developed in response. One three-hour seminar. *W. Best*

**AAS 320 African American Religious History (see REL 320)**

**AAS 321 Black Power and Its Theology of Liberation (also REL 321)**  
Fall HA  
This course examines the various pieties of the Black Power Era. It charts the explicit and implicit utopian visions of the politics of the period that, at once, criticized established black religious institutions and articulated alternative ways of imagining salvation. It also explores the attempt by black theologians to translate the prophetic black church tradition into the idiom of black power. The aim is to keep in view the significance of the Black Power era for understanding the changing role and place of black religion in black public life. Two lectures, one preceptorial. *E. Glaude*

**AAS 325 African American Autobiography (also ENG 393)**  
Fall LA  
Highlights the autobiographical tradition of African Americans from the antebellum period to the present as symbolic representations of African American material, social, and intellectual history and as narrative quests of self-development. Students will be introduced to basic methods of literary analysis and criticism, specifically focusing on cultural criticism and psychoanalytic theory on the constructed self. One three-hour seminar. *V. Smith*

**AAS 333 Studies in the Classical Tradition (see CLA 335)**

**AAS 334 Educating a New Majority (also SOC 334)**  
Not offered this year  
SA  
This course examines minority education in the United States in the context of the sociology of education and intergroup relations from a historical perspective, and the most recent conditions facing African Americans and other...
AAS 336 Race and American Politics (see POL 336)

AAS 340 Shades of Passing (also ENG 391/AMS 340)  Fall LA

Studies the trope of passing in 20th-century American literary and cinematic narratives in an effort to re-examine the crisis of identity that both produces and confounds acts of passing. Examines how American novelists and filmmakers have portrayed and responded to this social phenomenon, not as merely a social performance but as a profound intersubjective process embedded within history, law, and culture. Focuses on narratives of passing across axes of difference, invoking questions such as: To what extent does the act of passing reinforce or unblur seemingly natural categories of race, gender, and sexuality? One three-hour seminar. A. Cheng

AAS 346 The American Jeremiad and Social Criticism in the United States (see REL 367)

AAS 351 Law, Social Policy, and African American Women  Spring

Journeying from enslavement and Jim Crow to the post-civil rights era, this course will show how law and social policy have shaped, constrained, and been resisted by black women's experience and thought. Using a wide breadth of materials including legal scholarship, social science research, visual arts, and literature, students will also develop an understanding of how property, the body, and the structure and interpretation of domestic relations have been frameworks through which black female subjectivity in the United States was and is mediated. Two lectures, one preceptorial. I. Perry

AAS 352 Black Protest in 20th-Century America (also HIS 483)  Not offered this year HA

Examines the evolution of African American political mobilization in the 20th century. Explores the various ways that African Americans articulated their political demands and affirmed their citizenship, using worker's rights, the church, feminism, education, war, grassroots organizations, the federal bureaucracy, international allies, and the law as tools for political action. Prerequisite: HIS 387 recommended. One three-hour seminar. N. Rooks

AAS 353 African American Literature: Origins to 1910 (also ENG 352)  Not offered this year LA

A survey of literary materials produced within the African American experience, from the 18th century through the contemporary period, with special emphasis on genre, theme, and context. The course will investigate dominant and marginalized literary histories and the importance of gender, region, and sensibility. Two lectures, one preceptorial. D. Brooks

AAS 356 Migration, Urban Space, and African American Culture (also AMS 356)  Not offered this year SA

From 1910 until 1940, African Americans migrated from rural to urban areas. This interdisciplinary course will focus on cultural geography, or how the resulting changes and realignments of place and space have shaped and continue to shape American society and affect understandings of African American identity and culture. One three-hour seminar. N. Rooks

AAS 359 African American Literature: Harlem Renaissance to Present (also ENG 366)  Spring LA

This introductory course surveys literature from the early 20th-century to the present; it covers Harlem Renaissance prose and poetry from writers including Countee Cullen, W.E.B. DuBois, Langston Hughes, Zora Neale Hurston, Nell Larsen, Alain Locke, James Weldon Johnson, Claude McKay, and Jean Toomer; modernist poetry by Gwendolyn Brooks and Robert Hayden; drama by Lorraine Hansberry; novels by Ralph Ellison and Toni Morrison; and nonfiction by James Baldwin, Alice Walker, and Richard Wright. The course analyzes aesthetic forms and locates literary texts in social and political contexts. Two lectures, one preceptorial. V. Smith

AAS 362 Race and the American Legal Process: Emancipation to the Voting Rights Act (also WWS 497/POL 338)  Fall SA

This course examines the dynamic and often conflicted relationships between African American struggles for inclusion, and the legislative, administrative, and judicial decision-making responding to or rejecting those struggles, from Reconstruction to the passage of the Voting Rights Act. In tracing these relationships we will cover issues such as property, criminal law, suffrage, education, and immigration, with a focus on the following theoretical frameworks: equal protection, due process, civic participation and engagement, and political recognition. Two lectures, one preceptorial. I. Perry

AAS 363 Topics in the Politics of Writing and Difference (see SPA 352)

AAS 365 Migration and the Literary Imagination (also REL 362/ENG 394)  Fall LA

This course will explore the various meanings of migration and mobility found in 20th-century African American literature. Through careful historical and literary analysis, we will examine the significant impact migration has had on African American writers and the ways it has framed their literary representations of modern black life. W. Best

AAS 366 African American History to 1863 (see HIS 386)

AAS 367 African American History from Reconstruction to the Present (see HIS 387)

AAS 368 Topics in African American Religion (also REL 368/POL 424)  Not offered this year EM

http://www.princeton.edu/ua/
Assesses the value of religion and its impartations of the historical, ethical, and political in African American life. Courses will also critique African American religion from a broader contextual basis by establishing commonalities and differences across historical and cultural boundaries. Two lectures, one preceptorial. M. Harris-Lacewell

AAS 370 History of Criticism (see ENG 306)

AAS 373 History of African American Art (see ART 373)

AAS 384 Prejudice: Its Causes, Consequences, and Cures (also PSY 384)  Fall SA

Prejudice is one of the most contentious topics in modern American society. There is debate regarding its causes, pervasiveness, and impact. This goal of this course is to familiarize students with the psychological research relevant to these questions. We will review theoretical perspectives on prejudice to develop an understanding of its cognitive, affective, and motivational underpinnings. We will also discuss how these psychological biases relate to evaluations of, and behavior toward, members of targeted groups. In addition, research-based strategies for reducing prejudice will be discussed. S. Sinclair

AAS 388 Studies in African American Popular Culture  Not offered this year SA

Explores the production, reception, aesthetics, and politics of black popular culture in the United States. Examines current and historical media images and exchanges while interrogating the dynamics, tensions, and personalities shaping the reception and circulation of popular cultural texts. Two lectures, one preceptorial. N. Rooks, M. Petty

AAS 389 Women Writers of the African Diaspora (see ENG 389)

AAS 390 African American Intellectual History (also HIS 481)  Not offered this year HA

An examination of the ways in which African American intellectualism is constructed in the history of Africans in the United States; the written and oral works of recognized black intellectuals; and the economic, cultural, historical, social, and political conditions under which such works are created and remembered. Two lectures, one preceptorial. Staff

AAS 391 Race, Class, and Intelligence in America (also SOC 391)  Not offered this year EC

The course explores relationships among race, class, and intelligence measurements. The history of the measurement of intelligence is analyzed. Historical and contemporary conceptualizations of race, ethnicity, and social class in America, including gender inequality, are examined. The "nature versus nurture" IQ heritability controversy is given thorough examination, as are analyses of works such as The Bell Curve. Attention is given to the educational system in America, expectancy and labeling effects, stereotype threat, and to public policy. One two-hour lecture, one preceptorial. Staff

AAS 392 Topics in African American Literature (also ENG 392)  Not offered this year LA

A historical overview of black literary expression from the 19th century to present day. Will emphasize a critical and analytical approach to considering the social, cultural, and political dimensions of African American literature. Two lectures, one preceptorial. D. Brooks

AAS 403 Race and Medicine (also ANT 403)  Spring EM

In 1998, then-President Clinton set a national goal that by the year 2010 race, ethnic, and gender disparities in six disease categories would be eliminated. While the agenda, called Healthy People 2010, is a noble goal, there is one major hurdle. No study has definitively determined the cause of health disparities. This course examines the role culture plays in reproducing health inequalities in the United States. For a final project, students will be asked to propose their own solutions for eliminating health disparities. One three-hour seminar. C. Rouse

AAS 412 Seminar in Political Theory (see POL 411)

AAS 413 Major Author(s) (see ENG 411)

AAS 422 Race and Sport (also HIS 482)  Not offered this year HA

Explores the connections between race, class, and gender and organized sports in 20th-century America. Looks at how athletics and team sports mirror broader social and political debates on race in American society. One three-hour seminar. S. Mathieu

AAS 477 The Civil Rights Movement (also HIS 477)  Spring HA

This course examines the evolution of African American political mobilization from 1945 to 1975. It explores the various ways that African Americans articulated their political demands and affirmed their citizenship, using workers' rights, the church, feminism, education, war, grassroots organizations, the federal bureaucracy, and the law as tools for political action. The readings for this course draw heavily from personal narratives, oral testimonies, and historical scholarship. One three-hour seminar. J. Perry, J. Guild

http://www.princeton.edu/ua/
Program in African Studies

**Director**
Daniel I. Rubenstein

**Executive Committee**
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Kwame Anthony Appiah, Philosophy, University Center for Human Values
Wendy L. Belcher, Comparative Literature, African American Studies
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Andrew P. Dobson, Ecology and Evolutionary Biology
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Evan S. Lieberman, Politics
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S. George H. Philander, Geosciences
Carolyn M. Rouse, Anthropology, African American Studies
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Jennifer A. Widner, Woodrow Wilson School, Politics

**Sits with Committee**
Nancy Pressman-Levy, Library
Jeanne Altmann, Ecology and Evolutionary Biology

The Program in African Studies is a multidisciplinary forum that brings together students and faculty to learn about Africa—its peoples, environments, and resources—by exploring cultural, historical, political, scientific, and technological issues. These are brought together in an introductory course and reinforced in the senior colloquium where students share their works in progress. In between these "bookends," the program sponsors and endorses a variety of courses, seminars, and field study programs enabling students majoring in any department to design a course of study that satisfies their interests in Africa.

**Admission to the Program**

Students seeking admission to the program should contact the program manager.

**Program of Study**

To obtain the certificate of proficiency, students must complete the normal requirements in their major department as well as the following requirements of the program:

1. Introduction to African Studies (AFS 200);
2. Four courses from an approved list (see below);
3. The Senior Colloquium where students discuss work-in-progress;

Students are exempt from the AFS 200 requirement if they have taken courses at the University of Cape Town. No more than two courses in Swahili will count toward the four-course requirement.

**Study Abroad**

The Program in African Studies strongly encourages concentrators to study in Africa. Princeton has its own "Semester in Kenya" where Princeton faculty and Kenyan scholars teach a sequence of four courses that each lasts a week. A summer program of intensive Swahili instruction in Tanzania at the University of Dar es Salaam taught by Princeton and African instructors was initiated in the summer of 2007. Princeton also has a linkage with the University of Cape Town to enable undergraduates to study in South Africa for a semester or a year. Students are also welcome to study at other African universities, such as Rhodes University in South Africa, which offers an approved summer course.

**Certificate of Proficiency**

Students who have met the requirements of the program and their department will receive a certificate of proficiency in African studies upon graduation.

**Courses in African Studies.** A list of courses in African studies offered by other departments and programs may be found on the program website. If other courses on Africa are offered, these may be added with the permission of the director.

The Program in African Studies sponsors seminars throughout the year that bring to the University distinguished scholars, government officials, and other experts with diverse points of view and interests in Africa. The program also sponsors an "Indaba" where members of the University gather for informal discussion of African issues over breakfast.

http://www.princeton.edu/ua/
Program in Swahili. The Program in African Studies offers a four-term sequence of language instruction in Swahili. Completion of all four terms of the sequence will satisfy the University language requirement. Occasionally, more advanced courses also will be offered. Note: Normally students electing a beginner's course in any language will receive credit only if two terms are completed.

The program emphasizes the skills of speaking, reading, and writing Swahili as well as the cultural context of the East African nations where Swahili is spoken. The program encourages students to consider study abroad during the school year or the summer to complement their language study. Princeton offers intensive intermediate Swahili instruction during the summer at the University of Dar es Salaam in Tanzania. For more information, contact the Program in African Studies.

Princeton in Africa. Students interested in working in Africa after graduation can apply to the Princeton in Africa (PiAF) program for fellowships. Princeton in Africa seeks to develop young leaders committed to Africa's enhancement. To accomplish this, PiAF offers opportunities for service through fellowships with a variety of organizations that work across the African continent.

Courses

AFS 200 Introduction to African Studies   Spring SA
An exploration of the past, present, and future of Africa in a multidisciplinary setting. A dozen Africanist faculty members collaborate in an effort to shed light on both the huge potential of Africa and its peoples and the enormous challenges the continent faces. Topics vary from politics, economics, conservation, biodiversity, climate change, the environment, health and disease, and written and oral literature, to the impact of the world on Africa as well as Africa's contributions to and place in worlds present and past. Two lectures, one preceptorial. Staff

AFS 258 Music of Africa (see MUS 258)

AFS 303 Social Structure in Africa: Responses to Socio-Political and Economic Forces Since Independence Spring SA
The seminar addresses the structural consequences and responses that African nations and communities developed upon their insertion into global political and economic practice and discourse. Africa's character prior to modern nationhood forms the backdrop to discussions of the development and utilization of social, political, and economic strategies for continued participation in global political and economic intercourse. Themes include: traditional religious practice and the church; global economic interactions; African interstate relations; governance, regime change, and elections; wars and displacement; and women in society. C. Agawu

AFS 374 African Development and Globalization   Spring SA
Africa today represents less than 2 percent of the world's GDP. The legacy of colonial rule has undoubtedly contributed to a slowdown in the international competitiveness of Africa. However, there are internal factors as well. Today, many countries are progressively shifting from a US-EU-Africa paradigm, to one that includes a larger proportion of alternative investors from the Middle-East, India, and China. This seminar will focus on the effect of the legacy of complex political intricacies and the ways in which Africa engages the world; and how African countries face and anticipate the challenges of globalization. One three-hour seminar. M. Sagna

AFS 400 Topics in African Studies   Not offered this year
Designed to allow juniors and seniors enrolled in the program to examine significant problems in Africa in an interdisciplinary manner. Topics vary from year to year, reflecting faculty research interests. Prerequisite: one core course and one cognate course, or instructor's permission. Required of all program concentrators; open to others by permission of program director and course instructor. Staff

AFS 427 Conflict in Africa   Fall
Examines selected aspects on conflict in Africa. The concept "conflict" is used to mean organized and/or collective political violence that causes the death of about 1,000 people per year. The course will focus on the following issues: analytical debates about conflicts in Africa; actors/participants such as guerrillas, warlords, and child soldiers; continental politics about conflict; the politics of humanitarian intervention; wars in the Great Lakes Region; the war and warlords of West Africa; the genocide in Rwanda, and the aftermath of wars, especially those of Southern Africa. One three-hour seminar. A. Seegers

SWA 101 Elementary Swahili I   Fall
An introduction to Kiswahili language and culture. Focuses on the development of the communication skills students need to interact with Swahili speakers. Instruction emphasizes cultural themes and experiential activities that enhance the four components of speaking, writing, listening, and reading. Students will also gain some insight into the cultures of East Africa. Four classes. M. Mwita

SWA 102 Elementary Swahili II   Spring
Continuation of SWA 101. Emphasis is on increasing proficiency in reading and listening comprehension, speaking, and writing. Cultural contexts of the East African societies where Swahili is spoken are incorporated in classroom
activities in order to enhance communication and cultural proficiency. Prerequisite: SWA 101. Four classes. M. Mwita

SWA 105 Intermediate Swahili I  Fall

This second-year Swahili course focuses on enhancing the communicative skills acquired in the first year. Instruction emphasizes reading, writing, speaking, and listening. The course infuses cultural and sociopolitical aspects of life in East Africa with more complex grammatical concepts such as the subjunctive, grammar infixes, and relative clauses. Prerequisites: SWA 101 and 102, or instructor's permission. Four classes. M. Mwita

SWA 105T Intermediate Swahili I in Tanzania

This intensive four-week course offered at the University of Dar es Salaam will cover similar content as the regular 105 offered at Princeton in the fall semester. Content will continue from 101 and 102, focusing on enhancing the communicative skills acquired in the previous semesters, through reading, writing, speaking, and listening activities on cultural content that review and consolidate already acquired language skills. Special emphasis will be placed on East African content and classroom/out-of-class activities/exercises will require frequent day-to-day interaction with native speakers of Kiswahili. M. Mwita, A. Mutembei

SWA 107 Intermediate Swahili II  Spring

Emphasizes conversational fluency and increased facility in reading and writing skills while introducing students to Swahili literature. This literature forms the basis for a survey of cultural issues and more advanced grammar. Students will be able to understand and analyze the main ideas and significant details of materials in Swahili such as media articles, short stories, poetry, short novels, films, and plays. Covers advanced-level Swahili grammar, as well as the development of expository writing skills. Prerequisite: SWA 105, or instructor's permission. Four classes. M. Mwita

SWA 107T Intermediate Swahili II in Tanzania

This is a continuation of the 105T (Intermediate Swahili I) intensive summer course offered at the University of Dar es Salaam. It will cover similar content as the regular 107 offered at Princeton in the spring semester. Communicative skills acquired in the previous semesters will be enhanced through reading, writing, speaking, and listening activities on cultural content that review and consolidate already acquired language skills. Special emphasis will be placed on East African content and classroom/out-of-class activities/exercises will require frequent day-to-day interaction with native speakers of Kiswahili. M. Mwita, A. Mutembei
Program in American Studies

**Director**
Hendrik A. Hartog

**Executive Committee**
Wallace D. Best, Religion, African American Studies
M. Christine Boyer, Architecture
Margot Canaday, History
Anne A. Cheng, English, African American Studies
Rachael Z. DeLue, Art and Archaeology
Jill S. Dolan, English, Lewis Center for the Arts
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Alexandra T. Vazquez, English, African American Studies
Judith L. Weisenfeld, Religion
R. Sean Wilentz, History

The Program in American Studies is an interdepartmental plan of study. The aim is to give students an understanding of American society--its culture, its institutions, its intellectual traditions, and the relationships among its diverse people--by exploring and debating issues raised in the separate disciplines.

The cooperating departments from which the program draws faculty and other resources include anthropology, architecture, art and archaeology, economics, English, history, music, philosophy, politics, psychology, religion, sociology, and the Woodrow Wilson School of Public and International Affairs. Students from all departments are welcome to apply for admission.

**Admission to the Program**

The program accepts approximately 45 students each year. Criteria for admission are a strong academic record and particular interest in the multidisciplinary work of the program. Before applying for admission, students must take American Studies 201, preferably during the sophomore year, and achieve a satisfactory standing in the course.

**Program of Study**

In addition to 201, students must complete two 300- or 400-level American studies courses. The work of these courses involves cooperative study of a major topic in American history or culture and its relation to other aspects of American life. Usually, the course operates as a seminar, with emphasis on independent research and writing. Lectures and discussions led by outside specialists, as well as films or field trips, frequently supplement the work.

Students must also complete three American studies electives, which are courses in the American field offered by departments throughout the University and approved by the program director (pass/D/fail not acceptable).

Students are expected to complete a normal departmental course of study with such emphasis on the American field as that department permits. The senior thesis must be on a topic related to American culture or history.

**Certificate of Proficiency**

Students who fulfill all requirements of the program will receive a certificate of proficiency in American studies upon graduation.

**Courses**

**AMS 201 American Places: An Introduction to American Studies**  Fall HA

An introduction to the key themes of interdisciplinary work on North America, from the 16th century to the modern era. Readings and related material will focus on the study of particular American places. Topics may include native-European contact, the American Revolution, slavery, urbanization, the rise of mass culture, and the computer revolution. One 90-minute lecture, one 90-minute preceptorial. *W. Gleason*

**AMS 305 Law and Work (also POL 425)**  Fall SA

http://www.princeton.edu/ua/
Examines both what people want, and historically have wanted, in the workplace, and how American laws provide or fail to provide these rights and opportunities. Emphasizes the legal regimes created by the Wagner Act of 1935 and the Civil Rights Act of 1964. Categories of rights created in these eras are constantly being re-designed and understood. The class will look at how the law has interpreted these rights, and how far the expansion of workplace rights extends. Is the workplace best seen as a site for individual opportunity and personal growth, a furthering of American democracy, or an avenue to making money? One three-hour seminar. P. Frymer

AMS 317 The Fear of God: American Horror from Jonathan Edwards to Cloverfield Fall LA

This seminar explores the evolution of American horror fiction and cinema, from the religious roots in the Puritan sensibility to the present day when horror addresses a somewhat wider range of dreads—including, but not confined to, the traditional fear of damnation. Works selected reflect a constant oscillation between the moral and amoral ends of fear-generation. The seminar will investigate this irresolvable ambivalence about the relative merits of salvation through fear versus fear as a perverse form of entertainment. One three-hour seminar. Staff

AMS 325 Urban Education Reform Fall SA

This seminar focuses on issues involved in improving educational opportunities for children in urban schools. Students will analyze the historical and contemporary writings on issues fundamental to student educational performance, with emphasis on understanding the barriers and pathways to reform. Students will also apply their readings to case studies of selected urban school districts exploring the policy and political dimensions of various reform initiatives. One three-hour seminar. L. Gerwin

AMS 331 Intellectual Property: Theory, History, and Policy Fall EM

Intellectual property law is concerned with the legal regulation of mental products. It affects such diverse subjects as the visual and performing arts, new plant varieties, electronic databases, advertising, insulin-producing bacteria, and video games. This course seeks to mix theoretical, historical, and policy approaches to the regulation of knowledge. Through approaching intellectual property as a regulatory system, it will examine the balancing of incentives to foster human creativity with the concern about unduly restricting its diffusion. One three-hour seminar. Staff

AMS 332 Special Topics in Performance History and Theory (see THR 331)

AMS 340 Shades of Passing (see AAS 340)

AMS 346 Latinos in American Life and Culture (see LAO 200)

AMS 350 Civil Society and Public Policy (see WWS 325)

AMS 353 Moby-Dick Unbound (also ENG 355) Spring LA

Undertakes a close reading of Moby-Dick (1851), often acclaimed as the greatest American novel. Why was this story of a tragic sea voyage so neglected in its day, and so celebrated by later generations? To explore its twin lines of action—Ahab's drive to kill a white whale versus Ishmael's quest to know it—the class will use the methods of history, literature, art, religion, economics, philosophy, and ecology. Of special interest are the ways Melville anticipates recent environmental thought, depicts a globalized culture, and dramatizes the national struggle to reconcile faith and fact, race and justice. One three-hour seminar. W. Howarth

AMS 356 Migration, Urban Space, and African American Culture (see AAS 356)

AMS 361 Festival, Celebration, and Ritual in American Culture (see REL 361)

AMS 396 The Idea of America (see CHV 396)

AMS 411 Seminar in Political Theory (see POL 411)
**Information and Departmental Plan of Study**

**Prerequisites**

Students who wish to major in anthropology must take one anthropology course (any level) prior to junior year or have permission from the departmental representative. It is recommended they complete 201 prior to spring of junior year.

**Early Concentration**

A sophomore may apply for early concentration through consultation with the departmental representative.

**Program of Study**

Anthropology concentrators take eight or more departmental courses. Three are required "core" courses: 201 Introduction to Anthropology, 301 The Ethnographer's Craft, and 390 History of Anthropological Theory. The core courses ensure that students will have a systematic understanding of method and theory in sociocultural anthropology. Because core courses prepare students for all independent work (junior paper and senior thesis), students should plan to complete 301 and 390 in their junior year.

The rest of each student's courses may be chosen in accordance with his or her special interests. Up to two courses from other departments may be counted as cognates so long as they are judged by the departmental representative to be relevant to a student's junior or senior independent work. Well-prepared undergraduates may take graduate seminars for departmental credit. To enroll in a graduate seminar, the student must have the approval of the departmental representative and the instructor of the course.

**Independent Work**

**Junior Independent Work.** Independent work in the junior year includes readings and research toward the writing of a junior paper. In the fall students work with a faculty adviser to develop a detailed research proposal and annotated bibliography. In the spring students submit a paper based on the research initiated in the fall.

**Senior Independent Work.** In the senior year, the independent work consists of a thesis, or a comparable project that must include a substantial written component, on a subject relevant to the student's interests that has the approval of the department. Field work is encouraged but not required. It is recommended that students participate in a senior workshop.

**Senior Departmental Examination**

In the spring of senior year, all concentrators must complete a departmental examination designed to test their knowledge of the broader field of anthropology.
Special University Programs. Students who choose to major in the department are encouraged to take advantage of opportunities for individual study under special University programs. For example, under the Study Abroad Program students may enrich their programs at Princeton with a term or a year of anthropological study abroad. Under the Field Study Program it is possible for departmental students to do intensive domestic field study. The Community-Based Learning Initiative also provides opportunities for independent research. Students should consult with the departmental representative about these and other possibilities.

Interdepartmental Programs. Students concentrating in the department may participate in programs such as: African American studies, African studies, American studies, East Asian studies, European cultural studies, Hellenic studies, humanistic studies, South Asian studies, Latin American studies, Near Eastern studies, women and gender, and the Woodrow Wilson School's Program in Law and Public Affairs.

Courses

ANT 201 Introduction to Anthropology   Fall SA
A comparative study of human cultures. The human capacity for culture, embedded in language and symbolism, enables us to know the world in distinctive ways. Culture helps us make sense of human nature and distinguish between the universal and the culturally specific. Knowledge of the world and nature, and that which gives meaning to human life, is "uncultured" cognition. Students examine diverse cognitive dispositions through empirical, historical, and theoretical cross-cultural conditions for the possibility of gaining knowledge. Two lectures, one preceptorial. J. Borneman

ANT 206 Human Evolution (also GEO 208/EEB 306)   Spring EC
The evolution of humans in the Pleistocene. An interdisciplinary perspective on the role of biology and culture in human evolution. Readings and lectures from the fields of biology, geology, and anthropology. Two lectures, one class. A. Mann, J. Monge

ANT 215 Human Adaptation (also EEB 315)   Fall ST
Human adaptation focuses on human anatomy and behavior from an evolutionary perspective. Lectures and weekly laboratory sessions focus on the evolution of the human brain, dentition, and skeleton to provide students with a practical understanding of the anatomy and function of the human body and its evolution, as well as some of its biological limitations. No science background required. Two 90-minute lectures, one three-hour laboratory. A. Mann, J. Monge

ANT 225 Japanese Society and Culture (see EAS 225)

ANT 232 Social Lives, Social Forces   SA
Examining law and love as social forces provides a way to examine some key assumptions behind such everyday distinctions as altruism and self-interest, public and private, rules and norms, regulation and free market, kinship and citizenship, friend and foe. This seminar untangles these binaries by exploring various settings--of family, community, law, and business--where they have been put into practice as organizing principles, and thus into contention. It also follows them beyond the United States into postcolonial and post-socialist environments, so as to further hone our comparative and interpretive questions. One three-hour seminar. C. Greenhouse

ANT 250 Musical Cultures of the World (see MUS 250)

ANT 301 The Ethnographer's Craft   Fall SA
Ethnography as a craft and as a written genre, combining student field research projects in Princeton with the study of classic ethnographies. Required for juniors concentrating in anthropology. One 90-minute lecture, one 90-minute class. Prerequisite: one course in anthropology or instructor's permission. Staff

ANT 304 Political Anthropology   SA
A cross-cultural examination of collective action, power, and legitimacy. Topics will include cultural variation in systems of leadership and decision making, the sociocultural contexts of egalitarianism and hierarchy, and human rights struggles. Issues of representation and self-representation in film and media will be considered. One 90-minute lecture, one 90-minute class. Staff

ANT 306 Current Issues in Anthropology   SA
A course taught by different members of the department and visiting faculty on various subjects not normally taught in regular courses. Staff

ANT 310 Fundamentals of Biological Anthropology   EC
A survey of current data and debates in evolutionary theory, molecular anthropology, primate biology and behavior, primate and human evolution, and modern human biology and adaptation. One three-hour seminar. A. Mann

ANT 311 Cultural Analysis and International Development Dilemmas   SA
Designed to give students the anthropological tools to analyze concrete development dilemmas. Specific instances of
ANT 315 Modern Human Origins  ST

This summer course focuses on the fossil and archaeological evidence that documents the evolutionary origins of modern humans. Working at the prehistoric cave site of Marillac in the southwest of France, students have an intensive introduction to archaeological field and laboratory techniques. Three weeks of classroom/lecture and three weeks of field study/laboratory. A. Mann

ANT 316 Cultural Diversity: Money, Sex, Nation  SA

This course explores the use of money, sex, and national belonging in processes of cultural diversification. Its focus is anthropological: making and understanding difference in space and time. Its method is primarily ethnographic: relating face-to-face or personal encounters to macro-political factors and to contemporary issues. Drawing from film, music, and selected readings, it examines how money, sex, and national form create value and interact to create people. Students will be asked to examine critically and reflexively their own prejudices as they influence the perception and evaluation of cultural differences. One three-hour seminar. J. Borneman

ANT 318 Understanding Muslim Social and Political Movements  SA

Introduces students to a number of contemporary movements claiming to restore Islam as the central norm for practice in the social, economic, and political life of Muslim communities and societies. These movements are studied from an anthropological perspective, using anthropological studies as well as writings by orientalists and others. The course is centered on the reconfiguration of religion, self, community, identity, and power. Emphasis on the Arab world and Iran. One three-hour seminar. A. Hammoudi

ANT 321 Ritual, Myth, and Worldview  SA

An exploration of classic and modern theories of religion (belief, ritual, myth, worldview) as they pertain to a cross-cultural understanding of these phenomena. One 90-minute lecture, one 90-minute class. I. Clark-Deces

ANT 322 Cross-Cultural Texts  HA

This seminar closely reads descriptive and fictive works replete with cross-cultural representations and juxtaposed histories. What makes a given comparative account--whether colonialist or postcolonialist--compelling? Various genres--ethnographic essays, intense travel narratives, translated tales and myths, and novels--receive concerted attention. One three-hour seminar. J. Boon

ANT 330 The Rights of Indigenous Peoples  EM

Using American Indian sovereignty, Australian Aborigine land claims, the Canadian Bill of Rights, the Maori Treaty of Waitangi, and various international conventions, students will consider whether there is a fundamental right to cultural integrity, and the historical, legal, and ethical implications posed by the relations between modern states and their indigenous populations. One 90-minute lecture, one 90-minute class. L. Rosen

ANT 331 The Anthropology of Gender  SA

An introduction to archaeological field and laboratory techniques. Three weeks of classroom/lecture and three weeks of field study/laboratory.

ANT 332 The Anthropology of Selected Regions  SA

The significant impact of peoples of particular regions on the development of anthropological theory, method, and sensibility. Special attention to the dynamic precolonial history of the region and to political and religious movements in the contemporary context of rapid socioeconomic change. Staff

ANT 333 Social Change in Contemporary India (also SAS 337)  SA

This course introduces students to the debates that have defined the anthropological study of India. It explores classic and recent theories of caste and hierarchy, focusing in particular on the ethnography of change in everyday Indian life. The course also considers the emergence of identity politics in India. Communal identities and power relations in India are often expressed and challenged in popular religious practices. The course will explore everyday Indian religiosity with reference to debates about Hindu reformism and nationalism. One three-hour class. I. Clark-Deces

ANT 335 Medical Anthropology  EM

Exploration of cross-cultural constructions of sickness, disease, health, and healing interrogates our basic ethical, moral, and political positions. Our healing and disease models derive from specific cultural assumptions about society, gender, class, age, ethnicity, and race. Categories of disease from one culture can compromise ethical positions held by another. We pursue the moral implications of a critique of medical development and the political and ethical implications of treating Western medicine as ethnoscientific as well as universal truth. One 90-minute lecture, one 90-minute class. J. Biehl

ANT 336 The Anthropology of Law  EM

Study of the relation between formal legal institutions and the social and cultural factors influencing their development. Western and non-Western systems compared in terms of their forms of judicial reasoning, implementation through law of moral precepts, fact-finding procedures, and dispute settlement mechanisms. Two 90-minute lectures. L. Rosén

http://www.princeton.edu/ua/
ANT 352 Pacific Islanders: Histories, Cultures, and Change  SA
This course concerns histories of Pacific Islanders from the first settlements through colonial rule. It will also look at the diversity of cultures and their sociocultural transformation in more recent times. Throughout the semester, we will also use Pacific ethnography to shed light on general questions concerning cultural difference, inequality, and issues of interpretation/translation. Two 90-minute classes. R. Lederman

ANT 363 Islamic Social and Political Movements (see NES 363)

ANT 390 History of Anthropological Theory  Spring HA
A review of the main currents in anthropological theory with particular emphasis on major issues in American and European anthropology and the intellectual climate within which they developed. Required for juniors concentrating in anthropology. One 90-minute lecture, one 90-minute class. Prerequisite: one course in anthropology or instructor's permission. Staff

ANT 403 Race and Medicine (see AAS 403)

ANT 404 Special Topics in Regional Studies  HA
Analysis of a major world region stressing the issues of cultural diversity, history, and social change. Attention will be given to the theoretical contributions of regional study, the history of regional approaches, and the internationalization of the production of anthropological research. Prerequisite: instructor's permission. Staff

ANT 405 Topics in Anthropology  SA
Study of a selected topic in anthropology; the particular choice will vary from year to year. Staff

ANT 406 Theoretical Orientations in Cultural Anthropology  SA
Analysis of classical and contemporary sources of cultural anthropology, with particular emphasis on those writers dealing with meaning and representation. The topical focus of the course will vary with the instructor. Prerequisite: anthropology major or instructor's permission. One three-hour seminar. Staff

ANT 412 Anthropological Approaches to the Study of Religion (also REL 412)  SA
Classic and modern theories of religion relevant to anthropologists. Students will familiarize themselves with anthropological monographs dealing with a particular aspect of religion: shamanism, witchcraft, possession and ecstasy, healing. Prerequisite: instructor's permission. Staff

ANT 413 Cultures and Critical Translation  EC
Approaches to language and culture by Sapir, Saussure, and their forerunners and successors. The seminar draws on anthropology, linguistics, and other disciplines alert to critical theories of translation. Topics include field work encounters, standardized nationalist and colonialist languages, philosophies of translation, ritual languages, marketplace discourse, and orality/literacy. One three-hour seminar. Prerequisite: anthropology major or instructor's permission. J. Boon

ANT 415 The Anthropology of Science  EC
This course considers how the sciences can be studied ethnographically, how they vary culturally one from another, and how scientific knowledge is generated. It develops an understanding of the values and social contexts of Western scientific practice through the comparative study of Western and non-Western systems of knowledge, and explores the implications and validity of the assumption that the sciences are culturally produced rather than objective standards transcending culture. One three-hour seminar. Staff

ANT 416 Culture and International Order  SA
This course focuses on the relation of local and global cultural processes to international orders and regimes. After colonialism and after the Cold War, there is a fundamental reorganizing of "peoples" and "cultures." Emphasis on the increased intensity and scale of interaction between local and global processes, on changes in group identifications, on the transformation of ideologies (cultural, economic, religious, political), and on alternative ways of imagining and managing life. One three-hour seminar. J. Borneman

ANT 425 Post-War French Social Theory  SA
Using the works of thinkers such as Sartre, Merleau Ponty, Aron Ricoeur, Lévi-Strauss, Foucault, and Bourdieu, the course will present students with some conflicting images of Western society. It will introduce students to these authors, with emphasis on their departure from traditional schools of thought and the consequences of their ideas on the production of knowledge and societies. Two 90-minute seminars. A. Hammoudi

ANT 427 Democracy and Ethnography in the United States  SA
Ethnography is a mode of research, a creative literary genre, and a democratic discourse. This seminar focuses on these different ways of reading in relation to the ethnography of the United States--to consider how ideas about personhood, gender, citizenship, community, identity, and power "work" simultaneously as theory and practice. Drawing on close readings of ethnographies, fiction, and public policy debates, the seminar gives particular attention to the (often uneasy) connections among anthropological theories of cultural identity, political struggles over rights, and literary experiments in social analysis. One three-hour seminar. C. Greenhouse

http://www.princeton.edu/ua/
ANT 432 The Anthropology of Memory  SA

Explores issues surrounding the organization of experience in dealing with the past, and the use of narrative tools in the analysis of culture and structuring of memory generally. This course takes up three major approaches to memory: social organization (Halbwachs), psychoanalysis (Freud), and associative temporalities (Sebald). A better understanding of memory will improve our approaches to cultural observation, documentation, analysis, and interpretation. One three-hour seminar. J. Borneman

ANT 441 Gender: Contested Categories, Shifting Frames  SA

An exploration of the reciprocal influences of anthropology and gender studies, considering both classic and recent contributions; an evaluation of key interpretive categories (for example, "nature," "domestic," "woman") specifically in the context of cross-cultural translation; and comparison of various approaches to questions about the universality of gendered power hierarchies. One three-hour seminar. R. Lederman

ANT 491 Critical Perspectives on Global Health and Health Policy (see GHP 350)
Program in Applications of Computing

**Director**
Kenneth Steiglitz

**Acting Director**
Szymon Rusinkiewicz (fall/spring)

**Executive Committee**
Joel Cooper, Psychology
Bradley W. Dickinson, Electrical Engineering
Paul J. DiMaggio, Sociology, Woodrow Wilson School
David P. Dobkin, Computer Science
Henry S. Farber, Economics
Adam Finkelstein, Computer Science
Thomas A. Funkhouser, Computer Science
James L. Gould, Ecology and Evolutionary Biology
Gilbert H. Harman, Philosophy
Alain L. Kornhauser, Operations Research and Financial Engineering
Paul Lansky, Music
Andrea S. LaPaugh, Computer Science
Sharad Malik, Electrical Engineering
Luigi Martinelli, Mechanical and Aerospace Engineering
Szymon Rusinkiewicz, Computer Science
Robert E. Schapire, Computer Science
Jaswinder P. Singh, Computer Science
Kenneth Steiglitz, Computer Science
Robert F. Stengel, Mechanical and Aerospace Engineering
Olga G. Troyanskaya, Computer Science and Lewis-Sigler Institute for Integrative Genomics

The Program in Applications of Computing is an interdisciplinary program designed for students who want to combine the study of computing and computers beyond an introductory level with another academic concentration, but who are not concentrating in computer science. The program welcomes students in all disciplines, including, of course, the traditional areas of computer application, such as engineering, the physical sciences, economics, and mathematics. Students who are interested in what have been in the past less traditional application areas, such as biology, cognitive science, graphic arts, music, history, philosophy, politics, sociology, literature, and so on are also encouraged to pursue the certificate. Many students have found this program an effective way to understand how computing concepts and technology are changing our world, and to apply computer science to their own specialties.

**Admission to the Program**

The program is open to juniors and seniors who have successfully completed COS 126 General Computer Science or an equivalent prerequisite to COS 217 Introduction to Programming Systems, 226 Algorithms and Data Structures, and 323 Computing for the Physical and Social Sciences, and who have fulfilled the requirements for admission as a concentrator in a department other than computer science. Students interested in the program should contact the program director by e-mail: ken@cs.princeton.edu.

**Program of Study**

The course requirements are simply stated: First, COS 126 or its equivalent. Then, two courses from among the three: COS 217, COS 226, and COS 323. Finally, two more courses at the 300- or 400-level that involve a substantial computing component, at least one of which is a computer science departmental.

In addition, students are required to complete a senior thesis on a topic that makes significant use of some aspect of computer science. The intent is that this thesis satisfy the requirements of both the program and the student's major department and is thus necessarily interdisciplinary. A wide range of thesis topics is possible. In the last few years of the program, students have earned certificates with a variety of majors, including anthropology, chemistry, classics, economics, electrical engineering, history, philosophy, and psychology.

The thesis work is coordinated through the student's thesis adviser in the major department and an assigned program adviser (who may be, in routine cases, the program director). When this isn't possible, the student may instead undertake a one-semester independent project with a strong computer-related component, separate from, but related to, the student's area of concentration. This option must be arranged in consultation with the program adviser, and be approved by the program committee.

Overall, a certificate candidate's courses and thesis must form a coherent plan of study that fulfills both the program requirements and the requirements of the candidate's major department. This planning is done in consultation with the program adviser and the student's academic adviser in the major department. Certificate candidates who want to design custom programs focused on specific aspects of computing applications should feel free to consult with the appropriate committee members.

**Certificate of Proficiency**

Students who fulfill the program requirements receive a certificate upon graduation.

http://www.princeton.edu/ua/
Program in Applied and Computational Mathematics

**Director**  
TBA

**Acting Director**  
Philip J. Holmes

**Departmental Representative**  
Weinan E

**Executive Committee**  
A. Robert Calderbank, Electrical Engineering, Mathematics  
René A. Carmona, Operations Research and Financial Engineering  
Emily A. Carter, Mechanical and Aerospace Engineering  
Ingrid C. Daubechies, Mathematics  
Weinan E, Mathematics  
Philip J. Holmes, Mechanical and Aerospace Engineering  
Yannis G. Kevrekidis, Chemical and Biological Engineering  
Paul D. Seymour, Mathematics  
Amit Singer, Mathematics  
James M. Stone, Astrophysical Sciences  
Jeroen Tromp, Geosciences  
Sergio Verdú, Electrical Engineering

**Associated Faculty**  
Yacine Aït-Sahalia, Economics  
Michael Aizenman, Physics, Mathematics  
William Bialek, Physics, Lewis-Sigler Institute for Integrative Genomics  
David M. Blei, Computer Science  
Adam Burrows, Astrophysical Sciences  
Carlos D. Brody, Molecular Biology, Princeton Neuroscience Institute  
Roberto Car, Chemistry  
Moses S. Charikar, Computer Science  
Bernard Chazelle, Computer Science  
Patrick Cheridito, Operations Research and Financial Engineering  
Mung Chiang, Electrical Engineering  
Erhan Çinlar, Operations Research and Financial Engineering  
Iain D. Couzin, Ecology and Environmental Biology  
Bradley W. Dickinson, Electrical Engineering  
David P. Dobkin, Computer Science  
Jianqing Fan, Operations Research and Financial Engineering  
Jason W. Fleischer, Electrical Engineering  
Christodoulos A. Floudas, Chemical and Biological Engineering  
Mikko P. Haataja, Mechanical and Aerospace Engineering  
Gregory W. Hammett, Plasma Physics Lab, Astrophysical Sciences  
Isaac M. Held, Geosciences, Atmospheric and Oceanic Sciences  
Sergiu Klainerman, Mathematics  
Naomi Ehrich Leonard, Mechanical and Aerospace Engineering  
Simon A. Levin, Ecology and Evolutionary Biology  
Elliott H. Lieb, Mathematics, Physics  
Luigi Martinelli, Mechanical and Aerospace Engineering  
William A. Massey, Operations Research and Financial Engineering  
Jeremiah P. Ostriker, Astrophysical Sciences  
H. Vincent Poor, Electrical Engineering  
Frans Pretorius, Physics  
Jean-Hervé Prévost, Civil and Environmental Engineering  
Herschel A. Rabitz, Chemistry  
Peter J. Ramadge, Electrical Engineering  
Jennifer L. Rexford, Computer Science  
Clarence W. Rowley, Mechanical and Aerospace Engineering  
Robert E. Schapire, Computer Science  
José A. Scheinkman, Economics  
Yakov G. Sinai, Mathematics  
Jaswinder P. Singh, Computer Science  
K. Ronnie Sircar, Operations Research and Financial Engineering  
Howard Stone, Mechanical and Aerospace Engineering  
John D. Storey, Molecular Biology, Lewis-Sigler Institute for Integrative Genomics  
Sankaran Sundaresan, Chemical and Biological Engineering  
Salvatore Torquato, Chemistry  
Olga G. Troyanskaya, Computer Science, Lewis-Sigler Institute for Integrative Genomics  
Geoffrey K. Vallis, Geosciences, Atmospheric and Oceanic Sciences  
Robert J. Vanderbei, Operations Research and Financial Engineering

**Undergraduate Announcement**  
http://www.princeton.edu/ua/

Applied Mathematics at Princeton. There has never been a better time to be a mathematician. The combination of mathematics and computer modeling has transformed science and engineering and is changing the nature of research in the biological sciences. The requirements for the mathematics major are a minimum of eight upperclass courses in mathematics or applied mathematics including three basic courses on real analysis, complex analysis, and algebra. It is possible to design a course of undergraduate study aimed more strongly toward applications. Applied and computational mathematics/mathematics faculty have developed core courses in applied mathematics and several courses where the emphasis is mathematical modeling. The latter is central to applied mathematics where it is not only necessary to acquire mathematical techniques and skills, but also important to learn about the application domain.

The Undergraduate Certificate. The certificate is designed for students from engineering and from the physical, biological, and social sciences who are looking to broaden their mathematical and computational skills. It is also an opportunity for mathematically oriented students to discover the challenges presented by applications from the natural sciences and engineering. Students interested in the undergraduate certificate contact the program's undergraduate representative in the spring semester of their sophomore year to discuss their interests, and to lay out a plan for their course selection and research component.

Program of Study
The requirements for the undergraduate certificate in applied and computational mathematics (ACM) consist of:

1. A total of five courses normally 300 level or higher (requires letter grade; pass/D/fail not accepted), at least two of which are not included in the usual requirements for the candidates' major concentration; and

2. Independent work consisting of a paper/course project/computational laboratory, possibly in the context of a course offered by ACM faculty or a senior thesis in the major department with a significant applied mathematics component (subject to approval of the ACM undergraduate representative). This independent work may not be used to satisfy the requirements of any other certificate.

Regardless of which option is selected in (2), students will also be required to participate during their junior and senior year in a not-for-credit colloquium offered by ACM. This will provide a forum for presentation and discussion of independent work among all certificate students and will introduce them to other areas of applied mathematics.

The five required courses may vary widely from department to department in order to include a broad spectrum of science and engineering students throughout the University. These courses should fit readily within the degree requirements of the respective departments of the engineering school or the economics, mathematics, physics, chemistry, molecular biology, and ecology and evolutionary biology, or other relevant departments, but will require a particular emphasis in applied mathematics.

The five required courses must be distributed between the following two areas, with at least two from each area:

1. Mathematical foundations and techniques, including differential equations, real and complex analysis, discrete mathematics, probability, and statistics, typically offered by the Department of Mathematics.

2. Mathematical applications, including signal processing, control theory, optimization, mathematical economics, typically offered by the economics, science, and engineering departments.

Specific choices must be approved by the ACM undergraduate representative.

The paper/course project/computational laboratories can be done as part of a course offered by applied and computational mathematics faculty or associated faculty on a wide range of topics of current interest in applied mathematics. Such courses vary from year to year and are designated to satisfy automatically the independent work requirement. Four courses developed and staffed by applied and computational mathematics faculty and offered regularly are the following:

- CBE 448/MAT 448 Introduction to Nonlinear Dynamics
- MAE 541/APC 571 Applied Dynamical Systems
- MAT 594/APC 584 Wavelets: Applications of Wavelets in Mathematics and Other Fields
- MAT 595/APC 586 Topics in Discrete Mathematics: Discrete Math

Any other course that students might use to satisfy the independent work requirement must have prior approval from the applied and computational mathematics undergraduate representative. Students may satisfy the independent work requirement outside of a course after consultation with and approval by the undergraduate representative. If the senior thesis option is selected, attempts will be made to coordinate it with departmental requirements.

**Certificate of Proficiency**

Students who fulfill all requirements of the program will receive a certificate of proficiency in applied and computational mathematics upon graduation.

**Relevant Advanced Courses.** A list of representative advanced undergraduate and some graduate courses that meet the certificate requirements can be found on the program website. This list is primarily illustrative and is by no means complete. Specific programs should be tailored by the program undergraduate representative in consultation with the student to meet individual and/or departmental needs.

### Courses

**APC 150 Introduction to Statistics**  
QR  
This course is an introduction to probability and statistical methods, and covers topics in probability, random variables, sampling, descriptive statistics, probability distributions, estimation and hypotheses testing, introduction to the regression model. The course emphasizes the practice, and students will learn how to perform data analysis using modern computational tools. (*L. Martinelli*)

**APC 199 Math Alive (also MAT 199)**  
QR  
An exploration of some of the mathematical ideas behind important modern applications, from banking and computing to listening to music. Intended for students who have not had college-level mathematics and are not planning to major in a mathematically based field. The course is organized in independent two-week modules focusing on particular applications, such as bar codes, CD-players, population models, and space flight. The emphasis is on ideas and mathematical reasoning, not on sophisticated mathematical techniques. Two 90-minute classes, one computer laboratory. (*I. Daubechies, S. Hughes*)

**APC 307 Combinatorial Mathematics** (see MAT 307)  
http://www.princeton.edu/ua/
APC 350 Introduction to Differential Equations (also CEE 350/MAT 350)  QR

An introduction to differential equations, covering both applications and fundamental theory. Basic second-order differential equations (including the wave, heat, and Poisson equations); separation of variables and solution by Fourier series and Fourier integrals; boundary value problem and Green's function; variational methods; normal mode analysis and perturbation methods; nonlinear first order (Hamilton-Jacobi) equations and method of characteristics; reaction-diffusion equations. Application of these equations and methods to finance and control. Prerequisites: MAT 102, 103, and 202. Two 90-minute lectures. W. E

APC 351 Topics in Mathematical Modeling (see MAT 351)

APC 441 Computational Geophysics (see GEO 441)
Program in Architecture and Engineering

**Director**
Maria E. Garlock

**Executive Committee**
Sigrid M. Adriaenssens, Civil and Environmental Engineering
Stanley T. Allen, Architecture
Michael A. Celia, Civil and Environmental Engineering

Edward A. Eigen, Architecture
Maria E. Garlock, Civil and Environmental Engineering
Peter R. Jaffé, Civil and Environmental Engineering
Guy J. Nordenson, Architecture
James A. Smith, Civil and Environmental Engineering

The Program in Architecture and Engineering is intended for students interested in pursuing a career in architectural design or engineering design. The program includes course work and independent studies in structures and architecture, history of architecture and of structures, and studio design.

**Admission to the Program**

Students interested in this joint program are encouraged to consult the program director. Further information may be found under the listing of the Department of Civil and Environmental Engineering.

**Certificate of Proficiency**

Students who fulfill the program requirements will receive a certificate of proficiency upon graduation.
The undergraduate program at the School of Architecture is known for its rigorous and interdisciplinary approach to preprofessional education. The four-year undergraduate program leads to an A.B. with a concentration in architecture. In addition to design and the history and theory of architecture and urbanism, undergraduates study a range of disciplines that contribute to an architect's knowledge and vision, including courses in architectural analysis, representation, computing, and building technologies. Such a broad academic program also prepares students for a graduate program in architecture and other related disciplines such as landscape architecture, urban planning, civil engineering, art history, and the visual arts.

Information and Departmental Plan of Study

Prerequisites

Students who wish to enter the school are normally required to complete three courses: ARC 203 Introduction to Architectural Thinking, ARC 204 Introduction to Architectural Design, and ART 242/ARC 242 The Experience of Modernity: A Survey of Modern Architecture in the West. Students are encouraged to enroll in ART 242 during their freshman year and in ARC 203 and 204 in their sophomore year. However, this is not a mandatory sequence, and students may change the order in which they enroll in these three prerequisites. With the approval of the departmental representative, students may substitute another art and archaeology course in the history of architecture if it is not possible to take ART 242.

Program of Study

The program provides a foundation for graduate professional study in architecture, landscape architecture, urban planning, historic preservation, and related fields of study. In particular, the program prepares students for further study at the graduate level in design and the history and theory of art or architecture. Students may also elect a program offered jointly by the School of Architecture and the School of Engineering and Applied Science.

In addition to the general prerequisites and the requirements for independent work, each student is required to complete 10 courses in three cognate areas: (a) history and theory; (b) technology; and (c) design seminars, from those listed below. All students are required to take ARC 403 Topics in the History and Theory of Architecture in the fall semester of their senior year. This course covers methodologies of historical analysis and research, the literature of the field, and the varieties of architectural writing. All students are required to enroll in ARC 404 Advanced Design Studio, in the fall semester of their senior year. The advanced design studio presents a challenging independent design project in which the knowledge of previous studios is synthesized and new techniques of representation are employed. Students should check with the school office to determine which one-time-only courses are being offered during the academic year. The requirements are listed below:

NOTE: An asterisk indicates mandatory course; a double asterisk indicates a one-time-only course or topic.

History and Theory (six courses required)

Three courses in the History and Theory of Architecture, one of which is ARC 403; two courses in History and Theory of Urbanism and Landscape; and at least one course to be taken in the Department of Art and Archaeology for a total of six courses.

http://www.princeton.edu/ua/
Architecture (two courses required in addition to ARC 403)

302/ART 346 Architecture and the Visual Arts
308/ART 328 History of Architectural Theory
**489 Selected Works of 20th-Century Architects
MOD 500 Topics in Media and Modernity

Urbanism and Landscape (two courses required)

URB 201 Introduction to Urban Studies
304 Historical Development of Urban Form
401 Theories of Housing and Urbanism
492 Topics in the Formal Analysis of the Urban Structure
525/ART 524 Mapping the City
570 The Sociology of Contemporary Design
332/ART 332 The Landscape of Allusion: Garden and Landscape Architecture, 1450-1750
565/ART 569 History and Theory of Landscape Architecture

Art and Archaeology (one course required)

ART 200 The Art and Archaeology of the Ancient Near East and Egypt
ART 213 Modernist Art: 1900 to 1950
ART 214 Contemporary Art: 1950 to the Present
ART 305 Greek and Roman Architecture
ART 315 Medieval Architecture
ART 320 Rome, the Eternal City
ART 333 Renaissance and Baroque Architecture
ART 337 Court, Cloister, and City: Art and Architecture in Central and Eastern Europe
ART 342 Modern Architecture
ART 351 Traditional Chinese Architecture
ART 445 Topics in the History and Theory of Architecture in Early-Modern Europe
ART 458 Seminar. Modern Architecture

Technology (two courses required)

CEE 262 Structures and the Urban Environment
*311 Building Science and Technology: Building Systems
CEE 361 Structural Analysis and Introduction to Finite Element Methods
CEE 362 Structural Dynamics and Earthquake Engineering
CEE 364 Materials in Civil Engineering
CEE 366 Design of Reinforced Concrete Structures
406 Energy and Form
CEE 461 Design of Large-Scale Structures: Buildings
CEE 462 Design of Large-Scale Structures: Bridges
510 Structural Analysis for Architecture
511 Structural Design
514 Environmental Engineering of Buildings, Part I
515 Environmental Engineering of Buildings, Part II
516 Architectural Acoustics and Lighting

Design Seminars (two courses required)

**306 Research Seminar: Eco-Urbanist Architecture
374 Computing and Representation
*404 Advanced Design Studio
**447 Analysis of Buildings
**485 Autonomy and Interdependence

Independent Work

Each student is required to complete independent work in both semesters of the junior and senior years.

Junior Year. In the junior year, the independent work requirement is satisfied by taking a design studio in each semester. All undergraduate design studios are organized topically. The projects in each studio may vary in scale and complexity; design methodologies and representational skills are introduced incrementally beginning with the fall semester. Teaching methods within the design studios include seminars, desk criticism, and schoolwide reviews of student projects. Students may choose from one of several offerings in each semester via a lottery system at the beginning of each semester. Every effort will be made to see that as many students as possible receive their first choice from the design studios being offered in each semester, and to keep the enrollment of the design studios to a maximum of 12 students.

Senior Year. In the fall and spring semesters of the senior year, the independent work requirement is satisfied by the architectural thesis. The senior thesis is a detailed project, presenting a well-argued piece of research on a precise architectural theme, and may include a substantial amount and variety of visual materials (including any of several forms of representation, for example, architectural drawings, models, video, photographs, computer-generated images). The relative proportion of written to visual material for each student must be agreed upon with the adviser and thesis committee. The final presentation and oral defense of the senior thesis in the spring will constitute a section of the departmental examination.
The thesis is a year-long project that begins in the fall semester. Faculty thesis advisers are assigned at the beginning of the fall term of the senior year, and students work closely with the adviser in the formulation of the topic, research methods, organization of the thesis material, and presentation of the work.

**Senior Departmental Examination**

All students in the program will take the departmental examination in May of their senior year.

**Preparation for Graduate Study**

Students who contemplate pursuing graduate professional study in architecture are strongly advised to elect MAT 103, or 101 and 102; and PHY 101. Courses in the social sciences and art and architectural history are also encouraged.

**Professional Study in Architecture.** Princeton undergraduates completing the program, if admitted to Princeton's graduate professional program (M.Arch. degree), generally complete their graduate studies in three years. Advanced standing may be granted by professional graduate schools at other universities.

In order to qualify for licensing as architects in the United States, students are required, by individual states, to complete a program leading to a professional degree that is accepted by the National Architectural Accrediting Board. Please see the NAAB statement at the end of this section.

**Architecture and Engineering.** Students interested in pursuing studies both in architecture and civil engineering may participate in the joint Program in Architecture and Engineering offered through the Department of Civil and Environmental Engineering in the School of Engineering and Applied Science. The program leads to the B.S.E. degree. For further information, consult the appropriate program entry in the engineering section.

**Other Facilities.** Most of the school's facilities are in the Architecture Building, which is adjacent to McCosh Walk near the center of campus. The building is home to undergraduate and graduate design studios, seminar rooms, the Betts Auditorium, an exhibition gallery, faculty and administrative offices, the School of Architecture Library, the Visual Resources Collection, the Computer-Aided Design and Imaging Facility, and facilities for work related to building and construction technologies.

The Architecture Laboratory is used by faculty members and students for model-making and work related to building systems and construction and for the testing and analysis of materials and structural models. This hands-on experience helps students develop a deeper understanding of the tectonic aspects of building.

The laboratory houses facilities for building in wood, plastic, metal, and concrete, and enables students to learn general model theory, build and test models of actual buildings, and study current building systems and technology.

The laboratory is staffed by skilled craftsmen from 8:30 a.m. to 9 p.m.; provisions are made to keep the facility open for additional hours when necessary. The introductory course in construction meets in the laboratory for a weekly workshop.

The Architecture Library is a division of Princeton's Firestone Library system. Located in the Architecture Building, its holdings focus on current publications in architecture, urbanism, and landscape. These holdings include approximately 32,500 volumes; 3,748 microfiche reels; and the collections of the former Bureau of Urban Research and the Winton Reading Room. (The Winton Reading Room, a gift from Mrs. C. W. Jones, David J. Winton '20, and Charles J. Winton Jr. '22, was the school's original library until 1967-68, when the library system was expanded.) The library subscribes to more than 350 domestic and international periodicals, ranging from professional journals in the various design disciplines to periodicals covering the history and theory of design.

Library materials acquired before 1980 can be located in the Supplementary Electronic Card Catalog. Items added to the collection since 1980 are cataloged in Voyager, an online database that also provides access to the holdings of the University's entire library system, all of which may be used by architecture students. These include the general collection of the Firestone Library; the Marquand Library, one of the finest art libraries in the world and home to approximately 54,000 architecture books out of a collection totaling approximately 260,000 volumes; the library of the Woodrow Wilson School of Public and International Affairs; the Office of Population Research Library; and the Social Science Reference Center at Firestone Library.

The School of Architecture Archive houses materials of historic value related to the history of the school. These include selected students' thesis projects, student files, school files, and the Jean Labatut collection, which includes papers, slides, and drawings that Labatut donated to the school.

The Hobart Betts Auditorium is used for class lectures, special lectures, symposia, and conferences hosted by the School of Architecture and other departments. It contains audiovisual equipment for slide projection, video projection and recording, audio recording, and other presentation aids.

The most up-to-date listings of events, lectures, exhibitions, symposia, courses, and faculty can be accessed through the School of Architecture website or through the academics section of Princeton University's website.

**Visual Resources Collection.** The Visual Resources Collection contains more than 64,000 slides, 5,000 digital images, 300 audio tapes of major lectures and conferences held at the school, as well as a growing collection of video tapes and CD-ROMs on architecture. The history of architecture is covered in the collection, although more emphasis is placed on the 19th and 20th centuries. The collection is international but is strongest in American and Western European architecture. It is steadily growing in both size and scope. The majority of the collection is devoted to works of more than 3,000 architects and artists. A section documenting the projects of Princeton students is also maintained. The collection is cataloged in a database that enables the researcher to search for information by architect, building name, site, or other categories. The collection contains equipment for making slides for lectures and class...
The Department of Art and Archaeology also maintains a large slide collection that documents all aspects and all periods of Western and non-Western art. Housed in McCormick Hall, the collection is available to students for lectures and class presentations.

**Computer-Aided Design and Imaging Facility.** The Computer-Aided Design and Imaging Facility is a cluster of workstations and peripherals maintained for the purpose of helping students and faculty to embrace the latest developments in computer-aided design in their work. Computing is an integral part of nearly all aspects of architectural design and research today. The school is committed to training all students in the productive use of the most advanced design and imaging technologies, as well as leading the field in the critical examination of the implications of these new technologies in architecture and urbanism. Drawing on a broad range of sources and expertise, faculty and students engage in an open-ended investigation of the new potentials for computer technology within the specific demands of architecture as a discipline. These include spatial modeling, simulation of program and use, the generation of formal and organizational strategies, and rapid prototyping.

Faculty and support staff are continually reviewing new software and other developments in the field to ensure that the most appropriate and up-to-date software and equipment are available for student use.

**National Architectural Accrediting Board Statement.** 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 two types of degrees: the bachelor of architecture and the master of architecture. A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.

Master degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the preprofessional degree is not, by itself, recognized as an accredited degree.

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**Courses**

ARC 201 Introductory Drawing (see VIS 201)

ARC 202 Introductory Drawing (see VIS 202)

ARC 203 Introduction to Architectural Thinking  Fall LA

A broad overview of the discipline of architecture: its history, theories, methodologies, and its manners of thinking and working. Rather than a chronological survey, the course will be organized thematically, with examples drawn from a range of historical periods as well as contemporary practice. Through lectures, readings, precepts, and studio sessions, students will acquire a working knowledge of key texts, buildings, and architectural concepts. Two lectures, one preceptorial. *S. Allen, J. Kipnis*

ARC 204 Introduction to Architectural Design  Spring LA

The first in a series of design studios offered to students interested in majoring in architecture. The course will introduce architecture as an "impure" plastic art, inseparable from a network of forces acting upon it. The student will be confronted with progressively complex exercises involving spatial relations in two dimensions, three dimensions, and time. The course will stress experimentation while providing an analytical and creative framework to develop an understanding of structure and materials as well as necessary skills in drawing and model making. Two three-hour studios with lectures included. *L. Roy*

ARC 215 Graphic Design (see VIS 215)

ARC 242 The Experience of Modernity: A Survey of Modern Architecture in the West (see ART 242)

ARC 262A Structures and the Urban Environment (see CEE 262A)

ARC 262B Structures and the Urban Environment (see CEE 262B)

ARC 302 Architecture and the Visual Arts (also ART 346)  Fall LA

Explores the relationships between architectural discourse and the visual arts from the historical avant-garde to the present. Architectural discourse will be considered here as the intersection of diverse systems of representation: buildings, projects, drawings, but also architectural theory and criticism, exhibitions, photographs, professional magazines, and the popular press. The course will treat as visual arts not only painting and sculpture, but also photography, cinema, fashion, advertisement, and television. Two lectures, one preceptorial. *S. Papapetros*

ARC 304 Cities of the 21st Century  Spring HA

Examination of a range of urban spatial types, city plans, maps, and communication networks. Focus on how inherited models have been used by modern architects/planners in the 20th century. One 90-minute lecture, one 90-minute preceptorial. *M. Boyer*

ARC 305 Urban Studies: Analysis of Contemporary Urban Form  Not offered this year LA

http://www.princeton.edu/ua/
Studies of the contemporary problems and process of urban design and physical planning. Analysis of the design and organization of space, activities, movement, and interaction networks of the urban physical environment. One three-hour seminar. *S. Whiting*

**ARC 308 History of Architectural Theory (also ART 328)  Fall HA**

Architectural theory, criticism, and historiography from the Renaissance to the present, emphasizing the transformations of the classical Vitruvian tradition and theories of modern architecture from the end of the 17th century to the 1930s. Architectural thought in its institutional and cultural context and as it relates to design method and practice. Two lectures, one preceptorial. *Staff*

**ARC 311 Building Science and Technology: Building Systems  Fall**

An introduction to the nature of building. Emphasis will be placed on understanding construction methods, materials, and evaluating the processes by which architects formulate strategies to execute their design ideas. A continuing theme will be to evaluate the relationship between architectural design and building systems and technology. Two lectures, one two-hour laboratory. *N. Oppenheimer*

**ARC 315 Medieval Architecture (see ART 315)**

**ARC 320 Rome, the Eternal City (see ART 320)**

**ARC 327 Introductory Painting (see VIS 203)**

**ARC 328 Introductory Painting (see VIS 204)**

**ARC 332 The Landscape of Allusion: Garden and Landscape Architecture, 1450-1750 (see ART 332)**

**ARC 333 Renaissance and Baroque Architecture (see ART 333)**

**ARC 351 Traditional Chinese Architecture (see ART 351)**

**ARC 364 Materials in Civil Engineering (see CEE 364)**

**ARC 374 Computational Design  Fall LA**

This course will examine the possibilities of representation and information in the virtual realm. Through a series of modeling/rendering/compositing exercises, presentations, and in-class discussions, students will investigate the evolving relationship between architecture and its means of representation, as well as broader issues of technology and culture. The course will provide a firm understanding of current computer software. One three-hour seminar. *A. Kilian*

**ARC 401 Theories of Housing and Urbanism  Fall SA**

Housing ideas and urban projects of architects and social scientists since the mid-19th century as a response to industrialization, the development of the welfare state, the rise of professionalism, and the dispersion of democratic culture. Material drawn from architecture, urban planning, political theory, sociology, and social psychology. One three-hour seminar. *A. Laing*

**ARC 403 Topics in the History and Theory of Architecture  Fall LA**

Selected issues in relationship to the development of architectural history and theory as critical disciplines, emphasizing the historiography and methodology of these disciplines. Course focuses on particular critics through a close reading and analysis of selected texts. One three-hour seminar. *E. Eigen*

**ARC 404 Advanced Design Studio  Fall**

Examines architecture as cultural production, taking into account its capacity to structure both physical environments and social organizations. A specific problem or topic area will be set by each studio critic, and may include a broad range of building types, urban districts or regional landscapes, questions of sustainability, building materials, or building performance. Studio work will include research and data gathering, analysis, and program definition. Students are expected to master a full range of design media, including drawing, model-making, and computer-aided design. *A. Andraos, D. Wood*

**ARC 406 Energy and Form (also ENV 406)  Not offered this year**

Introduction to concepts of energy utilization and conservation in building. Course presents the physics of building thermal performance, including quantitative methods, and discusses conservation strategies in building design and source energy. Passive design and alternative energy sources, including wind and solar-thermal, will be covered. One three-hour seminar. *Staff*

**ARC 411 Latin American Studies Seminar (see LAS 406)**

**ARC 445 Topics in the History and Theory of Architecture in Early-Modern Europe (see ART 445)**

**ARC 458 Seminar. Modern Architecture (see ART 458)**

**ARC 492 Topics in the Formal Analysis of the Urban Structure  Fall**

The Western city, American and European, has undergone a number of mutations since the Renaissance. This course will explore the complex relationships between different cities and architecture, between "real" cities and "fictional"
architectural cities. Possible topics might include: urbanization as it affects contemporary life; the American vs. European city; the state of New Jersey, the exurban state "par excellence." One three-hour seminar. M. Gandelsonas
Department of Art and Archaeology

Chair
Thomas F. Leisten

Departmental Representative
Elizabeth Anne McCauley

Director of Graduate Studies
Andrew M. Watsky

Professor
Robert W. Bagley
Hal Foster
Thomas DaCosta Kaufmann
Michael Koortbojian
Thomas F. Leisten
Elizabeth Anne McCauley
Hugo Meyer
John A. Pinto
Jerome Silbergeld
Andrew M. Watsky

Associate Professor
Esther da Costa Meyer
Brigid Doherty, also German

Assistant Professor
Bridget Alsdorf

Lecturer with Rank of Professor
James C. Steward

Visiting Lecturer with Rank of Professor
Yve-Alain Bois

Lecturer
Christina T. Halperin
Colin Lang
Jeremy Melius
Jelena Trkulja

Associated Faculty
Leonard Barkan, Comparative Literature
Anthony T. Grafton, History
Michael W. Jennings, German
Susan Naquin, History, East Asian Studies
P. Adams Sitney, Lewis Center for the Arts, Visual Arts
Susan A. Stewart, English

Art Museum

Director
James C. Steward

Associate Director
Rebecca E. Sender

Curator of Education and Academic Programs
Caroline I. Harris

Research Curator
Betsy J. Rosasco

Curator
Laura M. Giles
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Cary Y. Liu
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Conservator
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Index of Christian Art

Director
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Reader
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Adelaide Bennett Hagens
Beatrice T. Radden Keefe
Jessica L. Savage

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The Department of Art and Archaeology is devoted to the study of the visual arts and the investigation of material artifacts from a wide range of cultures and periods. It is also where students interested in the practice of art (taught by faculty in the Program in Visual Arts) can pursue a major. Working closely with faculty members in small classes and often dealing directly with original objects and primary sources, students can explore subjects as diverse as Roman city planning, Islamic archaeology, Japanese painting, Renaissance architecture, Chinese cinema, 19th-century photography, and contemporary art.

Students in the Department of Art and Archaeology learn techniques for analyzing visual materials and locating them within time and place. They also investigate the factors that influence stylistic change (e.g., religious beliefs, economic constraints, patronage demands, and technological changes). Like any humanist or social scientist, they must evaluate evidence, form hypotheses, test data, and draw conclusions. Successful majors master the translation of visual perceptions into linguistic expression, develop visual memory, and make connections with a wide array of historical evidence. Students must have at least a B- average based on courses and independent work in order to graduate from the department.

Information and Departmental Plan of Study

Students interested in majoring in the Department of Art and Archaeology must choose one of three programs, each of which has its own admission prerequisites and curricular requirements.

Advanced Placement

One unit of advanced placement credit is granted for a score of 5 on the Art History Advanced Placement Examination.

Early Concentration

A sophomore may apply for early concentration through consultation with the departmental representative.

Study Abroad

Foreign study can be a richly rewarding part of any concentration in the Department of Art and Archaeology. Art history courses taken abroad (normally up to two per semester or four for a year in a study abroad program) can be pre-approved for departmental credit by the departmental representative. Students generally study abroad during the junior year or the first semester of the senior year. Junior independent work can be completed under the supervision of a departmental faculty member with prior approval and ongoing contact with the faculty adviser. Senior independent work in the fall of the senior year may be done overseas, but the spring semester work must be done in residence. Students contemplating study abroad should speak with the departmental representative as early as possible and should plan to take courses in the language of the country in which they wish to study.

In addition, students interested in archaeology may choose to participate in overseas archaeological excavations undertaken by departmental faculty. For further information, contact Professor Thomas Leisten.

Preparation for Graduate Study

Students who are contemplating graduate work in the history of art and archaeology are reminded that most graduate programs require a reading knowledge of two or more foreign languages. In most fields German is particularly important.

Certificate in Visual Arts. For certificate requirements, see the description under the Program in Visual Arts.

Resources for Research. Outstanding resources are available for students concentrating in art and archaeology. These include the Marquand Library, a non-circulating research library with over 400,000 books; the Princeton University Art Museum; the Index of Christian Art; the Visual Resources Collection; and the P.Y. and Kinmay W. Tang Center for East Asian Art. Firestone Library also houses extensive holdings of illuminated manuscripts, prints, and photographs in departments including the Manuscripts Division, Graphic Arts Collection, Rare Books and Special Collections, the Cotsen Children's Library, and the Western Americana Collection. Staff members in the University Art Museum and the Index of Christian Art occasionally offer courses or otherwise participate in the department's teaching activities. Students are encouraged to take advantage of the proximity of major museum collections in New York, Philadelphia, and elsewhere.

Honors. Honors are awarded by a vote of the faculty to students having the highest, weighted grade point average based on grades achieved in departmental courses (including all courses taken outside the department that have been designated as cognates), junior independent work, senior independent work, and the senior oral examination.

Program 1. History of Art

This central program allows a broad and rich exposure to the visual arts produced in a great variety of periods and locations.

Prerequisites
Any two courses offered by the Department of Art and Archaeology.

Program of Study

A total of 10 courses in the Department of Art and Archaeology, including ART 400 (Junior Seminar) and two seminars at the 400- or 500-level. Students must also take at least one course in five of the following six distribution areas: East Asia; ancient Mediterranean; medieval/early Islamic; Renaissance/Baroque/late Islamic; African/Pre-Columbian; and modern/contemporary (19th century to the present). In choosing courses to satisfy the distribution requirement, students are encouraged to explore a range of media (e.g., architecture, painting, sculpture, photography, film). Thematic courses as well as courses spanning more than one area will be allocated to a distribution area on a case-by-case basis. ART 100, ART 101, ART 400, and ART 401 count as departmentals but not as distribution courses.

Cognates. No more than two cognate courses taken in other departments (including the Program in Visual Arts) may be counted toward the 10 departmentals. This includes summer courses. Students participating in the Study Abroad Program may be allowed to count more than two courses taken overseas as departmentals. All cognate courses must be approved prior to enrollment by the departmental representative based on the submission of a syllabus and course description. Courses cross-listed with the Department of Art and Archaeology automatically count as departmentals.

Junior Seminar. During the fall of the junior year, all majors must take the junior seminar (ART 400). The course introduces students to various methodologies used by art historians and archaeologists, and prepares them for writing the junior and senior independent work. Students who are abroad during the fall of the junior year can complete the junior seminar during the fall semester of the senior year.

Independent Work

Junior Independent Work. The fall junior independent work consists of a paper of approximately 20 pages addressing the state of the literature on a particular subject selected by the student as well as various methodologies appropriate to it. This paper is usually advised and graded by the instructor of the student's junior seminar. During the spring term, students write a second research paper (approximately 25 pages) with a departmental adviser of their choice.

Senior Independent Work. The senior independent work consists of a year-long research project of approximately 60-80 pages on a topic selected by the student and approved by the faculty adviser. The student selects a faculty adviser in the spring of the junior year and submits an extensive outline and annotated bibliography to the adviser by late November of the senior year. The thesis grade is the average of the grades given by the faculty adviser and a second faculty reader.

Senior Departmental Examination

The senior departmental examination consists of a one-hour oral examination covering material from departmental courses and attended by three faculty members (including the adviser of the senior thesis, its second reader, and one additional faculty member).

Program 2. History of Art and Visual Arts

Concentrators in this program explore the modes of thought and practice of visual media and develop their creative skills in connection with a general program of humanistic education. Courses are offered in ceramics, digital and analog photography, drawing, film and video production, film history and criticism, painting, photography, printmaking, sculpture, installation art, and contemporary criticism as well as art history.

Prerequisites

Two courses in the Department of Art and Archaeology and two studio courses in the Program in Visual Arts. By the first Tuesday following spring break, sophomores submit an application and a portfolio of creative work to the Lewis Center for the Arts administrative office. The admissions committee for the Program in Visual Arts will notify students accepted into the program by early April. No AP credit is accepted toward the Program 2 concentration.

Program of Study

A total of 12 courses, of which at least four must be from the Department of Art and Archaeology, and at least six from the Program in Visual Arts.

The visual arts courses must include: at least two different media; at least two studio courses at the 300- or 400-level; and VIS 392, Issues in Contemporary Art, or a cognate course. Visual Arts 392 is strongly recommended for studio artists, for whom it has been specifically designed. However, it is possible to substitute a relevant 300- or 400-level seminar directly related to the medium a student practices with the prior permission of the director of the Program in Visual Arts. The Department of Art and Archaeology courses must include: ART 400 (taken in the fall of the junior year); a course in the modern/contemporary distribution area (19th century to the present); and courses in two other distribution areas (see Program 1).

Cognates. Up to two courses in studio art or art history may be taken at other institutions during the summers with prior approval by the departmental representative (for art history courses) or the director of the Program in Visual Arts.
(for studio art courses). Courses taken as part of the Study Abroad Program may be allowed to count as departmentals with prior approval from the departmental representative. A cognate course in another department is accepted only for Visual Arts 392.

**Junior Seminar.** During the fall of the junior year, all concentrators must take the junior seminar (ART 400). This course introduces students to various methodologies used by art historians and archaeologists. Students who are abroad during the fall of the junior year can complete the junior seminar during the fall semester of the senior year.

**Independent Work**

**Junior Independent Work.** The fall junior independent work consists of a paper of approximately 20 pages addressing the state of the literature on a particular subject selected by the student as well as various methodologies appropriate to it. This paper is usually advised and graded by the instructor of the student's junior seminar (ART 400). At the same time, students select two advisers from the Program in Visual Arts, and complete the Program 2 Adviser Approval Form. The creative junior independent work is done in consultation with the student's advisers and also with the general visual arts faculty in "open studio" meetings. The advisers' spring-term grade for junior independent work represents an evaluation of the entire year's studio work. The creative junior independent work is exhibited in a group show at the beginning of the senior fall semester.

**Senior Independent Work.** By the beginning of the senior year, students must select three advisers, including one from the Department of Art and Archaeology faculty, and complete the Program 2 Adviser Approval Form. The senior independent work is a major studio project completed by the end of the spring term, which is done in consultation with the student's advisers, and also with the general visual arts faculty in four "open studio" meetings. Students present their work in an exhibition at the end of the year, usually in a two-person show with another certificate or Program 2 student. The grade for the senior independent work represents an evaluation of the entire year's studio work and is the average of two grades: (1) the average of the grades given by the student's three advisers; and (2) the average of the grades given by the rest of the Program in Visual Arts faculty who view the senior exhibition.

**Senior Departmental Examination**

The senior examination takes the form of a one-hour critical discussion of the senior independent work with the student's three advisers at the end of the spring term, normally at the time of the student's exhibition. The grade for the oral examination is the average of the three grades given by the advisers participating in the examination.

**Program 3. Archaeology**

This program brings together faculty from a variety of departments in a major that combines academic training in archaeology with practical experience on excavations (participation in a summer excavation project is normally required). The program is designed to combine broad comparative study across cultures with specialization in the area of a student's particular interest. Individually tailored courses of study are arranged with the advice and approval of the program adviser.

**Prerequisites**

Any two archaeology or related courses approved by the program adviser.

**Program of Study**

A total of 10 courses in the Department of Art and Archaeology or approved cognates. These must include ART 400 (Junior Seminar), ART 401 (Archaeology Seminar), and four more Department of Art and Archaeology courses approved by the program adviser in four of the following five areas: the Americas; Egypt/Ancient Near East; Mediterranean/European (Greek, Roman, Byzantine, etc.); Islamic; and Central Asia/East Asia. The remaining four courses, which need not be in the Department of Art and Archaeology, must include two courses in the history, art, and/or literature of a single culture. A student with a special interest in classical antiquity, for example, might take courses in the Department of Classics. Other possibilities include certain courses in religion, anthropology, geology, chemistry, and materials science/conservation. Students are strongly encouraged to acquire both a modern and an ancient language appropriate to their fields of special interest. The program adviser may approve up to two language courses as cognates, provided that they are at a level higher than is required to satisfy the basic University language requirement.

**Cognates.** No cognates are accepted for the four courses taken in the Department of Art and Archaeology.

**Independent Work**

**Junior Independent Work.** Same as for Program 1, except that the two junior papers should be on archaeological subjects.

**Senior Independent Work.** Same as for Program 1, except that the thesis should be on an archaeological subject.

**Senior Departmental Examination**

Same as for Program 1.

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Courses

ART 100 Introduction to the History of Art: Ancient to Medieval  Fall LA
A survey of Western art from ancient civilizations through the medieval period with emphasis on the major artists and works of art. Two lectures, one preceptorial. Staff

ART 101 Introduction to the History of Art: Renaissance to Contemporary  Spring LA
A survey of Western art from the Renaissance to the present with emphasis on the major artists and works of art. Two lectures, one preceptorial. C. Heuer

ART 102 An Introduction to the History of Architecture  Not offered this year LA
A survey of architectural history in the West, from ancient Egypt to 20th-century America, stressing a critical approach to architectural form through the analysis of context, expressive content, function, style, structure, and theory. Discussion will focus on key monuments and readings that have shaped the history of architecture. Two lectures, one preceptorial. J. Pinto

ART 105 Lab in Conservation of Art (see CEE 105)

ART 200 The Art and Archaeology of the Ancient Near East and Egypt (also NES 205)  Not offered this year LA
The art and archaeology of the ancient Near East and Egypt from the end of the prehistoric period, ca. 3000 B.C., to the beginning of the Iron Age, ca. 650 B.C. Focus on the rise of complex societies and the attendant development of architectural and artistic forms that express the needs and aspirations of these societies. Occasional readings in original texts in translation will supplement the study of art and architecture. Two lectures, one preceptorial. Staff

ART 202 Greek Art: Ideal Realism  Not offered this year LA
A study of Greek sculpture and painting from the Late Geometric period (760 B.C.) to the end of the Hellenistic period (31 B.C.). Emphasis on the interaction of abstraction and naturalism. Readings include the ancient poets, tragedians, and historians to place the art in its intellectual and social context. Two lectures, one preceptorial. Staff

ART 203 Roman Art  Spring LA
Roman painting, sculpture, architecture, and other arts from the early Republic to the late Empire, focusing upon the official monuments of Rome itself and the civic and private art of Pompeii and Herculaneum. Emphasis on historical representation, imperial propaganda, portraiture, narrative technique, and classical art theory. Two lectures, one preceptorial. Staff

ART 205 Medieval Art in Europe (also HLS 205)  Fall LA
The art of Europe from the fall of Rome to the Renaissance. Emphasis on the effects of cultural, religious, and political change on artistic production. Works treated include the Lindisfarne Gospels, the Bayeux Tapestry, Chartres Cathedral, and the Ste. Chapelle. Two lectures, one preceptorial. J. Trkulja

ART 206 Byzantine Art and Architecture (also HLS 206)  Not offered this year LA
Art and architecture of the Eastern Mediterranean and Eastern Europe ca. 600-1500. The course will focus on the art of the Byzantine Empire and its capital, Constantinople, and on its broad sphere of cultural influence (Russia, Armenia, Georgia, Sicily, Venice, Serbia, Bulgaria, Rumania). An examination of principal factors that shaped the artistic legacy of eastern Christendom during the Middle Ages. Offered in alternate years. Two lectures, one preceptorial. Staff

ART 209 Between Renaissance and Revolution: Baroque Art in Europe  Spring LA
Painting and sculpture in Europe from the 1580s to the 1790s. The great figures (e.g., Caravaggio, Rubens, Rembrandt, Vermeer, Velazquez, Bernini, et al.), major artistic innovations (still life, genre, landscape), and stylistic developments (e.g., rococo, Neoclassicism) seen in relation to intellectual, political, religious, and social change. Painting and sculpture in Europe from the 1580s to the 1790s. Includes the study of actual works of art in the museum in Princeton and elsewhere. Two lectures, one preceptorial. T. Kaufmann

ART 210 Italian Renaissance Painting and Sculpture  Fall LA
A selective survey, 1260-1600, allowing discussion of themes such as patronage; functions; materials and techniques; emulation as motivation; social, political, and economic issues; aesthetics; and the professions of the artist and of the art historian. Artists treated include Giotto, Masaccio, Donatello, Bellini, Leonardo, Raphael, Michelangelo, and Titian. Two lectures, one preceptorial. Staff

ART 211 Major Figures in American Art  Not offered this year LA
A selective overview of key figures from the 18th to the 20th century, with each lecture devoted to a single painter, architect, or sculptor as representative of significant themes in the history of American art. Among the artists considered are Copley, Jefferson, Cole, Homer, Eakins, Richardson, Saint-Gaudens, Olmsted, and O'Keeffe. Two lectures, one preceptorial. Offered in alternate years. R. DeLue

http://www.princeton.edu/ua/
ART 212 Neoclassicism through Impressionism  Fall LA

A broad study of European painting and sculpture from the French Revolution to 1900 with special attention to art's relationship to social, economic, and cultural changes. Lectures will explore a range of themes including art and revolution, the rise of landscape, shifting conceptions of realism, and the birth of "modernism" and the avant-garde. Emphasis on major figures including David, Canova, Goya, Ingres, Turner, Courbet, Manet, Monet, Degas, Rodin, Van Gogh, and Cézanne. Two lectures, one preceptorial. Staff

ART 213 Modernist Art: 1900 to 1950  Fall LA

A critical study of the major movements, paradigms, and documents of modernist art from fauvism to art brut. Among the topics covered are primitivism, abstraction, collage, the readymade, machine aesthetics, photographic reproduction, the art of the insane, artists in political revolution, anti-modernism. Two lectures, one preceptorial. Offered in alternate years. C. Lang

ART 214 Contemporary Art: 1950 to the Present  Spring LA

A critical study of the major movements, paradigms, and documents of postwar art--abstract-expressionist, pop, minimalist, conceptual, process and performance, site-specific, etc. Special attention to crucial figures (e.g., Jackson Pollock, Andy Warhol, Robert Smithson) and problems (e.g., "the neo-avant-garde," popular culture, feminist theory, political controversies, "postmodernism"). Two lectures, one preceptorial. Offered in alternate years. Staff

ART 215 Early Chinese Art and Archaeology  Not offered this year LA

A survey of Chinese art and archaeology from the Neolithic through the Han Dynasty. Recent archaeological finds are studied (and sometimes compared with Near Eastern counterparts) for the light they throw on the character of early Chinese civilization. Specific topics to be considered include the interaction between technique and design in bronze casting and jade carving. Three lectures, one preceptorial. R. Bagley

ART 216 Chinese Painting  Not offered this year LA

Thematic introduction to the role of painting in Chinese cultural history, with attention to the interaction of stylistic standards, materials, and techniques; the impact of regional geographies on landscape painting; the influence of class, gender, and social behavior on figure painting; the engagement of art with traditional philosophies and 20th-century socialism; and the shape of time in art-historical development. Three lectures. J. Silbergeld

ART 217 The Arts of Japan (also EAS 217)  Fall LA

Surveys the arts of Japan from the pre-historic period through the present day. Painting, sculpture, and architecture form the core of study. Examines the critical role of other forms, including calligraphy, lacquer, and ceramics. Takes close account of the broader cultural and historical contexts in which art was made. Topics include the ongoing tension in Japanese art between the foreign and the indigenous, the role of ritual in Japan's visual arts, the re-uses of the past, the changing loci of patronage, and the formats and materials of Japanese art. Two lectures, one preceptorial. A. Watsky

ART 218 Northern Renaissance Art  Not offered this year LA

The course surveys painting, prints, and sculpture in the Netherlands, Germany, and France from about 1350-1550. With emphasis on the work of major figures such as Van Eyck, Bosch, Dürer, and Bruegel, the course will consider changing circumstances of artistic production, function, iconography, and patronage. Two lectures, one preceptorial. C. Heuer

ART 219 Art of Hispania (also LAS 221)  Not offered this year LA

Painting, sculpture, and architecture in the Spanish-speaking world from 1492 to 1810. The great flowering of Spanish art, as represented by such figures as El Greco, Velázquez, and Goya, in its cultural and historical context, including developments in Latin America. Some attention to the art of Portugal. Two lectures, one preceptorial. T. Kaufmann

ART 220 Early Islamic Art and Architecture (also NES 230)  Not offered this year LA

A survey of art in the Islamic world from 600 through 1200. The course examines the formation of Islamic art and its roots in the art of late antiquity. Emphasis will be on the development of various types of religious and secular architecture and their decoration (wall-painting, carved stucco and wood, mosaic and Epigraphy) in the central regions of the early Islamic world. Topics such as textiles, metalwork, and ceramics will be considered. Two lectures, one preceptorial. T. Leisten

ART 221 The Arts of the Islamic World (also NES 232)  Fall LA

A survey of the architecture and the arts of various Islamic cultures between northern Africa and the Indian subcontinent from the seventh to the twentieth century. Emphasis will be on major monuments of religious and secular architecture, architectural decoration, calligraphy, and painting. Background in Islam or Middle Eastern languages is not a prerequisite. Two lectures, one preceptorial. T. Leisten

ART 222 The Experience of Modernity: A Survey of Modern Architecture in the West (also ARC 242/CEE 242)  Spring LA

An analysis of the emergence of modern architecture from the late 19th century to World War II, in light of new methodologies. The course will focus not only on major monuments but also on issues of gender, class, and ethnicity to provide a more pluralistic perspective on the experience of modernity. Two lectures, one preceptorial. E. da Costa Meyer

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ART 248 History of Photography  Not offered this year LA
A survey of photography from its multiple inventions in the early 19th century to its omnipresence (and possible obsolescence) in the 21st. Themes will include photography's power to define the "real"; its emulation and eventual transformation of the traditional fine arts; and its role in the construction of personal and collective memories. Two lectures, one preceptorial. A. McCauley

ART 256 Writing as Art  Not offered this year LA
In China, Japan, the Islamic world, and several other cultures, writing is ranked as the highest of the visual arts, far above painting, sculpture, even architecture. The forms taken by beautiful writing are at least as diverse as the writing systems that underlie them: think of Egyptian writing, Chinese calligraphy, and Roman monumental inscriptions. This course will introduce the world's major calligraphic traditions and examine the functions of beautiful writing, the reasons for its existence and prestige, and the factors that shape styles of writing. One three-hour seminar. R. Bagley

ART 262 Structures and the Urban Environment (see CEE 262A)

ART 266 Introduction to Pre-Columbian Art  Not offered this year LA
General survey of the indigenous civilizations of North America, Central America, and South America. The goals are to demonstrate methods and techniques employed by art historians working in this area to study the past, and to examine how art history, archaeology, and ethnohistory contribute to the interdisciplinary study of ancient peoples. Two lectures, one preceptorial. Staff

ART 270 Photography and Society  Not offered this year LA
What is the role of photography in contemporary society? By looking at familiar photographic forms, ranging from commercial portraits, ID cards, family albums, and fashion and advertising photography to newspaper and magazine illustrations, this course explores the diverse ways that photographs have come to define and challenge the "real." Students will talk with professionals in the fields of journalism and fashion, examine recent controversies over digital manipulation and politically charged photos, and consider the historical sources of contemporary styles. One three-hour seminar. A. McCauley

ART 300 Greek Archaeology of the Bronze Age  Not offered this year LA
A study of the culture of Greece and the Aegean from the Early Bronze Age to the eighth century B.C. Special emphasis is placed on the Minoan-Mycenaean civilization, the Dark Ages of the early first millennium, and the age of Homer. Two lectures, one preceptorial. Offered in alternate years. Staff

ART 301 The Art of the Iron Age: The Near East and Early Greece  Not offered this year LA
The course will focus on the formation of new artistic traditions in the ancient Near East and late-period Egypt after 1000 B.C.E. and then investigate their interrelationships with early Greece and the controversial theories of modern scholars of the dependence of early Greece on the ancient Near East. Two 90-minute classes. Staff

ART 302 Myths in Greek Art  Not offered this year LA
The changing representation of mythological and religious themes in Greek painting and sculpture from the Late Geometric to the Hellenistic period. Emphasis on the development of specific cycles of myths, with reference to their historical context. Readings in ancient sources in translation and modern criticism. Two lectures, one preceptorial. Offered in alternate years. Staff

ART 306 Classical Athens: Art and Institutions (also CLA 306)  Not offered this year LA
An examination of the culture and institutions of classical Athens, its buildings, monuments, and works of art, set against the historical background of the city's growth. Aspects of government, religious festivals, society, and daily life are investigated. The archaeological record is enriched by study of ancient historical sources in translation. Two lectures, one preceptorial. Staff

ART 308 Roman Cities and Countryside: Republic to Empire  Spring LA
Roman urban and suburban architecture throughout the Roman provinces from the late Republic to late Empire, focusing upon the Romanization of the provinces from Britain in the northwest to Arabia in the southeast. Town planning, imperial monuments, villas and sanctuaries, domestic and public architecture, and interior decoration considered. One three-hour class. H. Meyer

ART 315 Medieval Architecture (also ARC 315)  Not offered this year LA
Historical patterns of development in Western European architecture between 300 and 1300: Early Christian through Gothic, with emphasis on Romanesque and Gothic innovations. Two lectures, one preceptorial. Staff

ART 318 Medieval Manuscript Illumination (also HUM 318)  Not offered this year LA
A technical and historical introduction to manuscript illumination from the invention of the codex to the advent of the printed book. Topics include the history of script and ornament, genres of illuminated manuscripts, the varying relations between text and image, owners of books, circumstances of production. Extensive work with Princeton's manuscript collections. Two 90-minute classes. Offered in alternate years. Staff

ART 319 Italian Trecento Art  Not offered this year LA
Painting and sculpture of the formative years of the early Renaissance in Italy (ca. 1250-1400) with emphasis on the cultural, social, and religious concerns that found expression in art. Topics include the relationship between art and piety, the effect of the Black Death, and the rediscovery of the classical heritage. Two lectures, one preceptorial. Staff

ART 320 Rome, the Eternal City (also ARC 320) Fall LA
The fabric and image of the city seen in planning, architecture, and the works of artists and writers. Attention to the city as an ideal and an example, from its foundation to the present, with emphasis on major periods. Two lectures, one preceptorial. J. Pinto

ART 328 History of Architectural Theory (see ARC 308)

ART 331 Weimar Germany: Painting, Photography, Film (see GER 370)

ART 332 The Landscape of Allusion: Garden and Landscape Architecture, 1450-1750 (also ARC 332) Not offered this year LA
The concept of nature from the Renaissance through the 18th century as seen in European gardens and landscape architecture. Major consideration will be given to the Italian villa-garden complex, the French classical garden, and the English romantic garden and park as evidence of large-scale planning. Two lectures, one preceptorial. J. Pinto

ART 333 Renaissance and Baroque Architecture (also ARC 333) Not offered this year LA
European architecture from 1420 to the mid-18th century with particular emphasis on its historical and social background. The various architectural movements--Renaissance, baroque, and rococo--are studied in terms of important architects and buildings especially of Italy, France, and England. Two lectures, one preceptorial. J. Pinto

ART 334 The Renaissance (see COM 314)

ART 337 Court, Cloister, and City: Art and Architecture in Central and Eastern Europe (also GER 337) Not offered this year LA

ART 343 Topics in 19th-Century Art (also WOM 350) Spring LA
An often interdisciplinary study of themes and problems in 19th-century art with special attention to recent writing in the field. Possible topics include: the persistence of realism, Impressionism and its aftermath, shifting representations of masculinity and femininity, and the formation of the first European avant-gardes. The course may also center on a particular artistic medium or geographical location. Two lectures, one preceptorial. Staff

ART 344 Topics in 20th-Century Art Fall LA
An often interdisciplinary study of themes and problems in 20th-century art with special attention to recent writing in the field. Possible topics include: models of abstraction, critiques of the traditional mediums of art, artistic responses to technological transformation and/or political revolution, and artistic explorations of the unconscious. One three-hour seminar. One evening viewing session. C. Lang

ART 346 Architecture and the Visual Arts (see ARC 302)

ART 348 Masters and Movements of 20th-Century Photography Not offered this year LA

By focusing on six major figures (Stieglitz, Weston, Moholy-Nagy, Evans, Frank, Sherman), this course examines the ways that photography was transformed from a poor stepchild of the fine arts to a staple of museum exhibitions. Topics will include the impact of abstraction on photography; the interactions between art photography and the new print and cinematic mass media; and the development of photographic collections and criticism. Two 90-minute classes A. McCauley

ART 350 Chinese Cinema Fall LA
Thematic studies in Chinese film (Republic, People's Republic, Taiwan, Hong Kong), from the 1930s to the present with emphasis on recent years, viewed in relation to traditional and modern Chinese visual arts and literature; colonialism and globalism, Communist politics, gender and family values, ethnicity and regionalism, melodrama and the avant-garde, the cinematic market, artistic censorship, and other social issues. One three-hour seminar, one evening viewing session. J. Silbergeld

ART 351 Traditional Chinese Architecture (also ARC 351) Not offered this year LA
Thematic introduction to traditional Chinese architecture, urban design, and garden building, with attention to principles and symbolism of siting and design; building techniques; modularity of structures and interchangeability of palace, temple, tomb, and domestic design; regional variation. Two 90-minute classes. J. Silbergeld

ART 354 The Early Modern Print Spring LA
Surveys the history of prints in Europe and the United States from 1400 to the present. It will combine two main approaches: first, the distinctive history of printmaking, including origins, evolution of techniques, and the political, religious, and cultural functions of prints; and second, individual artistic developments, with emphasis on the work of
ART 366 Ancient Arts of Mexico (also LAS 366)  Not offered this year LA

Detailed examination of the Pre-Columbian arts of the indigenous civilizations of Mexico. The first part of the course will examine the architecture, monumental art, and craft art of the Aztecs and their contemporaries, the Huaxtecs, Tarascans, Mixtecs, Zapotees, and Mayas. The rest of the course is designed as a survey of the major Mexican art traditions that preceded them. Two lectures, one preceptorial. C. Heuer

ART 370 History of American Art to 1900  Not offered this year LA

An introduction to the history of art in the United States from the colonial period to 1900. Works of art will be examined in terms of their cultural, social, intellectual, and historical contexts. Students will consider artistic practices as they intersect with other fields, including science and literature. Topics include the visual culture of natural history, fashioning the self, race and representation, landscape and nation, art and the Civil War, gender politics, art and medicine, and realism and deception. Two lectures, one preceptorial. R. DeLue

ART 371 History of American Art, 1900 to the Present  Not offered this year LA

An introduction to the history of American art from 1900 to the present. Artists and works of art will be examined in terms of their cultural, social, intellectual, and historical contexts. Students will consider artistic practices as they intersect with other fields, including science and literature. Topics include the modern metropolis, art and social reform, the Harlem Renaissance, early film, identity politics, abstract art, the machine age, post-modernism, and globalization. Visits to the Princeton University Art Museum will be an integral part of this course. Two lectures, one preceptorial. R. DeLue

ART 373 History of African American Art (also AAS 373)  Not offered this year LA

An introduction to the history of African American art and visual culture from the colonial period. Artists and works of art will be considered in terms of their social, intellectual, and historical contexts. Students will consider artistic practices as they intersect with other cultural spheres, including science and literature. Topics and readings will be drawn from the field of art history as well as from other areas of inquiry, such as cultural studies, critical race theory, and the history of the Atlantic world. Two lectures, one preceptorial. R. DeLue

ART 390 Modernist Colloquies: Photography and Literature (see GER 373)

ART 391 Art in Germany Since 1960 (see GER 371)

ART 392 Issues in Contemporary Art (see VIS 392)

ART 400 Junior Seminar  Fall LA

An introduction to a range of methods and texts in the history of the discipline. The junior seminar is required of all art and archaeology concentrators. One three-hour seminar. C. Heuer, A. McCauley

ART 401 Archaeology Seminar  Spring LA

Introduces students to the methods and thinking of archaeologists and prehistorians. Topics include the concept of prehistory; ethnographic analogy and the interpretation of material remains; relating material culture to texts; schemes of cultural interpretation; and how to read an excavation report. This seminar is required of art and archaeology program 3 concentrators. One three-hour seminar. Staff

ART 410 Seminar. Greek Art (also HLS 410)  Fall LA

Topics of Greek art and architecture that will normally deal with the Hellenistic period (323-31 B.C.). Depending on student interest, special subjects may also be treated in relation to the Hellenistic period, such as classicism, or the course may concentrate on thematic studies, such as architectural sculpture. Two 90-minute seminars. Prerequisite: a course in ancient art or instructor's permission. Offered in alternate years. Staff

ART 420 Seminar in Asian Art  Not offered this year LA

A topic in Chinese or Japanese art, explored in depth. One three-hour seminar. Prerequisite: a course in Asian art or the instructor's permission. Offered in alternate years. Y. Shimizu

ART 421 Landscape Art in China  Fall LA

A course about Chinese concepts of nature and human nature, theories and traditions of landscape art. Weekly consideration of such themes as replicating and transforming the landscape; submission to/control of nature; landscape as political allegory; pilgrimage and exile; gardens and artists' studios; landscape magic in ancient China; endangered pandas, power dams, and the technology of modern art. One three-hour seminar. J. Silbergeld

ART 422 Virtue, Tyranny, and the Political Functions of Chinese Painting  Not offered this year LA

The patrons of Chinese painting and many of its leading artists were politicians by profession, both royal and commoner-bureaucrats, and much of their art was designed to fulfill political functions: propaganda, moral self-cultivation, self-advertisement and self-consolation, expressions of support, resistance, and resignation. Half of the course covers premodern China, half covers the 20th century. One three-hour seminar. Prerequisite: a course in Chinese art history or instructor's permission. J. Silbergeld

ART 425 The Japanese Print  Spring LA
An examination of Japanese woodblock prints from the 17th through the 19th century. This seminar considers the formal and technical aspects of woodblock prints, and the varied subject matter, including the "floating world" of prostitution and the theater, the Japanese landscape, and the burgeoning urban centers. Students will explore the links between literature and prints, especially the re-working of elite classical literary themes in popular prints. Prerequisite: at least one course in art history or Japanese studies, or permission of instructor. One three-hour seminar. A. Watsky

ART 430 Seminar. Medieval Art (also HLS 430)  Not offered this year LA
Topics in medieval art and/or architecture. One three-hour seminar. Prerequisite: a course in the art of this period or instructor's permission. Staff

ART 438 Representation of Faith and Power: Islamic Architecture in Its Context (also NES 428)  Not offered this year LA
The seminar explores the means by which messages of political and religious content were conveyed in Islamic architecture. Selected key monuments or ensembles will be discussed on the basis of their specific historical and religious setting. Special attention will be given to the problem of symbolism in Islamic architecture. T. Leisten

ART 440 Seminar. Renaissance Art (also HLS 441)  Not offered this year LA
Topics in 15th- and 16th-century art. One three-hour seminar. Prerequisite: a course in the art of this period or instructor's permission. C. Heuer

ART 442 Seminar. Old Master Drawings  Not offered this year LA
The study of techniques, functions, and connoisseurship of drawings, and their place in the interpretation of the history of art. Drawings ca. 1400-1800 will be the major objects considered. Extensive use of the resources of the art museum. One three-hour seminar. Prerequisite: a course in Renaissance or baroque art or instructor's permission. T. Kaufmann

ART 443 Global Exchange in Art and Architecture (also LAS 443)  Fall LA
Examines the global exchange in art and architecture between and among the continents of Europe, Asia, Africa, and the Americas in the period 1492-1800. The course focuses on the geographical, historical, religious, anthropological, and aesthetic aspects of issues such as cultural encounters, diffusion, transculturation, regionalism, and related topics. One three-hour seminar. T. Kaufmann

ART 445 Topics in the History and Theory of Architecture in Early-Modern Europe (also ARC 445)  Fall LA
Topics will focus on major figures, such as Palladio, Wren, and Piranesi; centers, such as Rome and Venice; or themes, such as architectural theory, the legacy of classical antiquity, and the villa. One three-hour seminar. J. Pinto

ART 446 Seminar. Northern European Art of the Late Middle Ages and Early Renaissance  Not offered this year LA
This seminar will address various aspects of northern European art during the period late Middle Ages through early Renaissance. One three-hour seminar. Prerequisite: a course in the art of this period or instructor's permission. C. Heuer

ART 448 Seminar. 17th- and 18th-Century Art  Not offered this year LA
Topics in 17th- and 18th-century art and architecture. One three-hour seminar. Prerequisite: a course in the art of this period or instructor's permission. Staff

ART 450 Seminar. 19th-Century European Art (also ECS 450)  Not offered this year LA
The seminar will focus in depth on a specific aspect of art, history, theory, and criticism in Europe between 1789 and 1914. Possible topics include French painting and its critics, portraiture and sociability, shifting conceptions of realism and naturalism, the onset of modernism, and representations of interior space. Prerequisites: a course in the art of this period or permission of the instructor. Visits to area museums. One three-hour seminar. B. Alsdorf

ART 452 Seminar. Modernism: The Ends of Art  Not offered this year LA
Does art have an essential nature? Do different mediums—painting, sculpture, photography, film, television, video—have specific ontologies that demand specific methods? How is the autonomy of art debated, and why is this debate so central to modernism? With images and texts by primary artists and critics, the seminar will investigate the "ends" of art in the sense of posited goals and presumed deaths. One three-hour seminar. Prerequisite: a course in the art of this period or instructor's permission. Staff

ART 454 Seminar. History of Photography  Not offered this year LA
Topics on the aesthetic and stylistic development of photography, including the study of movements and related critical theory, and on the artistic achievement of particular photographers. One three-hour seminar. A. McCauley

ART 456 Seminar. Contemporary Art  Not offered this year LA
Topics in contemporary painting, sculpture, or criticism in Europe and America since World War II. Prerequisite: a course in the art of this period or instructor's permission. H. Foster

ART 458 Seminar. Modern Architecture (also ARC 458)  Spring LA

http://www.princeton.edu/ua/
A study of some of the major themes and movements of modern architecture from the late 19th century to the present day. Students will be encouraged to examine the social and political context, to probe the architects' intellectual background, and consider issues of class and gender in their relation to architectural and urban form. One three-hour seminar. E. da Costa Meyer

ART 461 Great Cities of the Greek World (see HLS 461)

ART 463 American Art and Visual Culture  Not offered this year LA

An in-depth exploration of the history, theory, and interpretation of American art and visual culture from the colonial period to the present day. Topics covered will include race and representation in American art and culture; art and science; landscape art and theory; the Harlem Renaissance; and the art and artists of the Stieglitz circle. Visits to the Princeton University Art Museum as well as to other area museums (such as the Metropolitan Museum of Art in New York) will be an integral part of this course. One three-hour seminar. R. DeLue
Department of Astrophysical Sciences

Chair
David N. Spergel

Associate Chair
Michael A. Strauss
Ronald C. Davidson (Plasma Physics)

Departmental Representative
Neta A. Bahcall

Director of Graduate Studies
Gillian R. Knapp

Astronomy

Professor
Neta A. Bahcall
Adam S. Burrows
Christopher F. Chyba, also Woodrow Wilson School
Bruce T. Draine
Jeremy Goodman
J. Richard Gott III
James E. Gunn
Gillian R. Knapp
Jeremiah P. Ostriker
David N. Spergel
James M. Stone, also Applied and Computational Mathematics
Michael A. Strauss
Edwin L. Turner

Assistant Professor
Roman R. Rafikov
Anatoly Spitkovsky

Visiting Lecturer
Michael D. Lemonick

Associated Faculty
N. Jeremy Kasdin, Mechanical and Aerospace Engineering
Lyman A. Page Jr., Physics
Suzanne T. Staggs, Physics
Paul J. Steinhardt, Physics
Robert J. Vanderbei, Operations Research and Financial Engineering

Plasma Physics

Director
Nathaniel J. Fisch

Director of Graduate Studies
Nathaniel J. Fisch

Professor
Ronald C. Davidson
Nathaniel J. Fisch
Robert J. Goldston
Stewart C. Prager

Lecturer with Rank of Professor
Samuel A. Cohen
Gregory W. Hammett
Stephen C. Jardin
John A. Krommes

Cynthia K. Phillips
Allan H. Reiman
William M. Tang
Roscoe B. White

Lecturer
Ilya I. Dodin
Philip C. Efthimion
Hantao Ji
Richard P. Majeski
Hong Qin

Associated Faculty
Edgar Y. Choueiri, Mechanical and Aerospace Engineering
Szymon Suckewer, Mechanical and Aerospace Engineering

Information and Departmental Plan of Study

The Department of Astrophysical Sciences offers a comprehensive program for astrophysics majors with the flexibility to accommodate students with a broad range of interests. Many of our majors plan to continue in graduate school in astrophysics. For students with career goals in other areas such as science education, science policy, space exploration, as well as law, medicine, finance, and teaching, we offer a flexible choice of courses and research projects. The department covers all major fields in astrophysics—from planets, to black holes, stars, galaxies, quasars, dark matter, and the evolution of the universe. The relatively small size of the department provides an informal and friendly setting for students. Full accessibility to all faculty members and to the excellent departmental facilities, including our on-campus and remote telescopes and sophisticated computer system, is provided.

http://www.princeton.edu/ua/
Prerequisites

Mathematics 201, 202 or equivalent, and Physics 205 or 207; Astrophysical Sciences 204 is strongly recommended.

Early Concentration

Students interested in early concentration in astrophysics should contact the departmental representative.

Program of Study

Every student majoring in astrophysical sciences will acquire the necessary training in astrophysics by taking at least three astrophysics courses at the 300 or 400 level. In addition to these courses, departmental students will take courses in the Department of Physics that provide basic training in mechanics, quantum mechanics, electromagnetic theory, and other relevant topics.

Independent Work

Junior Year. In addition to the course work carried out during the junior year, each student carries out two junior independent research projects, one each semester. Each project is on a research topic of current interest, carried out under close supervision of a faculty adviser who is doing research in this area. The student will complete each term's independent work by submitting a written paper. The research projects can involve data analysis using astronomical data from our telescopes, including data from the Sloan Digital Sky Survey—a unique three-dimensional map of the universe—and from national and international facilities such as the Hubble Space Telescope. Similarly, theoretical and computational projects in astrophysics are available. The topics, to be selected jointly by the student and his/her adviser, can range from areas such as cosmology and the early universe, to galaxy formation, large-scale structure of the universe, quasars, black holes, stars, and planetary astrophysics. Interdisciplinary projects, including astronomy and education, science policy, planetary science, astrobiology, space science exploration, and more are possible.

Senior Year. In the senior year, in addition to course work, students carry out an extensive research project with a faculty adviser for their senior thesis. The thesis is completed by submitting the final written paper summarizing the work. There is a wide range of observational and theoretical topics available, including interdisciplinary projects as discussed above. The senior thesis work is frequently published as part of a scientific paper in an astrophysical journal. After the thesis has been completed and read by the adviser and an additional faculty member, the student presents an oral summary of the work, followed by an oral defense of the thesis.

Senior Departmental Examination

The thesis work and the oral defense, combined with an oral examination on general topics in astrophysics, comprise the senior departmental examination.

Preparation for Graduate Study

The undergraduate program the department provides an excellent preparation for graduate study in astrophysics, with concentrators frequently accepted at the top graduate schools in the country.

Additional Courses: See Course Offerings [http://registrar.princeton.edu/course-offerings/] especially for the following courses currently offered on a one-time-only basis: AST 201 Mapping the Universe (Fall), AST 303 Modeling and Observing the Universe: Research Methods in Astrophysics (Fall), AST 403 Stars and Star Formation (Spring).

Courses

AST 203 The Universe  Spring QR

This specially designed course targets the frontier of modern astrophysics. Subjects include the birth, life, and death of stars; the search for extrasolar planets and extraterrestrial life; the zoo of galaxies from dwarfs to giants, from starbursts to quasars; dark matter and the large-scale structure of the universe; Einstein's special and general theory of relativity, black holes, worm holes, time travel, and big bang cosmology. This course is designed for the nonscience major and has no prerequisites past high school algebra and geometry. High school physics would be useful. A. Spitkovsky, C. Chyba

AST 204 Topics in Modern Astronomy  Spring QR

The solar system; the birth and evolution of the stars; supernovae, neutron stars, and black holes; the evolution of the chemical elements; the formation, structure, and evolution of galaxies; cosmology and the evolution of the universe; and life in the universe. Prerequisites: PHY 103 or 105 and MAT 103 or 104 or equivalent. Intended for students in the sciences. A. Burrows

AST 207 A Guided Tour of the Solar System (see GEO 207)
AST 255 Life in the Universe (see GEO 255)

AST 301 General Relativity (also PHY 321)  Not offered this year

This is an introductory course in general relativity for undergraduates. Topics include the early universe, black holes, cosmic strings, worm holes, and time travel. Two 90-minute lectures. Prerequisites: MAT 201, 202; PHY 203, 208. Designed for science and engineering majors. J. Goodman

AST 302 Structure of the Stars  Not offered this year

Topics include the physical properties of stellar matter under conditions of mechanical and thermal equilibrium, origin, evolution, and death of single and binary stars, stellar atmospheric layers, and the abundances of the chemical elements. Two 90-minute lectures. Prerequisites: MAT 201, 202, PHY 203, 208. Designed for science and engineering majors. J. Goodman

AST 374 Planetary Systems: Their Diversity and Evolution (see GEO 374)

AST 401 Cosmology (also PHY 401)  Not offered this year

Topics include the properties and nature of galaxies, quasars, active galactic nuclei, galaxy clustering, large-scale properties of the universe, formation of galaxies and other structures, microwave background radiation, the big bang, and the early universe. Two 90-minute lectures. Prerequisites: MAT 201, 202; PHY 203, 208. Designed for science and engineering majors. N. Bahcall, D. Spergel

AST 402 Interstellar Matter and Star Formation  Not offered this year

Emission mechanisms (thermal, spectral line, synchrotron) for ionized and neutral gas are applied to observations of the interstellar medium over the entire spectrum to derive its properties. Topics include star formation, HII regions, molecular clouds, dust, masers, interstellar chemistry, supernova remnants, shock processes, cosmic ray acceleration and propagation, magnetic fields. Two lectures, one class. Prerequisites: MAT 201, 202, and PHY 203, 208. G. Knapp, D. Spergel

http://www.princeton.edu/ua/
Program in Biophysics

**Director**  
William Bialek

**Executive Committee**  
Robert H. Austin, Physics  
Lewis-Sigler Institute for Integrative Genomics  
David W. Tank, Molecular Biology, Princeton Neuroscience Institute  
Ned S. Wingreen, Molecular Biology

The Program in Biophysics is designed for students who are interested in bringing the intellectual traditions of physics to bear on the phenomena of life. In practice, this means taking courses that reach across the huge gulf between disciplines, and exploring the interface through junior and senior independent work. At Princeton, "biophysics" means much more than the application of methods from physics to the problems of biology; students are encouraged to appreciate that physicists and biologists ask different questions, and expect different kinds of answers. Current examples of this style of work range from the dynamics of single molecules to the networks of neurons responsible for perception and memory, from collective behavior in groups of organisms to the mechanics of single cells, and from information flow in genetic regulatory networks to evolution. As in all areas of physics, research in biophysics involves both theory and experiment.

Recent certificate students have concentrated in physics, some in molecular biology, and some in other departments. Students are encouraged to speak with the program director to find a program of study that builds on existing requirements in their home department.

**Admission to the Program**

Students are admitted to the program once they have chosen their field of concentration and consulted with the program director, who will assign them an adviser. Normally, they will have completed the freshman and sophomore prerequisites for their concentration.

**Program of Study**

Biophysics students develop a program in consultation with their adviser that consists of a core curriculum plus the necessary prerequisites, junior and senior independent work in biophysics, and electives. Because a sound training in mathematics is a prerequisite for successful performance in upperclass physics courses, at least one 300-level course in differential equations should be taken as early as possible.

Physics concentrators who enter the department via the traditional route (PHY 105/6 or 103/4 as freshmen) are encouraged to take MOL 214 or (preferably) 215 as early as possible, to have a clearer idea of the opportunities at the interface between physics and biology. To broaden their background, students must also take one 300 or 400 level course in the biological sciences. Most certificate students have also taken PHY 412 (Biological Physics) or the graduate course PHY 562 (Biophysics). Finally, students are encouraged to gain direct laboratory experience with biological systems, either by arranging to split their junior laboratory experience between PHY 312 and MOL 350 (by arrangement with the physics departmental representative), or by working in a biophysics laboratory on campus over the summers. For physics concentrators who enter the department via the Integrated Science curriculum (ISC 231-4 as freshmen), the sophomore course ISC 235/6 can serve as an introduction to the biological sciences. These students should use PHY 412 and/or 562 as electives to deepen their understanding of current work in the field.

Molecular biology concentrators who enter the department through the Integrated Science curriculum are encouraged to continue their physics education through PHY 203 or 205, and PHY 208, but most importantly through PHY 301 (Thermal Physics). This should provide the preparation required for PHY 412, and for serious independent work with physics content. Molecular biology concentrators who enter the department through the more traditional path are encouraged to take their introductory physics courses (PHY 103/4, or, preferably, 105/6) as early as possible, and to plan a curriculum that brings them to 300-level mathematics courses in the start of their junior year. These students should continue their physics education as described above.

Recognizing that biophysics is an interdisciplinary program whose excitement lies in the fluidity of the intellectual landscape, alternative programs of study may be arranged at the discretion of the program committee. Junior independent work in the physics department can be two different topics in biophysics, or one in physics, the other in biophysics. Independent work for molecular biology concentrators should display a clear connection to the ideas, as well as the methods, of physics. Independent research topics are approved in advance by the program committee, in consultation with faculty advisers.

To qualify for the biophysics program certificate, a minimum B average must be attained in the program courses, and a B average in the independent work. Program courses may not be taken pass/D/fail.

**Certificate of Proficiency**

Students who fulfill all requirements of the program will receive a certificate of proficiency in biophysics upon graduation.

http://www.princeton.edu/ua/
Program-Related Courses. There are a variety of electives available to suitably prepared program members:

Applied and Computational Mathematics
514 Biological Dynamics (also EEB 514/MOL 514)

Chemistry
542 Principles of Macromolecular Structure
543 Advanced Topics in Structural Biology
306 Physical Chemistry: Chemical Thermodynamics and Kinetics
Certain 500-level courses, with the instructor's permission

Engineering
ELE 352 Physical Optics

Molecular Biology
400-level and certain 500-level courses, with the instructor's permission

Physics
412 Biological Physics
562 Biophysics (with instructor's permission)
Information and Departmental Plan of Study

Prerequisites

The freshman program in engineering or its equivalent.

General Requirements

In order to qualify for the B.S.E. degree in the Department of Chemical and Biological Engineering, a student must satisfy the requirements of the School of Engineering and Applied Science and must choose courses during the sophomore, junior, and senior years to provide a core knowledge of chemical engineering and advanced knowledge in an area of concentration. The advanced science and core chemical engineering courses in the sophomore and junior years provide the fundamental tools of thermodynamics, transport processes, and reactor analysis. In the spring semester of the junior year students take a laboratory base course that utilizes core chemical engineering knowledge. In the senior year, students undertake an in-depth design analysis with state-of-the-art design and optimization tools in CBE 442 Design, Synthesis, and Optimization of Chemical Processes. Students can tailor their specific interests in chemical and biological engineering by pursuing an area of concentration that culminates with a senior thesis project. The areas of concentration, reflective of the practice of modern chemical engineering, include bioengineering, biotechnology, materials and product engineering, energy and environmental engineering, optimization dynamics and information technology, entrepreneurship and management, and science and engineering for new technologies. This program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone (410) 347-7700. Students with special interests should consult the section on special programs and options. Total courses: 36.

Departmental Requirements

Chemical and Biological Engineering Core

The nine courses listed below are required of all chemical and biological engineering majors:

245 Introduction to Chemical Engineering Principles
246 Thermodynamics
250 Separations in Chemical Engineering and Biotechnology
341 Mass, Momentum, and Energy Transport
346 Chemical Engineering Laboratory
441 Chemical Reaction Engineering
442 Design, Synthesis, and Optimization of Chemical Processes
451, 452 Independent Work or 454 Senior Thesis

Most students carry out a two-term senior thesis. Students must complete a two-term thesis for departmental honors. Students who elect one term of independent work are required to take an additional chemical engineering elective.

http://www.princeton.edu/ua/
Mathematics Requirement

MAT 303 Ordinary Differential Equations, or MAE 305 Mathematics in Engineering I

Chemistry Requirement

CHM 201 General Chemistry I, or CHM 203 Advanced General Chemistry I, or CHM 207 Advanced General Chemistry: Materials Chemistry
CHM 202 General Chemistry II, or CHM 204 Advanced General Chemistry II, or CHM 215 Advanced General Chemistry: Honors Course
CHM 301 Organic Chemistry I, or CHM 303 Organic Chemistry I: Biological Emphasis

Molecular Biology Requirement

MOL 214 Introduction to Cellular and Molecular Biology, or MOL 215 Quantitative Principles in Cell and Molecular Biology

Advanced Science Requirements

Advanced Chemistry: The advanced chemistry course provides a greater depth in the underlying science of chemistry. The courses may be any 300 level or above chemistry course, including those cross-listed by the chemistry department. With the approval of the departmental representative, the advanced chemistry requirement may be selected from another science department.

Advanced Chemical Engineering: One advanced chemical engineering course is also required. This can be any 300 level or above course (excluding independent work) offered or cross-listed by the Department of Chemical and Biological Engineering.

Program of Study

Students are required to designate an area of concentration and take three courses from the approved lists below in that area of concentration. The senior independent work should also be undertaken within the area of concentration. In addition, students are required to take at least one course each from two of the advanced areas outside their area of concentration to provide technical diversity. (Note: An asterisk indicates one-time-only courses.)

Bioengineering and Biotechnology

CBE 423 Biologically Inspired Materials
CBE 432 The Cell as a Chemical Reactor
CBE 438 Biomolecular Engineering
CBE 439 Quantitative Physiology and Tissue Design
CBE 440 The Physical Basis of Human Disease
CBE 443 Separations in Chemical and Biochemical Processes
CBE 447 Biochemical Engineering
*CHM 412 Applied Quantitative Analysis: Molecular Recognition
CHM 543 Advanced Topics in Structural Biology: Neurodevelopmental Disorders from a Molecular Point of View
MAE 344 Introduction to Bioengineering and Medical Devices
MOL 340 Molecular and Cellular Immunology
MOL 342 Genetics
MOL 345/CHM 345 Biochemistry
MOL 348 Cell and Developmental Biology
MOL 434 Macromolecular Structure and Mechanism in Disease
MOL 435 Pathogenesis and Bacterial Diversity
*MOL 436 Statistical Methods for Genomic Data
MOL 455/COS 455 Introduction to Genomics and Computational Molecular Biology
MOL 457 Computational Aspect of Molecular Biology
NEU 258/PSY 258 Fundamentals of Neuroscience
NEU 259a, 259b/PSY 259a, 259b Introduction to Cognitive Neuroscience
NEU 408/MOL 408/PSY 404 Cellular and Systems Neuroscience
NEU 437/MOL 437/PSY 437 Computational Neuroscience
PSY 406 Functional Neuroanatomy
PSY 407 Developmental Neuroscience
QCB 510/CBE 535 Modeling Tools for Cell and Developmental Biology

Entrepreneurship and Management

CBE 260/EGR 260 Ethics and Technology: Engineering in the Real World
CEE 460 Risk Assessment and Management
COS 432 Information Security
ECO 310 Microeconomic Theory: A Mathematical Approach
EGR 495 Special Topics in Entrepreneurship
ELE 491 High-Tech Entrepreneurship
GEO 297/ENV 399 Environmental Decision Making
GEO 366/ENV 339/WWS 335 Current and Future Climate
ORF 245 Fundamentals of Engineering Statistics
ORF 335 Introduction to Financial Engineering
ORF 435 Financial Risk Management
WWS 304 Science, Technology, and Public Policy
WWS 315 Bioethics and Public Policy

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Energy and Environmental Technology

CEE 303 Introduction to Environmental Engineering
CEE 306 Hydrology
CEE 308 Environmental Engineering Laboratory
CEE 471 Introduction to Water Pollution Technology
CHM 333/ENV 333 Oil to Ozone: Chemistry of the Environment
*ECO 429 Issues in Environmental and Natural Resource Economics
*ELE 431 Solar Energy Conversion
ENV 201a, 201b Fundamentals of Environmental Studies: Population, Land Use, Biodiversity, Energy
ENV 202a, 202b Fundamentals of Environmental Studies: Climate, Air Pollution, Toxics, and Water
ENV 204 Global Warming: Causes, Consequences, Policy Responses
ENV 531/GEO 531/CEE 583 Topics in Energy and the Environment: Intro to Petroleum Engineering
GEO 220a or 220b Weather and Climate
GEO 322 Biogeochemical Cycles and Global Change
GEO 363/CHM 331/ENV 331 Environmental Geochemistry: Chemistry of the Natural Systems
GEO 418/CHM 418 Environmental Aqueous Geochemistry
GEO 470/CHM 470 Environmental Chemistry of Soils
MAE 328/EGR 328/ENV 328 Energy for a Greenhouse-Constrained World
MAE 427 Energy Conversion and the Environment: Transportation Applications

Materials and Product Engineering

CBE 415 Polymers
CBE 423 Biologically Inspired Materials
CEE 364 Materials in Civil Engineering
CHM 403 Advanced Organic Chemistry
ELE 441 Solid-State Physics I
ELE 442 Solid-State Physics II
ELE 449 Materials and Solid-State Device Laboratory
MAE 324 Structure and Properties of Materials
MAE 334 Materials Selection and Design
MSE 301 Materials Science and Engineering
MSE 302 Laboratory Techniques in Materials Science and Engineering
MSE 531/ELE 531 Introduction to Nano/Microfabrication

Optimization, Dynamics, and Information Technology

CBE 445 Process Control
CBE 448 Introduction to Nonlinear Dynamics
CBE 520 Molecular Simulation Methods
CBE 527 Nonlinear and Mixed-Integer Optimization
COS 217 Introduction to Programming Systems
COS 226 Algorithms and Data Structures
COS 323 Computing for the Physical and Social Sciences
COS 333 Advanced Programming Techniques
*EEB 355 Introduction to Statistics for Biology
ORF 245 Fundamentals of Engineering Statistics
ORF 307 Optimization
ORF 309/EGR 309/MAT 309 Probability and Stochastic Systems
ORF 311 Optimization Under Uncertainty
ORF 406 Statistical Design of Experiments
ORF 409 Introduction to Monte Carlo Simulation
ORF 411 Operations and Information Engineering
ORF 417 Dynamic Programming

Science and Engineering for New Technologies

Transport Phenomena

CBE 342 Fluid Mechanics
MAE 306/MAT 302 Mathematics in Engineering II
MAE 336 Viscous Flows
MAE 423 Heat Transfer

Chemical Technology

CBE 421/CHM 421 Catalytic Chemistry
CHM 302 Organic Chemistry II, or CHM 304 Organic Chemistry II: Biological Emphasis
CHM 305 The Quantum World
CHM 306 Physical Chemistry: Chemical Thermodynamics and Kinetics
CHM 406 Advanced Physical Chemistry: Chemical Dynamics and Thermodynamics
CHM 407 Inorganic Chemistry: Structure and Bonding

Engineering Physics

PHY 203 Classical Mechanics A, or PHY 205 Classical Mechanics B

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Special Programs and Options. The flexibility built into the chemical and biological engineering curriculum provides an opportunity for students to obtain a thorough education in the fundamentals of chemical engineering science and at the same time pursue a cognate field (a "track") such as biology, business, medicine, chemistry, or physics. Students simply elect as few or as many courses in the cognate field as they desire. While some students may concentrate all their electives in a single field, others may prefer to divide their time between two tracks, for example, chemistry and the biological sciences, or physics and mathematics. The following listing suggests the many tracks available.

**Applied and Computational Mathematics:** Elective courses in mathematics, modeling, and applications.

**Applied Mathematics and Computer Technology:** Elective courses in statistical studies, mathematics, electrical engineering, computer science, mechanical and aerospace engineering, and civil engineering and operations research.

**Applied Physics:** Elective courses in physics, mathematics, and chemical and biological engineering.

**Biotechnology:** Elective courses in chemical and biological engineering, molecular biology, and chemistry.

**Business and Finance:** Elective courses in decision theory, engineering administration, and economics.

**Chemistry:** Additional courses in chemistry and the biological sciences beyond those required in the regular program.

**Energy Conversion and Resources:** Elective courses with emphasis on conversion of energy as given by the Departments of Mechanical and Aerospace Engineering, Chemical and Biological Engineering, and Physics.

**Environmental Studies:** Elective courses in ecology and evolutionary biology, molecular biology, chemistry, chemical and biological engineering, and civil and environmental engineering.

**Materials Science:** Elective courses in materials science and engineering, mechanical and aerospace engineering, chemical and biological engineering, and civil and environmental engineering.

**Premedical:** Elective courses in ecology and evolutionary biology, molecular biology, and chemistry.

Princeton University offers several special programs called certificate programs. Unlike the tracks described above, these certificate programs have formal requirements. They are described elsewhere in this announcement (for example, see the Programs in Engineering Physics, Engineering Biology, Materials Science and Engineering, Sustainable Energy, and Environmental Studies).

### Courses

**CBE 199 Great Inventions That Changed the World (also EGR 199) Not offered this year QR**

Examines a number of great inventions in 20th-century chemical technology. Focuses on scientists and engineers who tackled the urgent problems of their day. Using case studies, students learn about the methods and tools employed by scientists, examine their solutions, and discuss the consequences (both good and bad) of their inventions. Students develop their quantitative skills by using Excel to solve equations and do statistical analysis. Two lectures, one preceptorial. J. Wei

**CBE 201 An Introduction to Scientific Computing Not offered this year QR**

An introduction to computer programming emphasizing numerical modeling and problem solving, including numerical integration, solution of systems of non-linear equations, and composition of high-level macros for numerical work within spreadsheets. The programming environment is Visual Basic.NET, an object-oriented programming language that is accessible to beginner programmers and permits the rapid development of applications with a graphical user interface. Utilizes MATLAB data analysis, visualization, programming, and symbolic mathematics systems. Two lectures, one preceptorial. Prerequisite: MAT 103. A. Panagiotopoulos

**CBE 228 Energy Solutions for the Next Century (see MAE 228)**

**CBE 245 Introduction to Chemical Engineering Principles Fall**

Application of the principles of conservation of mass and energy to the design and analysis of chemical processes. Elementary treatment of single and multiphase systems. First law of thermodynamics for closed and open systems. Steady state and transient analysis of reacting and nonreacting systems. Prerequisite: general chemistry. R. Priestley
CBE 246 Thermodynamics  Spring

Basic concepts governing the equilibrium behavior of macroscopic fluid and solid systems of interest in modern chemical engineering. Applications of the first law (energy conservation) and second law (temperature, entropy, reversibility) to open and closed systems. Thermodynamic properties of pure substances and mixtures. Phase equilibrium and introduction to reaction equilibrium. Introduction to the molecular basis of thermodynamics. Applications include thermodynamics of protein stability, the Earth's energy balance, energy conversion schemes, and the binding of ligands to proteins. Prerequisite: 245 or instructor's permission. A. Panagiotopoulos

CBE 250 Separations in Chemical Engineering and Biotechnology  Spring

Fundamental thermodynamic principles and transport processes that govern separations in biotechnology and chemical processing. Staged operations, such as distillation and chromatography, are developed based on coupling phase equilibrium with mass balances. Transport processes driven by electric fields, centrifugal fields, or hydrodynamics provide the basis for understanding ultracentrifugation, membrane process, and electrophoresis. Prerequisites: CBE 245, or MAT 104 with permission of instructor. Three classes. A. Link

CBE 260 Ethics and Technology: Engineering in the Real World (also EGR 260)  Fall EM

An examination of engineering as a profession and the professional responsibilities of engineers. The ethics of engineering will be considered through case studies (e.g., automobile safety, pollution control), and the social responsibilities of engineering will be distinguished from those of science and business. Quantitative decision-making concepts, including risk-benefit analysis, are introduced and weighed against ethical considerations to compare technology options. Ethical conflicts between utilitarian theories and duty theories will be debated. Two lectures, one preceptorial. J. Benziger

CBE 341 Mass, Momentum, and Energy Transport  Fall

Survey of modeling and solution methods for the transport of fluids, heat, and chemical species in response to differences in pressure, temperature, and concentration. Both steady state and transient behavior will be examined. Topics include fluid statics; conservation equations for mass, momentum and energy; dimensional analysis; viscous flow at high and low Reynolds number; thermal conduction; convective heat and mass transfer, correlations; diffusion and interphase mass transfer. Working knowledge of calculus, linear algebra and ordinary differential equations is assumed. Three lectures, one preceptorial. MAE 305 may be taken concurrently. M. Brynildsen

CBE 342 Fluid Mechanics  Not offered this year

Elements of fluid mechanics relevant to simple and complex fluids. Topics include macroscopic balances; derivation of differential balance equations and applications to unidirectional flows; treatment of nearly unidirectional flows through the lubrication approximation; introduction to turbulent flow; flow through porous media; capillary flows; dispersed two-phase flows; and hydrodynamic stability. Three lectures. Prerequisite: 341. S. Sundaresan

CBE 346 Chemical Engineering Laboratory  Spring

An intensive hands-on practice of engineering. Experimental work in the areas of separations, heat transfer, fluid mechanics, process dynamics and control, materials processing and characterization, chemical reactors. Development of written and oral technical communication skills. Prerequisites 246, 341 or equivalents. One 90-minute lecture, two three-hour laboratories. I. Aksay, R. Priestley, R. Prud'homme

CBE 351 Junior Independent Work  Fall

Subjects chosen by the student with the approval of the faculty for independent study. A written report, examination, or other evidence of accomplishment will be required. L. Loo

CBE 352 Junior Independent Work  Spring

Subjects chosen by the student with the approval of the faculty for independent study. A written report, examination, or other evidence of accomplishment will be required. L. Loo

CBE 410 Molecular Structure and Property: Product Engineering (also CHM 410)  Not offered this year QR

The value of chemical products, such as motor fuels and refrigerants, depends on such properties as heats of combustion, boiling points, and environmental impact. The introduction of new products and improvement of existing products depend on understanding and manipulation of molecular structure and intermolecular forces. Computers will be used in data access, structure visualization and manipulation, data analysis, and property estimation. Prerequisites: CHM 201 and CHM 202 and CHM 301. Two 90-minute lectures. J. Wei

CBE 415 Polymers (also CHM 415)  Spring

Broad introduction to polymer science and technology, including polymer chemistry (major synthetic routes to polymers), polymer physics (solution and melt behavior, solid-state morphology and properties), and polymer engineering (overview of reaction engineering and melt processing methods). Two 90-minute lectures. R. Register

CBE 421 Catalytic Chemistry (also CHM 421)  Not offered this year

Concepts of heterogeneous catalysis applied to chemical processes. Major industrial processes based on heterogeneous catalysis, including ammonia synthesis, catalytic cracking, partial oxidation, and desulfurization. The major classes of heterogeneous catalysts, such as solid acids and transition metals, and the classes of chemical reactions catalyzed by these materials. Processing conditions and reactor design are also considered. Three lectures. Prerequisite: organic chemistry. J. Benziger

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CBE 423 Biologically Inspired Materials  Not offered this year

Focuses on the pathways utilized by biological systems to produce hierarchically structured inorganic/organic nanocomposites such as bone, teeth, diatoms, and sea-shells. These structures form through template-assisted self-assembly, in which self-assembled organic materials (proteins, lipids, or both) serve as the structural scaffold. The outcome is multifunctional composites with self-healing, sensing, and actuating properties. The course will critically evaluate the potential of biologically inspired materials in future applications. Two 90-minute lectures, one class. I. Aksay

CBE 432 The Cell as a Chemical Reactor  Not offered this year

Presents a framework for the analysis of cellular responses, such as proliferation, migration, and differentiation. Emphasis on mechanistic models of biotransformation, signal transduction, and cell-cell communication in tissues. Focuses first on unit operations of cell physiology transcription, translation, and signal transduction. Models of these processes will rely on tools of reaction engineering and transport. Process dynamics and control will then be used to analyze the regulatory structure of networks of interacting genes and proteins. Prerequisites: MOL 214 and MAT 303 or their equivalents. One three-hour lecture. S. Shvartsman

CBE 441 Chemical Reaction Engineering  Spring

Stoichiometry and mechanisms of chemical reaction rates, both homogeneous and catalytic; adsorption, batch, continuous flow, and staged reactors; coupling between chemical reaction rates and mass, momentum, and energy transport; stability; optimization of reactor design. Application to environmental and industrial problems. Two lectures, one class. Prerequisites: thermodynamics, 341. C. Nelson

CBE 442 Design, Synthesis, and Optimization of Chemical Processes  Fall

Introduction to chemical process flow-sheeting; process simulation design, sizing and cost estimation of total processes; process economics; introduction to optimization, linear programming, integer programming, and nonlinear programming; heat integration methods, minimum utility cost, minimum number of units, network optimization. Three lectures. Prerequisite: 441. C. Floudas

CBE 443 Separations in Chemical and Biochemical Processes  Not offered this year

Separations of importance in biochemical and chemical processes emphasizing physical and chemical mechanisms. Topics include: membrane separations, chromatographic separations, crystallization, centrifugation, filtration, extraction, and adsorption. Three lectures. R. Prud'homme

CBE 444 Process Control  Not offered this year

A quantitative study of the principles of process dynamics and control. Dynamic behavior of chemical process elements; analysis and synthesis of linear feedback control systems with special emphasis on frequency response techniques and scalar systems. Two 90-minute lectures. Prerequisite: differential equations, which may be taken concurrently. C. Floudas

CBE 447 Biochemical Engineering  Not offered this year

Introduction to engineering analysis of biological systems and the use of microorganisms in biotechnology. Specific topics will include: introduction to microbial biochemistry and genetics; enzyme kinetics; kinetics and energetics of microbial growth; heat and mass transfer in biological systems; microbial bioreactors; immobilized cells and enzymes; genetic engineering. Three lectures. Optional review sessions. Staff

CBE 448 Introduction to Nonlinear Dynamics (also MAT 448)  Not offered this year

An introduction to the phenomenology of nonlinear dynamic behavior with emphasis on models of actual physical, chemical, and biological systems, involving an interdisciplinary approach to ideas from mathematics, computing, and modeling. The common features of the development of chaotic behavior in both mathematical models and experimental studies are stressed, as is the use of interactive graphics to explore and analyze this behavior. Two 90-minute lectures. Prerequisites: knowledge of linear algebra and ordinary differential equations (for example, MAT 203, 303, or MAE 305). Y. Kevrekidis

CBE 451 Senior Independent Work  Fall

A one semester study of an important problem or topic in chemical and biological engineering. Projects may be experimental, computational, or theoretical. Topics selected by the students from suggestions by the faculty. Written report required. L. Loo

CBE 452 Senior Independent Work  Spring

A one semester study of an important problem or topic in chemical and biological engineering. Projects may be experimental, computational, or theoretical. Topics selected by the students from suggestions by the faculty. Written report required. L. Loo

CBE 454 Senior Thesis  Spring

A full year study of an important problem or topic in chemical and biological engineering culminating in a senior thesis. Projects may be experimental, computational, or theoretical. Topics selected by the students from suggestions by the faculty. Written thesis, poster presentation, and oral defense required. The senior thesis is recorded as a double course in the spring. Enrollment by application or interview. Departmental permission required. J. Benziger, L. Loo

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Department of Chemistry

Chair
David W. C. MacMillan

Associate Chair
Martin F. Semmelhack

Departmental Representative
Robert P. L’Esperance

Director of Graduate Studies
Steven L. Bernasek

Professor
Steven L. Bernasek
Andrew B. Bocarsly
Roberto Car
Robert J. Cava
Paul J. Chirik
John T. Groves
Michael H. Hecht
David W. C. MacMillan
Thomas W. Muir
Herschel A. Rabitz
Clarence E. Schutt
Jeffrey Schwartz
Annabella Selloni
Martin F. Semmelhack
Zoltán G. Soos
Erik J. Sorensen
Salvatore Torquato

Associate Professor
Jannette L. Carey
Joshua D. Rabinowitz, also Lewis-Sigler Institute for Integrative Genomics
Haw Yang

Assistant Professor
Abigail G. Doyle
Dorothea Fiedler

Lecturer
Henry L. Gingrich
Michael T. Kelly
Anne M. Morel-Kraepiel
Robert P. L’Esperance
István Pelczer
Paul J. Reider
Susan K. VanderKam

Associated Faculty
Emily A. Carter, Mechanical and Aerospace Engineering, Applied and Computational Mathematics
Benjamin A. Garcia, Molecular Biology
Frederick M. Hughson, Molecular Biology
Manuel Llinás, Molecular Biology, Lewis-Sigler Institute for Integrative Genomics
Michael C. McAlpine, Mechanical and Aerospace Engineering
François Morel, Geosciences
Satish C. B. Myneni, Geosciences
Jeffry B. Stock, Molecular Biology

Information and Departmental Plan of Study

The Department of Chemistry offers a flexible program suitable for those who plan to attend graduate school, as well as for premedical students or those intending to pursue a career in secondary school teaching. Indeed, a chemistry concentration is appropriate for anyone who desires a broad background of undergraduate training in science.

Advanced Placement

A student who received an Advanced Placement Examination score of 4 qualifies for one unit of advanced placement and is eligible to take CHM 215 Advanced General Chemistry; Honors, which completes the general chemistry curriculum in one semester instead of two. A student who received an Advanced Placement Examination score of 5 qualifies for two units of advanced placement and is eligible to take CHM 301 or 303. One term of advanced placement satisfies the B.S.E. chemistry requirement.

A departmental placement examination is given during Freshman Orientation Week for students who did not have an opportunity to take the Chemistry Advanced Placement Exam.

Prerequisites

Before entering the department, students are expected to complete:

1. general chemistry, such as CHM 201/203/207 and 202/204, or 215, or the equivalent (such as two units of advanced placement in chemistry), and

2. differential and integral calculus, such as MAT 103 and 104, or the equivalent advanced placement.

Students who plan to enter the department are urged to fulfill as many of these requirements as possible during freshman year. Prerequisite courses may not be taken using the P/D/F grading option.

The sophomore program of prospective chemistry concentrators should include a year of organic chemistry (CHM 301 and 302, or 303 and 304, or equivalent credit) and a year of general physics (PHY 101 and 102, or 103 and 104, or equivalent credit). Note: Also see Integrated Science sequence below.

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Early Concentration

A student who has been granted advanced placement credit in chemistry and has taken advanced courses in the subject during both terms of freshman year may be eligible for independent work in the sophomore year. Students interested in this option should contact the departmental representative in the spring of their freshman year.

Program of Study

University regulations require that, before graduation, students take eight courses, designated as departmental courses in their field of concentration. A chemistry concentrator may, with the approval of the departmental representative, use one or more non-introductory courses from other science departments, mathematics, and engineering as departmental courses.

Chemistry concentrators typically take more than eight courses that qualify as departmental.

Core Courses. Students must take three 300-, 400-, or 500-numbered courses in chemistry and at least one term of experimental laboratory instruction at Princeton as departmental core courses. These courses must include at least one term each of organic, physical, and inorganic chemistry. The experimental requirement may be fulfilled by taking either CHM 371, or MOL 350, or MSE 302, or PHY 311 or 312, or CHE 346, or QCB 301. NOTE: The experimental course must be completed by the end of the junior year.

Cognates. The remaining four departmental courses of the eight required by the University degree regulations can be either in chemistry or a cognate scientific area (for example, molecular biology, engineering, geology, materials science, computer science, mathematics, or physics). Many courses in the sciences at the 300-, 400-, and 500- levels are approved as departmental courses. Courses are evaluated on a case-by-case basis. To qualify as a departmental, the course must have one or more prerequisites (i.e., be non-introductory) and must have a strong chemistry component.

Physics/Mathematics. An understanding of chemistry requires a thorough background in physics and mathematics. Students majoring in chemistry should obtain a broad background in these subjects. In general, it is desirable to take courses in mathematics at least through multivariable calculus (MAT 201 or 203) and linear algebra (MAT 202 or 204). These courses may be counted as departmental courses. These mathematics courses are also required for professional certification. (See "Professional Certification in Chemistry" below.)

The program described above deliberately allows substantial flexibility and encourages a broad view of chemistry.

Independent Work

Junior Independent Work.

First-term program:

1. The Junior Colloquium: One evening each week throughout the fall term there will be talks by faculty members on topics not normally included in course work. Junior chemistry concentrators and early concentrators are required to attend these sessions.

2. Juniors will also be assigned three successive "tutorial advisers" from the faculty, one each for October, November, and December. Beginning in October, each student will see his/her first adviser. The adviser will select, for instance, a recent journal article on which the student will prepare a brief written report outlining the background and significance of the problem under consideration, the direction of the attack on the problem, and the contribution to the solution of the problem made by the article. The report is due at the end of the first tutorial period. The student may also be questioned orally to demonstrate understanding of the problem and the material studied.

Early in November and December, the same process will be repeated with a second and third adviser.

Tutorial advisers are selected by the Junior Colloquia chairperson to give the student a broad sampling of faculty interests. The student's final term grade is calculated by the departmental representative using the grades on the three tutorial reports plus the individual's record of attendance at the evening colloquia.

Second-term program:

All students will select a faculty adviser for their spring independent work by the start of the second term. (This adviser may also act as the senior thesis adviser in the senior year.) During the second term, the student will work on an independent research project under the guidance of his/her faculty adviser. At the end of the term, the student will write a paper discussing the semester's research. The student's final term grade is determined by the departmental representative in conjunction with the faculty adviser's evaluation, taking into consideration the work accomplished in the laboratory, the development of the student's laboratory skills, and the end-of-term paper.

Senior Independent Work. At the end of the junior year, each student selects a thesis adviser (who may or may not be the same as the adviser during the junior year). The adviser and the student will agree on a topic on which the student will undertake independent research throughout both terms of the senior year. This project will consist largely of original research involving "wet" laboratory work and/or chemical theory. On or before dean's date, a written thesis based on this research work must be submitted to the department. The thesis will be evaluated and ranked by a committee of eight professors, two each from the following four areas of study: inorganic chemistry, organic chemistry, physical chemistry, and biochemistry.

Grading note: The grades for the junior and senior independent work will comply with the University's grading guidelines.
Senior Departmental Examination

In May of the senior year, the department administers examinations produced by the American Chemical Society in order to fulfill University degree requirements. These examinations cover the fields of biochemistry, inorganic, organic, and physical chemistry. Preparation for these exams involves the following: (1) The biochemistry exam covers material presented in MOL 345. (2) The inorganic chemistry exam encompasses material from both CHM 407 and 408. (3) The organic chemistry exam spans a full year of course work from either CHM 301/302 or CHM 303/304. (4) The physical chemistry exam includes material from both quantum chemistry (CHM 305 or 405) and thermodynamics (CHM 306 or 406). Seniors preselect and complete two of the four examinations for this requirement.

Study Abroad

The department encourages students to consider opportunities for study abroad. Requirements for the junior independent work program are then met at the foreign host institution. In addition, the student may elect to have the number of required departmental courses reduced by one cognate per semester abroad, assuming advanced approval of a chemistry-related course of study at the foreign institution. (This course may not be counted as one of the four required core courses.) Students considering study abroad are urged to discuss their plans with the departmental representative early in the planning stages to lay out course work, obtain approvals, and set up junior independent work assignments.

Integrated Science Sequence

Completion of the ISC/CHM/COS/MOL PHY 231, 232, 233, 234 series fulfills the general chemistry and physics prerequisites. For full course descriptions and more information, see the Integrated Science website.

Professional Certification in Chemistry— as specified by the American Chemical Society. Students intending to pursue a career in chemistry, whether directly after graduation or following a graduate program, may wish to pursue a course of study leading to professional certification by the American Chemical Society. This certification requires two semesters of organic chemistry (one each of CHM 301 and 302, or 303 and 304, or equivalent), two semesters of physical chemistry (normally CHM 305 or 405, and 306 or 406), one semester of inorganic chemistry (normally CHM 407 or 408), one semester of experimental chemistry (CHM 371), multivariable calculus (MAT 201 or 203), linear algebra (MAT 202 or 204), and exposure to biochemistry (typically MOL 345). EEB/MOL 214 satisfies the biochemistry requirement, but is not counted as a departmental course; some upper-level courses in molecular biology or one of several different advanced chemistry courses also satisfy the requirement.

Chemistry Outreach Program. Nothing serves to foster excitement about science more than well-planned chemical demonstrations and activities. Many chemistry faculty, staff, and students participate in programs for local schools, museums, community groups, and youth organizations. The Chemistry Outreach Program gives chemistry concentrators hands-on experience with demonstrations and presentations and the opportunity to increase interest in science in the schools and the community. After a brief series of training sessions, chemistry outreach students, in concert with faculty and staff, present programs for visitors to Princeton and at local schools, museums, or libraries. The training sessions emphasize effective presentation, safe practice, choice of age-appropriate activities, and coordination with local educational requirements. They include laboratory sessions in which students master demonstrations and activities tested by the department or by the American Chemical Society. Students may also develop or help to develop new demonstrations or activities, and they may help with other science programs, such as the New Jersey State Science Olympiad. Interested students should contact Kathryn Wagner, director, kmwagner@princeton.edu.

Courses

**CHM 201 General Chemistry I** Fall ST

An introductory course. Principles of chemistry; understanding the world around us; structure and reactions of atoms and molecules; laboratory manipulations, preparations, and analysis. Fulfills medical school entrance requirements in general chemistry and qualitative analysis. Three lectures, one class, one three-hour laboratory. Open to those whose mathematics preparation is insufficient to qualify them for 203. M. Hecht, R. L'Esperance

**CHM 202 General Chemistry II** Spring ST

Continuation of 201. Principles of chemistry; introduction to chemical bonding and solid state structure; chemical kinetics, nuclear chemistry; descriptive inorganic chemistry; laboratory manipulations, preparations, and analysis. Fulfills medical school entrance requirements in general chemistry and qualitative analysis. Three lectures, one class, one three-hour laboratory. A. Bocarsly, R. L'Esperance

**CHM 203 Advanced General Chemistry I** Not offered this year ST

The fundamental principles of chemistry; descriptive chemistry, molecular structure, and bonding. Lectures and demonstrations. Laboratory includes qualitative and quantitative methods in chemical analysis, as well as selected experiments in general chemistry. Fulfills medical school entrance requirements in general chemistry and qualitative analysis. Three lectures, one class, one three-hour laboratory. Staff

**CHM 204 Advanced General Chemistry II** Not offered this year ST

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Continuation of 203. Topics in chemistry selected to illustrate fundamental principles; electrochemistry, chemical kinetics, bonding, and descriptive chemistry focusing on inorganic chemistry. Lectures and demonstrations. Laboratory includes qualitative and quantitative methods in chemical analysis, as well as selected experiments in general chemistry. Fulfills medical school entrance requirements in general chemistry and qualitative analysis. Three lectures, one class, one three-hour laboratory. **Staff**

**CHM 207 Advanced General Chemistry: Materials Chemistry  Fall ST**

Introduction to the basic concepts of chemistry: stoichiometry, types of reactions, thermodynamics, quantum mechanics, and chemical bonding. Introduction to the structure, chemistry, and properties of technologically important materials: metals, semiconductors, ceramics, and polymers. Fulfills medical school entrance requirements in general chemistry and qualitative analysis. Three lecture hours, one class, one three-hour laboratory. **R. L'Esperance, S. Bernasek**

**CHM 215 Advanced General Chemistry: Honors Course  Fall ST**

An intensive study of fundamental theoretical and experimental principles. Topics are drawn from physical, organic, and inorganic chemistry. For students with excellent preparation who are considering scientific careers. Fulfills medical school entrance requirements in general chemistry and qualitative analysis. Completion of 215 qualifies the student for 300-level courses and some 400-level courses after consultation with the instructor of the upper-level course. Three lectures, one class, one three-hour laboratory. **C. Schutt, R. L'Esperance**

**CHM 231 An Integrated, Quantitative Introduction to the Natural Sciences I (see ISC 231)**

**CHM 232 An Integrated, Quantitative Introduction to the Natural Sciences I (see ISC 232)**

**CHM 233 An Integrated, Quantitative Introduction to the Natural Sciences II (see ISC 233)**

**CHM 234 An Integrated, Quantitative Introduction to the Natural Sciences II (see ISC 234)**

**CHM 235 An Integrated, Quantitative Introduction to the Natural Sciences III (see ISC 235)**

**CHM 236 An Integrated, Quantitative Introduction to the Natural Sciences IV (see ISC 236)**

**CHM 255 Life in the Universe (see GEO 255)**

**CHM 301 Organic Chemistry I  Not offered this year ST**

An introductory course that covers the structures, properties, spectroscopy, and reactivity of organic compounds. Students will learn the mechanisms of organic chemistry and general principles through a combination of lectures and problem solving in small groups. The course may be followed by 302 or 304. This course is appropriate for students in chemistry, biology, and premedical programs. Prerequisite: 201 and 202; or 203 (or 207) and 204; or 215; or a score of 5 on the AP Chemistry Exam. Three lectures, one three-hour laboratory. **Staff**

**CHM 302 Organic Chemistry II  Not offered this year ST**

Continuation of 301. The principles introduced in 301 are extended to the structures and reactions of more complex, often polyfunctional molecules. Small-group problem solving is emphasized. This course is appropriate for students in chemistry, biology, and premedical programs. Prerequisite: 301. Three classes, one three-hour laboratory. **Staff**

**CHM 303 Organic Chemistry I: Biological Emphasis  Fall ST**

Introductory course devoted to the concepts of organic chemistry, including the structures, properties, and reactivity of simpler organic compounds. Emphasis on the mechanisms of organic chemistry; examples from biology when appropriate to illustrate the principles. The course should be followed by 304 in spring. Appropriate for students in biology or premedical programs. Prerequisite: 201 and 202; or 203 (or 207) and 204; or 215; or a score of 5 on the AP Chemistry Exam. Three lectures, one preceptorial, one three-hour laboratory. **M. Semmelhack, H. Gingrich**

**CHM 304 Organic Chemistry II: Foundations of Chemical Reactivity and Synthesis  Spring ST**

Continuation of 303 (or 301). The concepts introduced in CHM 303 will be extended to the structures and reactions of more complex molecules, with an emphasis on how organic chemistry provides the framework for understanding molecular processes in biology. The fundamental concepts of organic chemistry will be illustrated, as often as possible, with examples drawn from biological systems. Prerequisite: 301 or 303. Three lectures, one preceptorial, one three-hour laboratory. **E. Sorensen, H. Gingrich**

**CHM 305 The Quantum World  Fall**

Introduction to quantum mechanics, surveying applications in chemistry, physics, molecular biology, and molecular imaging. Computer-based tools will be emphasized. Prerequisites: CHM 202 or 204 or 215; MAT 102 or 104; PHY 101 or 102 or AP Physics. Three lectures, one preceptorial. **Z. Soos**

**CHM 306 Physical Chemistry: Chemical Thermodynamics and Kinetics  Spring**

Introduction to chemical thermodynamics, statistical mechanics, and kinetics. Special emphasis on biological problems, including nerve conduction, muscle contraction, ion transport, enzyme mechanisms, and macromolecular properties in solutions. Three lectures. Prerequisites: 201 and 202, or 203 (or 207) and 204, or 215; MAT 104; PHY 101 and 102, or PHY 103 and 104; or instructor's permission. **M. Kelly**

**CHM 331 Environmental Geochemistry: Chemistry of the Natural Systems (see GEO 363)**
CHM 333 Oil to Ozone: Chemistry of the Environment (also ENV 333)  Spring

The chemistry behind environmental issues, including energy consumption, atmospheric change, water consumption and pollution, food production and toxic chemicals. The course includes discussion of questions and problems, guest lectures, and a group project to construct an informational Web page. Prerequisites: a 200-level chemistry course or permission of instructor. F. Morel, A. Morel-Kraepiel

CHM 345 Biochemistry (see MOL 345)

CHM 364 Earth Chemistry: The Major Realms of the Planet (see GEO 364)

CHM 371 Experimental Chemistry  Fall

Discusses the principles of experimental design, data acquisition, analysis and interpretation, and the presentation of experimental results. Students are exposed to a broad range of quantitative laboratory methods in preparation for thesis work in chemistry. Typical laboratory exercises include synthesis, physical characterization, spectroscopy, kinetics, thermodynamics, electronics, and instrument design. Lectures on experimental design, data analysis, interpretation, and presentation. Two lectures, two three-hour laboratories. M. Kelly, C. Wang

CHM 403 Advanced Organic Chemistry  Fall

A selection of advanced topics in organic chemistry. Topics include reaction mechanisms, synthetic chemistry, chemistry of biologically important molecules. Selected biosynthetic pathways are compared and contrasted to synthetic approaches. Three lectures. Prerequisites: 301 and 302 (or 304); or, 303 and 304. J. Groves, E. Sorensen

CHM 405 Advanced Physical Chemistry: Quantum Mechanics  Fall

Introduction to quantum theory, atomic and molecular structure, and spectroscopy. This course will emphasize the development of fundamental underlying principles and illustrative examples. Prerequisites: 202, 204, or 215; MAT 201 or 203 (required); MAT 202 or 204 (very helpful, even if taken concurrently); PHY 103 (may be taken concurrently) or AP Physics. Three lectures, one preceptorial. A. Selloni

CHM 406 Advanced Physical Chemistry: Chemical Dynamics and Thermodynamics  Spring

Statistical thermodynamics, kinetics, and molecular reaction dynamics. Three lectures. Prerequisites: background in thermodynamics as developed in 202, 204, or 215; MAT 201 or equivalent. C. Wang

CHM 407 Inorganic Chemistry: Structure and Bonding  Fall

Structural principles and bonding theories are discussed for the various classes of inorganic and organometallic compounds. Includes an introduction to the electronic structure of transition elements and ligand field theory. Prerequisites: 201 and 202, or 207 and 202, or 215, or advanced placement. Three lectures. S. VanderKam

CHM 408 Inorganic Chemistry: Reactions and Mechanisms  Spring

Synthetic and mechanistic aspects of inorganic chemistry are presented; modern problems in inorganic chemistry are emphasized. Prerequisites: 201 and 202, or 207 and 202, or 215, or advanced placement. Three lectures. J. Schwartz

CHM 410 Molecular Structure and Property: Product Engineering (see CBE 410)

CHM 415 Polymers (see CBE 415)

CHM 418 Environmental Aqueous Geochemistry (see GEO 418)

CHM 421 Catalytic Chemistry (see CBE 421)

CHM 443 Pharmaceutical Research and Health Policy (see WWS 327)

CHM 448 Chemistry, Structure, and Structure-Function Relations of Nucleic Acids (see MOL 448)

CHM 470 Environmental Chemistry of Soils (see GEO 470)

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Department of Civil and Environmental Engineering

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Michael A. Celia

Departmental Representative
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Director of Graduate Studies
Peter R. Jaffé

Professor
Michael A. Celia
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Catherine A. Peters

Assistant Professor
Sigrid Adriaenssens
Elie Bou-Zeid
Kelly K. Caylor
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Branko Glišić
Mark A. Zondlo

Lecturer with Rank of Professor
David P. Billington

Associated Faculty
Ilhan Aksay, Chemical and Biological Engineering
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Michael G. Littman, Mechanical and Aerospace Engineering
François Morel, Geosciences
Satish C. Myneni, Geosciences
Guy J. Nordenson, Architecture
Tullis C. Onstott, Geosciences
Jorge L. Sarmiento, Geosciences
Bess B. Ward, Geosciences

Information and Departmental Plan of Study

Requirements for study in the Department of Civil and Environmental Engineering follow the general requirements for the School of Engineering and Applied Science and the University.

The student's program is planned in consultation with the departmental representative and the program adviser and requires a yearlong thesis, which counts as two courses. With departmental approval, the exceptional student who wishes to go beyond the science and engineering requirements may select other courses to replace some of the required courses in order to add emphasis in another field of engineering or science or to choose more courses in the area of study. Suggested plans of study and areas of concentration are available from the departmental representative.

Program of Study

The department offers five programs of study: architecture and engineering, environmental engineering, geological engineering, structural engineering, and engineering and the liberal arts. In the freshman year, students should complete all or most of the mathematics and basic science requirements. The student tentatively enters one of these programs at the end of the freshman year. The similarity of sophomore year studies, however, permits the student to enter any of the programs in the junior year. The tentative selection of an area of concentration provides a guide in the selection of supporting electives. All candidates for the B.S.E. degree are required to satisfy the general University and School of Engineering and Applied Science requirements. COS 126 should be taken during the freshman year if possible.

Architecture and Engineering. Engineering analysis, particularly for siting of buildings and the design of their structural and environmental systems, is a vital component of contemporary architecture. This program, jointly offered by the Department of Civil and Environmental Engineering and the School of Architecture, presents a unique opportunity to integrate engineering and architectural design by combining the curricula of the two schools. The course of study leading to the B.S.E. degree is designed so that students can plan to do graduate work in architecture or engineering, or to practice engineering in collaboration with architects and planners.

Students interested in this program must choose between two options. In the architecture-focus option, the engineering science and design requirements include a strong emphasis on architecture theory and practice. Students choosing this option select an architectural design project as a senior thesis under the direction of advisers from both the School of Architecture and the Department of Civil and Environmental Engineering. In the structures-focus option, the engineering science and design requirements include a strong emphasis on relevant courses in civil and environmental engineering. Students choosing this option select a structural design project as a senior thesis. This latter option is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone (410) 347-7700; under the Program in Civil Engineering. Program electives may be selected from courses in architecture, architectural history, civil engineering, or other engineering departments. A certificate is awarded to all students who successfully complete the program.

Architecture and Engineering: Structures Focus

http://www.princeton.edu/ua/
Engineering science and architecture requirement (nine courses):

CEE 205 Mechanics of Solids
ORF 245 Fundamentals of Engineering Statistics
CEE 262A Structures and the Urban Environment
CEE 303 Introduction to Environmental Engineering or CEE 306 Hydrology
CEE 312 Statics of Structures
CEE 364 Materials in Civil Engineering
CEE 365 Soil Mechanics
CEE 361 Matrix Structural Analysis and Introduction to Finite-Element Methods
CEE 362 Structural Dynamics in Earthquake Engineering
CEE 364 Materials in Civil Engineering
CEE 365 Soil Mechanics
ARC Junior Independent Work (fall)

Engineering and architectural design requirement (four courses):

CEE 366 Design of Reinforced Concrete Structures
CEE 462 Design of Large-Scale Structures: Bridges
CEE 478 Senior Thesis (counts as two courses)

Program elective requirement (four courses):

Students in this program must take ARC 203, ARC 204, and (from the approved list) one ARC course on urbanism and two courses in ART as program electives. For a complete list of courses approved by the program as electives, see the yellow pages brochure, available from the departmental representative and available online at the Civil and Environmental Engineering website.

Architecture and Engineering: Architecture Focus

Engineering science and architecture requirement (10 courses):

CEE 205 Mechanics of Solids
ORF 245 Fundamentals of Engineering Statistics
CEE 262A Structures and the Urban Environment
Either CEE 312 Statics of Structures or CEE 361 Matrix Structural Analysis and Introduction to Finite-Element Methods
CEE 366 Design of Reinforced Concrete Structures
ARC 203 Introduction to Architectural Thinking
ARC 204 Introduction to Architectural Design
ARC Junior Independent Work (fall)
ARC 311 Building Science and Technology: Building Systems or CEE 364 Materials in Civil Engineering
ARC 401 Theories of Housing and Urbanism (or another course on urbanism)

Engineering and architectural design requirement (four courses):

ARC Junior Independent Work (spring)
ARC Senior Independent Work (fall)
ARC 403 Topics in the History and Theory of Architecture
ARC Thesis

Program elective requirement (four courses):

Students in this program must take CEE 462 and (from the approved list) two additional ART courses as program electives. For a complete list of courses approved by the program as electives, see the yellow pages brochure, available from the departmental representative and available online at the Civil and Environmental Engineering website.

Environmental Engineering. This program is designed for students who wish to pursue a career related to the environment, whether in engineering, law, business, public policy, hydrological, or health and epidemiological sciences, and for students who wish to continue on to advanced graduate studies in environmental engineering (or a related earth science discipline). Course work in environmental engineering focuses on analysis of a large range of environmental problems as well as engineering design of innovative solutions to these problems. This is done through a combination of course work in hydrological sciences, chemistry, geochemistry, and biology applied to different environmental settings, and environmental/hydrological engineering design. The program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone (410) 347-7700; under the Program in Civil Engineering. The environmental engineering curriculum is sufficiently flexible to provide opportunities for students to pursue other certificate programs offered by the University. Students normally take the following courses:

Engineering science requirement (nine courses):

CEE 205 Mechanics of Solids
ORF 245 Fundamentals of Engineering Statistics
CEE 263 Rivers and the Regional Environment
CEE 303 Introduction to Environmental Engineering
CEE 306 Hydrology
CEE 308 Environmental Engineering Lab
CEE 361 Matrix Structural Analysis and Introduction to Finite-Element Methods
CEE 364 Materials in Civil Engineering or CEE 365 Soil Mechanics
MAE 222 Mechanics of Fluids

http://www.princeton.edu/ua/
Engineering design (four courses):
CEE 471 Introduction to Water Pollution Technology
CEE 477 Engineering Design for Sustainable Development
CEE 478 Senior Thesis (counts as two courses)

Program elective requirement (four courses):
For a complete list of courses approved by the program as electives, see the yellow pages brochure, available from the departmental representative and available online at the Civil and Environmental Engineering website.

Geological Engineering. Geological engineering is the application of science to problems and projects involving the earth, its physical environment, earth materials, and natural resources. The curriculum, offered in cooperation with the Department of Geosciences, is specially designed for the student who wishes to build upon the freshman and sophomore mathematics and engineering courses as a basis for studies in the earth sciences. Typical areas of concentration are water resources, engineering geology, earth resources, geotechnical engineering, geophysics, geochemistry, and atmospheres and oceans. The program is accredited as part of the civil engineering curriculum by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone (410) 347-7700. In addition to the general requirements of the School of Engineering and Applied Science, the following courses are required:

Engineering science requirement (nine courses out of 11):
CEE 205 Mechanics of Solids
ORF 245 Fundamentals of Engineering Statistics
CEE 303 Introduction to Environmental Engineering
CEE 306 Hydrology
CEE 308 Environmental Engineering Laboratory or GEO 300 Summer Course in Geologic Field Methods
CEE 361 Matrix Structural Analysis and Introduction to Finite-Element Methods
GEO 203 Geology
GEO 373 Structural Geology and/or CEE 365 Soil Mechanics
GEO 424 Seismology (also CEE 424) or GEO 418 Environmental Aqueous Geochemistry
MAE 305 Mathematics in Engineering I

Engineering design requirement (four courses):
Any two from: CEE 471 Introduction to Water Pollution Technology, CEE 461 Design of Large-Scale Structures: Buildings, or CEE 477 Engineering Design for Sustainable Development
CEE 478 Senior Thesis (counts as two courses)

Program elective requirement (four courses):
For a complete list of courses approved by the program as electives, see the yellow pages brochure, available from the departmental representative and available online at the Civil and Environmental Engineering website. These include courses in chemistry, economics, engineering, geosciences, mathematics, and physics.

Structural Engineering. Structural engineering is concerned with the analysis and design of civil engineering structures with an emphasis on buildings, bridges, stadiums, dams, and foundations. Particular emphasis is given to the design of these structures to resist earthquake and wind loads. The program is designed to meet the needs of students who are interested in continuing to advanced graduate studies or who plan to go into engineering practice and consulting. It is accredited as part of the civil engineering curriculum by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone (410) 347-7700. Its basic aim is the preparation of flexible and innovative graduates who can address the novel problems of modern engineering. Students in this program have the chance to interact directly with some of the best design and consulting companies in structural engineering. Students normally take the following courses:

Engineering science requirement (10 courses):
CEE 205 Mechanics of Solids
ORF 245 Fundamentals of Engineering Statistics
CEE 262A Structures and the Urban Environment
CEE 303 Introduction to Environmental Engineering
CEE 306 Hydrology
CEE 312 Statics of Structures
CEE 361 Matrix Structural Analysis and Introduction to Finite-Element Methods
MAE 305 Mathematics in Engineering I or APC 350 Introduction to Differential Equations
Any two from: CEE 308 Environmental Engineering Laboratory CEE 364 Materials in Civil Engineering, or CEE 365 Soil Mechanics
CEE 312 Statics of Structures
CEE 361 Matrix Structural Analysis and Introduction to Finite-Element Methods
MAE 305 Mathematics in Engineering I or APC 350 Introduction to Differential Equations

Engineering design requirement (four courses):
CEE 366 Design of Reinforced Concrete Structures
CEE 462 Design of Large-Scale Structures: Bridges
CEE 478 Senior Thesis (counts as two courses)

Program elective requirement (four courses):

http://www.princeton.edu/ua/
For a complete list of courses approved by the program as electives, see the yellow pages brochure, available from the departmental representative and available online at the Civil and Environmental Engineering website.

**Engineering and the Liberal Arts.** This program is designed for students who wish to obtain an engineering background as a foundation for a wide range of careers, such as medicine, law, public policy, visual arts, or engineering studies in materials, ethics, or history. Course work in this track should integrate engineering courses in a coherent manner with the topic of interest to the student. The track is designed to be rigorous, yet allow for a wide degree of flexibility in the course of studies.

All students in engineering and the liberal arts must acquire a strong background in mathematics and the basic sciences (eight courses), followed by courses in engineering sciences that stress design and analytical methods in civil and environmental engineering (a minimum of six courses). The program electives should form a coherent sequence of at least four courses in the student's area of interest, and junior independent research is strongly recommended as a program elective. This is followed by the senior thesis. In the junior independent research and senior thesis, students should relate their topics of interest to engineering problems. Students normally take the following courses:

*Engineering Science Requirement* (six courses): A minimum of six CEE courses, of which at least three should be at the 300 level or above. At least one of the 300-level courses has to have a laboratory component.

*Program Electives* (seven courses): The electives should include a coherent sequence of at least four courses in the student's area of interest, three of which should be at the 300 level or above.

The selection of engineering science requirements and electives should form a coherent program of study, which needs to be approved by the program director. At least eight of these courses must be at the 300 level or above. Junior independent research is strongly encouraged.

Senior Thesis CEE 478 counts as two courses.

**Materials Science and Engineering.** The Department of Civil and Environmental Engineering encourages students to consider the certificate Program in Materials Science and Engineering. To obtain a certificate, a student must take two core courses (MSE 301 or CEE 364 and MSE 302), one course in thermodynamics (usually CHE 246), electives from a set of approved courses, and do a senior thesis on a materials-related topic. Typically, civil and environmental engineering students choose electives related to the mechanical properties and durability of materials.

**Study Abroad**

Study abroad can be used to enhance and diversify the educational experience of departmental majors. Courses taken during foreign study may be preapproved for credit as departmentals by the department representative. Study abroad has served as a valuable option for junior independent work and in providing research material for the senior thesis. Students considering study abroad should consult with the departmental representative as early as possible.

**Courses**

**CEE 102A Engineering in the Modern World (also EGR 102A/MAE 102A)** Fall HA

Among the works of concern to engineering are bridges, railroads, power plants, highways, airports, harbors, automobiles, aircraft, computers, and the microchip. Historical analysis provides a basis for studying urban problems by focusing on scientific, political, ethical, and aesthetic aspects in the evolution of engineering over the past two centuries. The precepts and the papers will focus historically on the social and political issues raised by these innovations and how they were shaped by society as well as how they helped shape culture. Two lectures, one preceptorial. *M. Littman, D. Billington*

**CEE 102B Engineering in the Modern World (also EGR 102B/MAE 102B)** Fall ST

Among the works of concern to engineering are bridges, railroads, power plants, highways, airports, harbors, automobiles, aircrafts, computers, and the microchip. The laboratory centers on the scientific analyses that are the bases for these major innovations. The experiments are modeled after those carried out by the innovators themselves, whose ideas are explored in the light of the social contexts within which they worked. Two lectures, one three-hour laboratory. *M. Littman, D. Billington*

**CEE 105 Lab in Conservation of Art (also ART 105/EGR 105)** Spring ST

This course examines how environmental factors (acid, rain, ice, salts, biota) damage sculpture and monuments made of stone, paintings on wood, and bronze sculptures. It examines campus buildings that illustrate each type of damage and uses a visit to the Cloisters Museum to learn how those medieval buildings are protected. Lectures on structure and properties of materials and mechanisms of attack. Labs include quantifying water movement through stone, damage from freezing and salts, strength of mortars, protective effects of sealants and consolidants, effect of moisture on wood. Two lectures and one three-hour laboratory. *G. Scherer*

**CEE 205 Mechanics of Solids** Fall QR


http://www.princeton.edu/ua/
CEE 208 Mechanics of Fluids (see MAE 222)
CEE 235 Geology (see GEO 203)
CEE 242 The Experience of Modernity: A Survey of Modern Architecture in the West (see ART 242)
CEE 262A Structures and the Urban Environment (also ARC 262A/EGR 262A/URB 262A/ART 262) Spring
CEE 262B Structures and the Urban Environment (also ARC 262B/EGR 262B/URB 262B) Spring ST
CEE 263 Rivers and the Regional Environment Not offered this year QR
CEE 303 Introduction to Environmental Engineering (also ENV 303/URB 303) Spring
CEE 305 Environmental Fluid Mechanics (also GEO 375) Fall
CEE 306 Hydrology Spring
CEE 307 Field Ecohydrology (also EEB 305) Spring QR
CEE 308 Environmental Engineering Laboratory Spring
CEE 312 Statics of Structures Spring

Two lectures, one class. Prerequisites: MAT 104, PHY 103. S. Adriaenssens

Structural engineering as a new art form begun during the Industrial Revolution and flourishing today in long-span bridges, thin-shell concrete vaults, and tall buildings. Through laboratory experiments, students study the scientific basis for structural performance and connect external forms to the internal forces in major works of structural engineers. They examine contemporary exemplars that are essential to the understanding of 21st century structuring of cities with illustrations taken from New York, Boston, and New Orleans and urban areas elsewhere such as Japan, the Netherlands, and Switzerland. Two lectures, one three-hour laboratory. M. Garlock, D. Billington

The course introduces the students to the basic chemical and physical processes of relevance in environmental engineering. Mass and energy balance and transport concepts are introduced and the chemical principles governing reaction kinetics and phase partitioning are presented. These principles are applied to environmental engineering problems related to water and air pollution. Finally, these local problems are analyzed in the context of global environmental change. Two 90-minute lectures. Prerequisite: CHM 201 or MSE 104 or instructor's permission. C. Peters

Introduction of the conservation equations frequently used to describe fluid. Students are then exposed to various dynamics that emerge from application of these equations through examples: flow of the atmospheric boundary layer, fluid-structures interactions and flow in urban areas, open channel and river flows, lake dynamics, flow in estuaries, and coastal dynamics. The course concludes with an overview of the effects of stratification and earth rotation on environmental flows and an introduction to large scale atmospheric and oceanic circulations. Two 90-minute lectures. Prerequisites: MAT 202. E. Bou-Zeid

Analysis of fundamental processes affecting the dynamics of the hydrologic cycle. These include precipitation, evaporation, infiltration, runoff, and groundwater flow. Governing equations will be developed and applications will be considered for a range of hydrologic systems. Concepts and techniques for design of water projects will also be covered. Three lectures. Prerequisite: MAT 201, may be taken concurrently. J. Smith

This three-week course, offered as part of a four-course study abroad semester, takes place at Princeton University's Mpala Research Centre in central Kenya. The course will provide an introduction to the principles of hydrological sciences via the development and application of instrumentation for characterizing surface/subsurface hydrological dynamics in field settings. Lectures and field activities will address the theory of operation, design, and implementation of methods used to quantify hydrological patterns and processes. Prerequisite: MAT 201. K. Caylor

Designed to teach experimental measurement techniques in environmental engineering and their interpretations. Analytical techniques to assess biodegradation of wastes, lake eutrophication, non-point source pollution, and transport of contaminants in surface and groundwater, as well as hydrologic measurements to determine river and groundwater discharges, and soil-moisture dynamics in response to precipitation events will be conducted. One three-hour laboratory plus one lecture per week. Prerequisites: 303 or permission of instructor. P. Jaffé

Presents the fundamental principles of structural analysis, determination of internal forces and deflections under static load conditions, and introduces the bending theory of plane beams and the energy theorems. The theory of the first order is applied to beams, frames, arches, suspension bridges, and trusses, including both isostatic and hyperstatic structures. Graphic statics is used to better understand the "flow" of forces. Covers basic principles for construction of
influence lines and determination of extreme influences. Two lectures, one preceptorial. Prerequisite: CEE 205. B. Glisic

CEE 323 Modern Solid Mechanics (see MAE 223)

CEE 334 Global Environmental Issues (also WWS 334/ENV 334) Spring SA

As the world population grows and becomes more industrialized, human impact on the global environment also increases. This course examines a set of global environmental issues such as climate change, ozone layer depletion, population growth, and depletion of global fisheries, as well as regional issues such as loss of biological diversity, deforestation and desertification, acid rain, and the pollution and overuse of fresh waters. It also provides an overview of the scientific basis for these problems and examines current and possible future policy responses. One three-hour seminar. D. Mauezall

CEE 350 Introduction to Differential Equations (see APC 350)

CEE 360 Physics of the Ocean and Atmosphere (see GEO 361)

CEE 361 Matrix Structural Analysis and Introduction to Finite-Element Methods (also MAE 325) Fall


CEE 362 Structural Dynamics and Earthquake Engineering Spring

Analysis of forces and deformations in structures under dynamic loads. Idealization as discrete parameter systems. Single and multiple degrees of freedom. Response analysis under free vibration, harmonic, impulsive and random dynamic loads. Time and frequency domains. Earthquake phenomena from the engineering point of view, seismic waves, and power spectra. Faulting and seismic waves. Measurement of strong ground motion. Influence of geology. The concept of response spectra, structural response to earthquakes, and design criteria. Prerequisite: 361 or instructor's permission. E. Vanmarcke

CEE 364 Materials in Civil Engineering (also ARC 364) Spring

Lectures on structure and properties of building materials including cement, concrete, steel, asphalt, and wood; fracture mechanics; strength testing; mechanisms of deterioration (corrosion, freeze-thaw cycles, pollution). Labs on brittle fracture, heat treatment of steel, strength of concrete, mechanical properties of wood. G. Scherer

CEE 365 Soil Mechanics Spring

General introduction to physical and engineering properties of soils. Soil classification and identification methods. Soil exploration, sampling, and in situ testing techniques. Permeability, seepage, and consolidation phenomena. Bearing capacity equations, stress distributions, and settlements. Slope stability and lateral pressures. Prerequisite: 205 or instructor's permission. J. Prevost

CEE 366 Design of Reinforced Concrete Structures Fall


CEE 370 Sedimentology (see GEO 370)

CEE 375 Independent Study Fall

Independent research in the student's area of interest. The work must be conducted under the supervision of a faculty member, and must result in a final paper. Open to sophomores and juniors. Permission of adviser and instructor is required. J. Smith

CEE 376 Independent Study Spring

Independent research in the student's area of interest. The work must be conducted under the supervision of a faculty member, and must result in a final paper. Open to sophomores and juniors. Permission of adviser and instructor is required. J. Smith

CEE 417 Environmental Microbiology (see GEO 417)

CEE 424 Introductory Seismology and Oil Exploration (see GEO 424)

CEE 460 Risk Assessment and Management Fall

Fundamentals of integrated risk assessment and risk-based decision analysis. Stochastic models of natural and manmade hazards. Evaluation of failure chances and consequences. Decision criteria; acceptable risk. Risk control based on event tree, fault tree, system reliability, and random processes in space and time. Issues in risk-based regulation, liability, and insurance. Case studies involving energy-related technologies, the environment, civil infrastructure, and financial risk. Prerequisite: ORF 245, MAT 202, or instructor's permission. E. Vanmarcke

http://www.princeton.edu/ua/
CEE 461 Design of Large-Scale Structures: Buildings  Fall

The design of large-scale buildings is considered from the conceptual phase up to the final design phase. The following issues are addressed in this course: types of buildings, design codes, design of foundations, choice of different structural systems to resist vertical and horizontal loads, choice between different materials (steel versus concrete), design for wind and earthquake loading, construction management, financial and legal considerations are examined in detail. Several computer codes for analysis and design of buildings are used in this course. Prerequisite: 366 or instructor's permission. Staff

CEE 462 Design of Large-Scale Structures: Bridges  Spring

The design of bridges is considered from the conceptual phase up to the final design phase. The following issues are addressed in this course: types of bridges, design codes, computer modeling of bridges, seismic analysis and design, seismic retrofit design, inspection, maintenance and rehabilitation of bridges, movable bridges, bridge aerodynamics, organization of a typical engineering firm, marketing for engineering work. Several computer codes for analysis and design of bridges are used in this course. Prerequisite: 366 or instructor's permission. T. Zoli

CEE 471 Introduction to Water Pollution Technology (also GEO 471/URB 471)  Fall

An introduction to the science and engineering of water quality management and pollution control in natural systems; fundamentals of biological and chemical transformations in natural waters; identification of sources of pollution; water and wastewater treatment methods; fundamentals of water quality modeling. Two 90-minute lectures and field trips. P. Jaffé

CEE 472 Hydrometeorology and Remote Sensing  Fall

The structure and evolution of precipitation systems are examined, including the dynamical and microphysical processes that control the spatial and temporal distribution of precipitation. The fundamentals of remote sensing of aerosols, clouds and precipitation are introduced. Related topics in hydrology and hydraulics are covered. Three lectures. Prerequisite: instructor's permission. J. Smith

CEE 474 Special Topics in Civil and Environmental Engineering

A course covering one or more advanced topics in civil and environmental engineering. Subjects may vary from year to year. Three classes. M. Garlock

CEE 477 Engineering Design for Sustainable Development  Fall

Students will design several features of a LEED-certified building project in the Princeton area. Features that will be considered include ground source heat pumps; ventilation; photovoltaics (PV); insulation; glazing; green materials; and storm water management systems, including a green roof, porous parking lots, and the gray water usage. Ventilation will be designed considering the potential for vapor intrusion from volatile contaminants in the soil. Energy software will be used to determine the carbon footprint of alternative designs. Two 90-minute lectures. Prerequisite: 306 or 307 or instructor's permission. R. Harris

CEE 478 Senior Thesis  Spring

A formal report on research involving analysis, synthesis, and design, directed toward improved understanding and resolution of a significant problem in civil and environmental engineering. The research is conducted under the supervision of a faculty member, and the thesis is defended by the student at a public examination before a faculty committee. The senior thesis is equivalent to a year-long study and is recorded as a double course in the spring. J. Smith
Department of Classics

Chair
Edward J. Champlin

Departmental Representative
Marc Domingo Gygax

Director of Graduate Studies
Andrew M. Feldherr

Professor
Edward J. Champlin
Denis C. Feeney
Andrew M. Feldherr
Harriet I. Flower
Andrew L. Ford
Robert A. Kaster
Joshua T. Katz
Nino Luraghi
Brent D. Shaw
Christian Wildberg

Associate Professor
Marc Domingo Gygax
Constanze M. Güthenke, also Hellenic Studies

Visiting Associate Professor
Ilaria Marchesi

Assistant Professor
Yelena Baraz
Janet D. Downie
Brooke A. Holmes

Lecturer
Michael A. Flower
Dimitri H. Gondicas

Information and Departmental Plan of Study

Two programs of study are offered within the Department of Classics. The first, Classics, uses a knowledge of Greek and/or Latin as a gateway to the study of the literature, history, and culture of ancient Greece and Rome. The second, Classical Studies, allows for the study of different aspects of a specific period or facet of classical civilization and its impact and does not initially require a knowledge of Greek or Latin.

Program 1. Classics

Prerequisites

To enter this program a student normally should have completed either Greek 108 or Latin 108. A strongly motivated student who has completed Greek 102 or Latin 102 may concentrate with permission of the departmental representative.

Program of Study

Eight departmental courses are required. Of these, five must be in the original languages at the 200 level or above, including at least one course at the 300 level. The combination of Latin 104-108, or Greek/Latin 105-108, may be counted as the equivalent of one 200-level course. One course in ancient history (Classics 214, 216, 217, 218, or 219, or History 343) must also be included among the eight departmentals.

Students may count, among the eight required courses, up to three not requiring the use of Greek or Latin, either those offered by the department or, with the approval of the departmental representative, courses in other departments that deal with aspects of Greek and Roman civilization (see examples below).

Students are expected to pass a sight translation examination from Greek or Latin. This examination may be taken, by arrangement, at the end of any term in the junior or senior years; it will be graded pass/fail.

Students who are considering further work in the field, either in graduate school or in independent study, should take both Latin and Greek to the 300 level, continuing with both languages in each term of the junior and senior years. Such students are also strongly advised to take at least one course in Greek history and one in Roman history in their underclass years.

Students concentrating in classics have the opportunity to study in depth one or more of the areas listed below.

Greek or Latin Literature. Literary texts form the core of the study of the classical world, and the majority of concentrators are likely to plan their program of study around literature. In addition to the many courses offered in Greek and Latin, the department offers a number of courses on literature in translation, including CLA 124 The Ancient Comic Tradition and CLA 323 Self and Society in Classical Greek Drama. COM 205 The Classical Roots of Western Literature also treats many Greco-Roman works.

Ancient History. In addition to survey courses in Greek and Roman history (Classics 216, 217, 218, 219), the

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department offers courses on the ancient historians, given in Greek or Latin, and advanced seminars on selected historical topics (Classics 326, 327). Also available: CLA 214 The Other Side of Rome; CLA 324 Classical Historians and Their Philosophies of History; CLA 325 Roman Law; NES 220 Jews, Muslims, and Christians in the Middle Ages; NES 331 The Ancient Near East.

**Classical Philosophy.** Courses are offered in both Greek, Latin, and in translation including CLA 205 Introduction to Ancient Philosophy; PHI 300 Plato and His Predecessors; PHI 301 Aristotle and His Successors.

**Classical Art and Archaeology.** ART 202 Greek Art: Ideal Realism; ART 203 Roman Art; ART 306 Classical Athens: Art and Institutions.

**Medieval Studies.** In addition to courses in medieval Latin (LAT 232), the following are offered: HIS 343 The Civilization of the Early Middle Ages; HIS 344 The Civilization of the High Middle Ages; MED 227 The World of the Middle Ages; POL 301 Ancient and Medieval Political Theory; ART 205 Medieval Art in Europe.


**Comparative Literature.** CLA 334 Modern Transformations of Classical Themes; CLA 335 Studies in the Classical Tradition; CLA 372 English Literature and the Classics; COM 326 Tragedy.

**Independent Work**

**Junior Independent Work.** In the fall term of the junior year, students participate in a colloquium introducing them to research methods and library resources, to the creation and transmission of classical texts, and to computer-aided research tools. This colloquium is taken in addition to the normal course load. It meets once a week for approximately the first eight weeks of the semester and includes a term paper of 12 to 15 pages. In the spring term each student studies a specific topic chosen in consultation with an adviser, with whom he/she meets regularly for discussion and analysis, the result of which will be a substantial research paper of 20-25 pages.

**Senior Independent Work.** At the end of the second term of the junior year, a departmental student is advised to select the subject of his or her senior thesis after consultation with the departmental representative. The thesis in its final form must be submitted to the department by April 15 of the senior year.

**Senior Departmental Examination**

Students are expected to pass the senior comprehensive examination on Greek and Roman literature, history, and culture. They will have the opportunity to write on either or both civilizations.

**Study Abroad**

Travel and study in the Mediterranean are an important part of a classical education. The department strongly encourages its students to participate in one of the many programs available. Many departmental students spend one term of junior year at the Intercollegiate Center for Classical Studies in Rome. The center offers instruction in classical languages, presents lectures on ancient literature and history, and sponsors a series of trips to important museums and archaeological sites. Instruction is in English by American faculty members, and the curriculum is integrated with the Princeton undergraduate program. Equally valuable is the summer program at the American School of Classical Studies in Athens. The department has some funds to help meet the expenses of such summer study, and additional assistance may be available through the Program in Hellenic Studies.

**Summer Study.** Students who would benefit from intensive work in the languages may apply for financial assistance to study at a Greek or Latin institute.

**Certificate in Language and Culture**

Students pursuing a major other than classics or classical studies may still demonstrate their command of one or both of the classical languages cultures by working for certificates in Greek and/or Roman language and culture. The requirements are:

1. Three Greek and/or Latin courses, of which one may be at the 200 level, and the others must be at the 300 level.

2. A piece of independent work. This can be satisfied in several ways: (a) by a substantial paper growing out of one of the courses taken to fulfill the certificate requirement (this will be in addition to the work required in the course); (b) by a substantial paper on a topic agreed upon with an instructor in the department and approved by the program; or (c) with the agreement of the home department and the program, by a piece of independent work that will satisfy the requirements of both home department and program. As a substitute for this requirement, students may either take an additional course in their language at the 200 or 300 level or a CLA course focusing on the culture of their certificate program.

To enter either certificate program, students must file a written application in the Department of Classics before October 1 of their senior year.

**Preparation for Graduate Study**

Students should be aware that most graduate programs in classics will demand a more extensive training in the ancient
languages than these minimum requirements. Those considering going on to graduate school should plan to do additional work in Greek and Latin either during their time at Princeton or through a post-baccalaureate program.

**Certificate in Hellenic Studies.** Students who wish to study the literature and civilization of ancient, Byzantine, and modern Greece may find of interest the certificate Program in Hellenic Studies. The program's plan C provides a diachronic study of the Hellenic tradition from antiquity to the present.

**The Department Offers Courses in the Following Areas:**

Courses taught through English translations, designated classics (CLA)
Courses in Greek (CLG) and Latin (LAT)
Courses in modern Greek (MOG)

**Program 2. Classical Studies**

This program offers the opportunity for sustained and focused inquiry into the history, literature, and culture of the ancient Mediterranean, and their impact on later periods, using a variety of interpretative methods. The particular program for each student is determined in collaboration with the departmental representative and/or a faculty adviser.

The focus can be on a specific disciplinary subfield (e.g., ancient politics) or on a particular period to be explored from a number of perspectives (e.g., the history, literature, and art of Imperial Rome). Each program must have a methodological component designed to introduce the student to techniques of analysis appropriate to his or her particular interests. This component of the program is satisfied by two comparative or methodological courses, the subject matter of which is primarily concerned with the classical world. These courses are chosen by each student in consultation with a faculty adviser and/or the departmental representative and must be pre-approved by the departmental representative.

**Prerequisites**

One course from the list below (which may be taken during the spring semester of the sophomore year) or a comparable one-time-only course. A second course in addition to the prerequisite is strongly recommended as well, but this course can count as one of the six fulfilling the course requirement 1a (below). A freshman seminar on a classical subject may count as a prerequisite, but may not be used to fulfill course requirement 1a.

Applicants to this program of study must submit a statement defining a field of concentration (e.g., Latin Epic, Greek History, Late Antique Culture) and a list of prospective courses to the departmental representative by April 15. Given the range of possible interests each applicant may bring to the study of the ancient world, there is no set list of fields of concentration, and faculty members can give additional guidance in preparing a program of study.

**Program of Study**

The specific courses to be taken by each student must form a coherent program of study. Whatever the individual concentration, each student's program must contain the following components:

1a. Six courses focusing in whole or in part on classical civilization or its influence (see the list below). At least three of these courses must be taught in the Department of Classics (CLA, CLG, or LAT). Courses taken during the freshman and sophomore year beyond the prerequisite may count toward this requirement if they are appropriate to the student's overall program.

1b. Two comparative/methodological courses. The aim of this requirement is to introduce students to new perspectives and new tools of inquiry for exploring their chosen subject. There is no set list since different courses will be appropriate to different interests. These courses must be pre-approved by the departmental representative to count as part of the student's program.

2. Each student must successfully complete either Ancient Greek or Latin to the level of 108, or achieve an equivalent level of knowledge as determined by the departmental representative (e.g., by having satisfied the language requirement in either language or through a summer language program). However, at least one language course must be taken at Princeton.

Students should be aware that most graduate programs in classics will demand a more extensive training in the ancient languages than these minimum requirements. Those considering going on to graduate school should plan to do additional work in Greek and Latin either during their time at Princeton or through a post-baccalaureate program.

**Independent Work**

**Junior Independent Work.** In the fall term of the junior year departmental students will participate in a colloquium introducing them to research methods and library resources, to the creation and transmission of classical texts, and to computer-aided research tools. This seminar will lead to the production of a final written exercise of 12-15 pages. In the spring term each student will study a topic chosen in consultation with an adviser, who will meet regularly with the student for discussion and analysis, on the basis of which a substantial research paper of 20-25 pages will be produced.

**Senior Independent Work.** At the end of the second term of the junior year a departmental student is advised to select the subject of his or her senior thesis after consultation with a departmental faculty committee. The thesis in its final form shall be submitted to the departmental representative by April 15 of the senior year.

**Senior Departmental Examination**

http://www.princeton.edu/ua/
An examination designed by the thesis adviser, and intended to cover the entirety of the student's program of study, is taken at the end of the spring semester of the senior year.

**Preparation for Graduate Study**

Students who plan to do further work in the classics in graduate school are reminded that they will be required to pass proficiency examinations in reading French and German at an early stage of their graduate studies.

**Courses**

**CLA 205 Introduction to Ancient Philosophy** (see PHI 205)

**CLA 208 Origins and Nature of English Vocabulary** (also ENG 240)  Not offered this year LA

The origins and nature of English vocabulary, from proto-Indo-European prehistory to current slang. Emphasis on the Greek and Latin component of English vocabulary, including technical terminology (medical/scientific, legal, and humanistic). Related topics: the alphabet and English spelling, slang and jargon, social and regional variation, vocabulary changes in progress, the "national language" debate. Two lectures, one preceptorial. J. Katz

**CLA 212 Classical Mythology** (also HUM 212/WOM 212)  Fall LA

A study of classical myths in their cultural context and in their wider application to abiding human concerns (such as creation, generation, sex and gender, identity, heroic experience, death, transformations, and transcendence). A variety of approaches for understanding the mythic imagination and symbol formation through literature, art, and film. Two lectures, one preceptorial. A. Feldherr

**CLA 214 The Other Side of Rome** (also CHV 214)  EM

An introduction to Roman culture emphasizing tensions within Roman imperial ideology, the course explores attitudes toward issues such as gender and sexuality, conspicuous consumption, and ethnicity through the works of authors such as Petronius, Lucan, and Tacitus. It also considers the role of cinematic representations of ancient Rome in 20th-century America. Two lectures, one preceptorial. A. Feldherr

**CLA 215 The Literature of the Romans**  Not offered this year LA

An introduction to the literature of the Romans, covering major genres of particular importance for the later European literary tradition--historiography, epic, comedy, love poetry, and tragedy. The course will equip students with a basic idea of the main lines of Roman literary history, while enabling them to begin setting their reading of later European literature against an informed background of understanding. Two lectures, one preceptorial. Staff

**CLA 216 Archaic and Classical Greece** (also HIS 216)  Fall HA

A formative episode in Western civilization: the Greeks from the rise of the city-state, through the conflict between Athens and Sparta, to the emergence of Macedon in the fourth century B.C. Emphasis on cultural history, political thought, and the development of techniques of historical interpretation through analysis of original sources (Herodotus, Thucydides, and others). Two lectures, one preceptorial. M. Flower

**CLA 217 The Greek World in the Hellenistic Age** (also HIS 217)  HA

The Greek experience from Alexander the Great through Cleopatra. An exploration of the dramatic expansion of the Greek world into the Near East brought about by the conquests and achievements of Alexander. Study of the profound political, social, and intellectual changes that stemmed from the interaction of the cultures, and the entrance of Greece into the sphere of Rome. Readings include history, biography, religious narrative, comedy, and epic poetry. Two lectures, one preceptorial. M. Domingo Gygax

**CLA 218 The Roman Republic** (also HIS 218)  Spring HA

A study of the causes and unforeseen consequences of one small city-state's rise to world-empire, primarily through the analysis of ancient sources (including Livy, Polybius, Caesar, and Cicero) in translation. Emphasis on the development of Roman society and the evolution, triumph, and collapse of the republican government that it produced. Two lectures, one preceptorial. E. Champlin

**CLA 219 The Roman Empire, 31 B.C. to A.D. 337** (also HIS 219)  Not offered this year HA

A study of the profound transformation of Rome by the multicultural empire it had conquered, ending with the triumph of Christianity. Emphasis on typical social and cultural institutions and on the legacies of Rome to us. Ancient sources in translation include documents, histories, letters, and novels. Two lectures, one preceptorial. E. Champlin

**CLA 301 Ancient and Medieval Political Theory** (see POL 301)

**CLA 306 Classical Athens: Art and Institutions** (see ART 306)

**CLA 323 Self and Society in Classical Greek Drama** (also COM 323)  Not offered this year LA

http://www.princeton.edu/ua/
Designed to give students who are without knowledge of the Greek language the opportunity to read widely and deeply in the field of Greek drama, with particular emphasis on an intensive study of Greek tragedy, its origins and development, staging, structure, and meanings. Two 90-minute seminars. Staff

CLA 324 Classical Historians and Their Philosophies of History (also HIS 328) Not offered this year HA

Major classical historians, especially Herodotus and Thucydides, are studied in connection with the theory and practice of the art or science of history. Lectures and preceptorials treat the development of historical writing and its relationship to philosophy, politics, literature, and science, and problems such as that of fact and interpretation in historical writing. Two lectures, one preceptorial. M. Domingo Gygax

CLA 325 Roman Law (also HIS 329) Not offered this year HA

The historical development of Roman law and its influence on modern legal systems. Particular attention is given to the fundamental principles of Roman private law, including the law of persons, property, inheritance, and contract; and there is a close analysis of courtroom procedure. Two lectures, one preceptorial. E. Champlin

CLA 326 Topics in Ancient History (also HIS 326) Fall HA

A period, problem, or theme in ancient history or religion with critical attention to the ancient sources and modern discussions. The topic and instructor vary from year to year. Format will change each time, depending on enrollment. M. Domingo Gygax

CLA 327 Topics in Ancient History (also HIS 327/HLS 327) Not offered this year HA

A period, problem, or theme in ancient history or religion with critical attention to the ancient sources and modern discussions. The topic and instructor vary from year to year. Format will change each time, depending on enrollment. H. Flower

CLA 329 Sex and Gender in the Ancient World (also MED 329/WOM 331) Fall SA

The theoretical and ideological bases of the Western attitudes toward sex and gender categories in their formative period in the Greco-Roman world through the study of myth and ritual, archaeology, art, literature, philosophy, science, medicine, law, economics, and historiography. Selected readings in classical and modern texts. Staff

CLA 330 Greek Law and Legal Practice (also CHV 330) Not offered this year EM

The development of Greek legal traditions, from Homer to the Hellenistic age. The course focuses on the relationship between ideas about justice, codes of law, and legal practice (courtroom trials, arbitration), and the development of legal theory. Two 90-minute seminars. Staff

CLA 334 Modern Transformations of Classical Themes (also COM 334/HLS 334) LA

A special topic concerning the adaptation of one or more classical themes in contemporary culture through media such as literature, film, and music. Two 90-minute seminars. Staff

CLA 335 Studies in the Classical Tradition (also HLS 335/AAS 333) LA

A classical genre or literary theme will be studied as it was handed down and transformed in later ages, for example, the European epic; ancient prose fiction and the picaresque tradition; the didactic poem. Two 90-minute seminars. Staff

CLA 343 The Civilization of the Early Middle Ages (see HIS 343)

CLA 344 The Civilization of the High Middle Ages (see HIS 344)

CLA 372 English Literature and the Classics Not offered this year LA

The Greco-Roman tradition in English literature. Comparative readings in epic, pastoral, ode, tragedy, comedy, and other genres. Special attention to the problems of literary imitation and the effects of cultural changes upon literary genres. Classics read in English translation. Two lectures, one preceptorial. D. Feeney

CLG 101 Beginner's Greek: Greek Grammar Fall

Reading in the language is combined throughout with the learning of forms, vocabulary, and syntax. A foundation is built in classical vocabulary and grammar during the first term as a base for the student in the continuing course, Greek 102. Four classes. C. Güthenke

CLG 102 Beginner's Greek: Attic Prose Spring

The study of vocabulary, grammar, and syntax is continued from 101 by intensive reading in Attic prose of the classical period. Authors such as Plato are read. Four classes. C. Güthenke

CLG 103 Ancient Greek: An Intensive Introduction Spring

An intensive introduction to the essentials of Greek grammar. Students will begin reading Attic prose as quickly as possible. 103 covers the material of 101-102 in a shorter period through increased class-time, drills, and earlier exposure to actual Greek texts. Leads directly to 105. Five classes. C. Wildberg

CLG 105 Socrates Fall

http://www.princeton.edu/ua/
The life and teaching of Socrates based upon the evidence of Plato and Xenophon. Aristophanes's Clouds may also be read in English, with some excerpts in Greek. Includes a review of the grammar of Attic prose. Prerequisite: 102 or 103, or instructor's permission. Four classes. Staff

CLG 108 Homer Spring

The course consists of extensive reading in the Iliad supplemented by lectures and study assignments directed to Homer's literary art and to the moral and religious thought of the Homeric epics. Four classes. Prerequisite: 103, or the equivalent. Staff

CLG 213 Tragic Drama LA

The tragic drama of the last three decades of the fifth century B.C. Normally one tragedy each by Euripides and Sophocles is read in Greek, with other texts and critical work in English. Two 90-minute seminars. Staff

CLG 214 Seminar Not offered this year LA

Deals with a major topic in Greek literature or cultural history with readings from several of the most important Greek authors. Three hours. Prerequisite: Greek 108 or equivalent. Alternates with 213. Staff

CLG 240 Introduction to Postclassical Greek from the Late Antique to the Byzantine Era (also HLS 240) Fall LA

Readings will focus on historical, literary, philosophical, or religious texts with a range from the Hellenistic to the Byzantine periods. Two 90-minute seminars. C. Wildberg

CLG 301 Plato Not offered this year LA

Reading of selected dialogues with lectures on various aspects of the Platonic philosophy. One lecture, one class, one preceptorial. C. Güthenke

CLG 302 Greek Tragedy Not offered this year LA

Three tragedies are read in class; others (both in Greek and English) are assigned as outside reading. The preceptorials deal with general discussions of tragedy, including Aristotle's Poetics. Two classes, one preceptorial. Staff

CLG 304 Greek Historians Not offered this year HA

Intensive study of a major historical author, such as Herodotus or Thucydides, with special attention to narrative technique and historiographical principles. Two 90-minute seminars. N. Luraghi

CLG 305 Greek Comedy LA

Several plays of Aristophanes are read in the original (for example, Acharnians, Clouds) and others in translation. The emphasis of the course is on the language and verbal effects of the comedies, and on the connections of Old Comedy with Euripidean tragedy, contemporary politics, and philosophy. Consideration is also given to New Comedy, with selections from Menander's Dyskolos in Greek. Two 90-minute seminars. C. Güthenke

CLG 306 Greek Rhetoric: Theory and Practice Not offered this year HA

An introduction to the major techniques of Greek rhetoric with special attention to rhetorical treatises such as Aristotle's Rhetoric and to the application of these techniques in oratory and other literary forms. A. Ford

CLG 307 Homer and the Epic Tradition Not offered this year LA

All of the Odyssey is read in English and a considerable portion is read in Greek. Classes include close translation of key passages and reports on special topics. Emphasis is upon literary interpretation of the epic on the basis of detailed analysis of epic style, diction, and narrative techniques. Two 90-minute seminars. Staff

CLG 308 The Lyric Age of Greece Fall LA

Major texts of the Greek lyric age in their cultural and literary setting. An author such as Hesiod or Pindar may be selected for intensive treatment. Two 90-minute seminars. A. Ford

CLG 310 Topics in Greek Literature Not offered this year LA

The subject matter of the course will vary from year to year depending on the interests of the instructor and students. The reading may concentrate on one or more authors, a theme, a genre, a personality, or an event. Staff

LAT 101 Beginner's Latin Fall

The course is designed to introduce the student with no previous training in the language to the basics of grammar, vocabulary, and syntax. A foundation is built in the first term for continuation in the spring-term course, 102. Four classes. R. Kaster

LAT 102 Beginner's Latin Continued: Basic Prose Spring

The study of grammar, vocabulary, and syntax is continued from Latin 101. Reading in basic prose works by authors such as Cicero or Caesar completes the course. Four classes. B. Shaw
LAT 103 Latin: An Intensive Introduction  Spring
An intensive introduction to the Latin language that covers the material of 101-102 in a shorter time through increased class time and drills. Students completing the course will be prepared to take LAT 105. Four classes, one drill. D. Feeney

LAT 104 Intensive Intermediate Latin  Not offered this year
An alternative to Latin 105, offering more review of Latin grammar and syntax. Also designed as an introduction to Latin literature through selected readings in poetry and prose. Five classes. R. Kaster

LAT 105 Intermediate Latin: Catullus and His Age  Fall
Selections from the poems of Catullus and from Cicero's Pro Caelio form the core of the reading. 105 is a continuation of 102 and is designed as an introduction to Latin literature. Important grammatical and syntactical principles are reviewed. Four classes. Prerequisite: 102 or equivalent. Staff

LAT 108 The Origins of Rome: Livy and Vergil  Spring
The reading will be composed of excerpts from the early books of Livy's History of Rome, together with selections from Vergil's Aeneid (such as Book 4 or 8). The course introduces the student to two major works of the Augustan Age and gives advanced instruction in the Latin language. Fulfills the A.B. language requirement. Four classes. Prerequisite: 104, 105, or equivalent. A. Feldherr

LAT 203 Introduction to Augustan Literature  LA
Readings from Ovid, particularly his love poetry and his "epic," the Metamorphoses, as well as from other poets (such as Horace, Tibullus, and Propertius). Three hours. Prerequisite: 108 or equivalent. Staff

LAT 204 Readings in Latin Literature  Fall LA
The course will deal with a major topic in Roman cultural history or Latin literature, with readings from three or four of the most important Latin authors. This course may be taken for credit more than once, provided different topics are treated. Three hours. Prerequisite: 108 or equivalent. A. Feldherr

LAT 205 Roman Letters  LA
A careful reading of a selection of Latin letters in prose and verse by Cicero, Horace, Ovid, Pliny, and others in order to understand the place this important form of communication held in Roman culture. Prerequisite: 108 or permission of instructor. Two 90-minute classes. E. Champlin

LAT 210 Invective, Slander, and Insult in Latin Literature  Not offered this year LA
This course aims to build skills in reading literary Latin in a variety of genres, both poetry and prose, while introducing students to an important social function shared by many types of texts: winning status and prestige by slandering a rival. The substance of this invective--the kind of insult that wins over an audience--can also tell us much about Roman values in various realms of public and personal behavior. Prerequisite: LAT 108 or instructor's permission. Seminar. E. Champlin

LAT 232 Introduction to Medieval Latin  Fall LA
Intended for students in any field interested in the Latin Middle Ages. Readings will include a wide variety of prose and poetry from the fourth to the 14th centuries. Attention will be given both to improving reading skills and to acquiring essential background information and critical method. Two 90-minute seminars. Prerequisite: 108 or equivalent. B. Shaw

LAT 234 Latin Language and Stylistics  Not offered this year LA
Study of the development of literary Latin (predominantly prose), with translation to and from Latin. Syntactic and stylistic analysis of sections of such authors as Cicero, Sallust, Seneca. Translations of brief portions of major authors, with practice in thematically related composition. Two 90-minute seminars. R. Kaster

LAT 330 Cicero  Fall LA
The course will present a representative selection from Cicero's enormous literary production. The specific texts studied will differ from year to year, but will normally include extensive reading from at least two of the three main genres of Cicero's prose works: essays, letters, and orations. Two 90-minute seminars. R. Kaster

LAT 331 Horace  Not offered this year LA
Selected Odes, Epodes, Satires, and Epistles are read with emphasis on Horace's relation to Greek poetry, his poetic techniques and originality, his ethical and literary views, his portrayal of the life and culture of Augustan Rome, and his influence upon English poetry. Two classes, one preceptorial. A. Feldherr

LAT 332 Roman Drama  Not offered this year LA
The course will concentrate on a single author (for example, Plautus) or will survey the development and technique of the drama in Rome, with major emphasis on comedy. Two 90-minute seminars. A. Feldherr

LAT 333 Vergil's Aeneid  Not offered this year LA
An intensive study of the *Aeneid*, with focus on literary values but also with consideration of political and social factors, literary ancestry, and influence. Three classes. *D. Feeney*

**LAT 334 Vergil's Eclogues and Georgics**  LA

Critical reading and literary analysis of Vergil's cycle of 10 pastoral poems (*Eclogues*) and of the four books of *Georgics*. Three classes. *Staff*

**LAT 335 Roman Literature: Selected Author or Authors**  Not offered this year LA

The subject matter of the course will vary from year to year, depending on the interests of the instructor and students. The reading may concentrate on one or more authors, a theme, a genre, a personality, or an event. Two classes, one preceptorial. *A. Feldherr*

**LAT 336 Epicureanism and Stoicism**  Not offered this year EM

A study of the two main philosophical schools of the Republic and Early Empire: Epicureanism and Stoicism. Readings (in Latin) will be selected from Lucretius, Cicero, and Seneca, supplemented by selections from Greek sources in English translation. Three classes. *D. Feeney*

**LAT 337 Roman Republican Historians**  Fall HA

Selections of historians' works are read that illustrate topics such as the historian's use of sources, historical outlook, narrative techniques, style, and reliability. Sample historians of the Republic who may be read are Livy, Sallust, and Caesar, depending on the interests of the instructor and students. Two 90-minute seminars. *Staff*

**LAT 338 Latin Prose Fiction**  Not offered this year LA

A critical study of Latin fiction such as Petronius's *Satyricon* and Apuleius's *Metamorphoses* (*Golden Ass*). Although the chief emphasis will be on the literary aspects of these influential works, some attention will also be given to their value as social and religious documents of their time. Two 90-minute classes. *E. Champlin*

**LAT 339 Roman Historians of the Empire**  Not offered this year HA

An examination of historians' approaches to history and their literary merits; sample historians to be surveyed include Tacitus, Suetonius, and Velleius Paterculus; sample topics to be covered include their views of autocracy (nature and effects) and of Roman civilization (value, influence, shortcomings). Two 90-minute classes. *R. Kaster*

**LAT 340 Roman Satire**  LA

Selected satires of Horace, Juvenal, and Persius are read. Classes emphasize translation, stylistic analysis, and explication of the texts. There are also reports on special topics such as the origins and development of satire at Rome, and at least one in-depth interpretation by each student of a selected individual passage. Two 90-minute seminars. *Y. Baraz*

**LAT 342 Roman Elegy from Catullus to Ovid**  LA

Selections from Latin elegy. Students will read the fourth book of Propertius and sections of Ovid's *Fasti*, together with other elegies. Focuses on the poetic presentation of the metropolis of Rome, its history, religion, and urban life. Two 90-minute classes. *A. Feldherr*

**MOG 101 Elementary Modern Greek I** (see HLS 101)

**MOG 102 Elementary Modern Greek II** (see HLS 102)

**MOG 105 Intermediate Modern Greek** (see HLS 105)

**MOG 107 Advanced Modern Greek** (see HLS 107)
Department of Comparative Literature

Chair
Leonard Barkan

Departmental Representative
Susana Draper

Director of Graduate Studies
April Alliston

Professor
April Alliston
Leonard Barkan
David M. Bellos, also French and Italian
Sandra L. Bermann
Claudia J. Brodsky
Marina S. Brownlee, also Spanish and Portuguese Languages and Cultures
Maria A. DiBattista, also English
Caryl G. Emerson, also Slavic Languages and Literatures
Thomas W. Hare
Daniel Heller-Roazen, also Council of the Humanities
Alexander Nehamas, also Council of the Humanities, Philosophy
Eileen A. Reeves
Michael G. Wood, also English

Visiting Professor
Ann Smock, Stanley Kelley, Jr., Visiting Professor for Distinguished Teaching

Assistant Professor
Wendy Laura Belcher, also African American Studies
Benjamin Conisbee Baer
Susana Draper
Lital Levy

Lecturer with Rank of Professor
Peter Brooks, also University Center for Human Values

Lecturer
Nikolaos Panou

Associated Faculty
Kwame Anthony Appiah, Philosophy, University Center for Human Values
Eduardo L. Cadava, English
Rubén Gallo, Spanish and Portuguese Languages and Cultures
Simon E. Gikandi, English
Anthony T. Grafton, History
Andras P. Hamori, Near Eastern Studies
Thomas Y. Levin, German
P. Adams Sitney, Lewis Center for the Arts, Visual Arts
Michael A. Wachtel, Slavic Languages and Literatures

The Department of Comparative Literature invites students to approach literature from a broad, cross-cultural perspective. The curriculum encompasses literatures, languages, and cultures from around the world--including those of Europe, the Americas, Africa, Asia, and the Middle East--as well as interdisciplinary work of many types. While each student in the department is expected to focus his or her studies on a particular foreign language and literature, an interest in the way different literatures illuminate one another, or enter into dialogue with other disciplines, media, or forms of art, is fundamental to our work. Students motivated by a desire to understand literature in the broadest terms, as well as those interested in particular examples of literary comparison, will find an intellectual home in the Department of Comparative Literature.

The flexibility of the concentration has always been one of its strong points. With the guidance of the director of undergraduate studies and the junior and senior faculty advisers, each student creates a program of study tailored to his or her intellectual interests, choosing courses and independent projects that contribute to the whole.

Graduates successfully pursue many diverse careers, including law, medicine, business, foreign service, computing and technology, international investments and banking, creative writing, publishing and journalism, filmmaking, and education at the secondary and university levels. Many comparative literature students have gone on to graduate study in the field and now teach at a wide range of institutions in the U.S. and abroad.

Information and Departmental Plan of Study

Prerequisites

Foreign Language Requirement. To enter the department, students must be sufficiently knowledgeable in one language other than English to take an upper-level course in it in his or her junior year.

Plan to read a second foreign language before graduation. Proficiency in only one non-English language is required for admission to the department. However, students who concentrate in comparative literature are also expected to study at least one other non-English language and to be able to read in the language by the time they graduate. Such language study may take place before or during their years as departmental concentrators. Some students demonstrate their competency by taking an upper-level course in the literature of that language. Other students gain this competency by taking three terms of language study at Princeton, or two terms and an intensive language course in the summer, or (especially in the case of languages that are no longer spoken) an intensive language course in the summer. A few pass the AP test or take a foreign language test administered by the relevant department.

Introductory Courses. Students who wish to concentrate in comparative literature are advised (though not required) to take COM 205-206 or HUM 216-219 in their sophomore year or earlier.

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Early Concentration

Qualified students may elect early concentration and enroll in the department at the beginning of the spring term of sophomore year. They may begin their departmental course of study as well as their independent work, if they wish.

Program of Study

Students in comparative literature select courses from a wide range of offerings throughout the University and are encouraged to construct a program of study to match their individual interests. Nine departmental courses are required of each student, chosen according to the type of comparative work pursued. COM 300, the Junior Seminar, counts as one of the nine. This course is especially designed to introduce students to the history and methodology of the field, as well as to different avenues of comparative study. Concentrators must take the course in the fall term of their junior year, unless they are studying abroad, in which case the course may be taken in the senior year instead. Two other courses must be taken within the Department of Comparative Literature (i.e., listed or cross-listed as a COM course).

Regardless of the area of study elected, all concentrators must take four upper-level courses in a non-English-language literature department. In order to gain a broad knowledge of one literature, students are normally expected to devote three of the four courses to the literature of one language. Foreign-language literatures most typically studied in the Department of Comparative Literature are French, Spanish and Italian. Students also study Portuguese, German, Russian, Chinese, Korean, Japanese, Arabic, Hebrew, Greek, Latin, Swahili, Hindi, Persian, Turkish, Bosnian-Croatian-Serbian, Syriac, and Armenian. Upper-level courses generally are 300- or 400-level courses, but reading-intensive 200-level courses may be counted with permission from the director of undergraduate studies.

The remaining two courses are taken in appropriate departments throughout the University according to the student's area of study. Course selections generally fall into one of the areas described below. Each represents the study of literature in a different comparative context and includes all nine required courses:

A. Comparative work in literatures in at least two languages. Students choose four upper-division courses in non-English-language literature; three courses listed or cross-listed with comparative literature (one of which is COM 300); and two upper-level courses in literature in any other language (including English).

B. Comparative work in literature and a traditional textual discipline. (That is, in the humanities [e.g., philosophy, art and archaeology, classics, or religion] or social sciences [e.g., anthropology, history, psychology, sociology, politics, economics, or public policy]). Students choose four upper-level courses in non-English-language literature (four courses in one language, or three in one language and one in another); three courses listed or cross-listed in comparative literature (one of which is COM 300); and two upper-level courses in the relevant textual discipline.

C. Comparative work in literature and another medium. (That is, photography, film, art, art history, architecture, or music). Students choose four upper-level courses in non-English-language literature (four courses in one language, or three in one language and one in another); three courses listed or cross-listed in comparative literature (one of which is COM 300); and two upper-level courses in the relevant medium.

D. Comparative work in literature and regional or ethnic studies (that is, African [AFS], African American [AAS], American [AMS], East Asian [EAP or EAS], European [ECS or EPS], Hellenic [HLS], Judaic [JDS], Latin American [LAS], Latino [LAO], Near Eastern [NES], or South Asian [SAS]). Students choose four upper-level courses in non-English-language literature (four courses in one language, or three in one language and one in another); three courses listed or cross-listed in comparative literature (one of which is Comparative Literature 300); and two courses in the relevant region or ethnicity.

E. Comparative work in literary study and the creative arts, (that is, creative writing [poetry, the novel, short stories, drama, memoir], screenwriting, translation, dance, theatrical performance, visual arts, film, or video). Students choose four upper-level courses in non-English-language literature (four courses in one language, or three in one language and one in another); three courses listed or cross-listed with comparative literature (one of which is COM 300); and two courses in the relevant creative art. Students entering the department select this program provisionally. Final admission depends upon the acceptance of the creative thesis proposal by the department and by an adviser from the relevant creative arts program.

Departmental Distribution Requirement. At least two of the nine courses taken for the major should address historical periods, literature, or cultures before 1800 CE.

Theory and Methods of Comparative Literature. Theoretical issues naturally arise in the study of comparative literature. They may also function as the main focus of a student's work. Theoretical issues are specifically addressed in two departmental courses: COM 303 Comparative History of Literary Theory and COM 301 Theory and Methods of Comparative Literature: Critical and Literary Theory. Upper-level courses in theory, methodology, and criticism are offered by other humanities and social science departments as well.

Independent Work

Junior Year. Concentrators must write two junior papers. The first paper, some 3,000 words in length, will normally involve the close study of a work from one of the non-English-language literatures in which the student has linguistic competence. Its purpose is to develop the student's basic skills as a reader of complex texts. The second paper should be wider in scope, and might serve as the beginnings of a senior thesis. It will normally be some 8,000 words in length.

Senior Year. Concentrators must write a senior thesis, normally limited to 20,000 words, which is comparative in nature and should reflect the student's ability to relate and analyze materials in the area chosen. Creative theses must be accompanied by a substantial critical essay.

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Senior Departmental Examination

Concentrators must take the senior departmental examination, which tests their ability to analyze texts and make connections among them. The student consults with his or her senior faculty adviser to select specific titles from a broad reading list, reads them, and answers questions based on the student's particular language proficiency and chosen program of study. Students will also be asked to analyze a passage in their primary language.

Study Abroad

Summer Study Abroad. There are numerous opportunities for summer study abroad, some partially supported by University funds. A summer abroad can increase fluency in the language of concentration. It may also be an effective way to satisfy the departmental requirement of developing reading knowledge in a second foreign language. For further information about available programs, students should consult the director of undergraduate studies in comparative literature and also in the individual language and literature departments. Some departmental funding is available for summer language study for concentrators.

Summer Work Abroad. Princeton offers some excellent work abroad programs, including Princeton-in-France and the German summer work abroad program, to which qualified students from the department are encouraged to apply. The Office of International Programs [http://www.princeton.edu/oip/home/] also offers a selection of summer internships in Latin America for which comparative literature students may be eligible.

Study and Work Abroad

The department strongly encourages its students to undertake a semester, a year, or a summer abroad, in order to gain fluency in the language of concentration and to pursue further study in its literature and culture. Many opportunities are available for study abroad.

Certificate Program in Translation and Intercultural Communication. Since concentrators in comparative literature consider texts from an international and interdisciplinary perspective, and often with an emphasis in the creative arts, questions of translation and intercultural communication often arise. Majors in the department may write translation theses, for instance, or put theoretical problems associated with translation or cross-cultural comparisons at the center of their departmental work. In these cases, they might choose to combine the concentration with a certificate in the Program in Translation and Intercultural Communication.

Certificates in University Programs. Students in comparative literature frequently choose to combine their concentration with certificates from Princeton programs and centers. Concentrators interested in these certificates should consult with the director of undergraduate studies and the director of the relevant program.

Courses

COM 205 The Classical Roots of Western Literature (also HUM 205)   Fall LA
An introduction to the methods and some major texts of comparative literary study. It will focus on the Greco-Roman tradition, asking what it means to call a work a "classic": it will consider the outstanding characteristics of this tradition, how it arose and gained influence and attempt to place it in a global context. Readings will be divided into three topics: Epic Heroes (centering on Homer's Odyssey), Tragic Women (in ancient and modern drama), and the "invention" of modernity (Aeneid). Selected additional readings in non-Western literatures and in influential critical essays. Two lectures, one preceptorial. D. Heller-Roazen

COM 206 Masterworks of European Literature (also HUM 206)   Spring LA
This course seeks to discover (or rediscover) a series of significant works in the European tradition, and also to ask once again what a tradition is. The focus will be firmly on the close reading of particular texts, but discussions will also range freely over large questions: What is a classic, what difference does language make, can we think both about world literature, in Goethe's phrase, and about the importance of national and local loyalties? No easy answers promised, but astonishing adventures in reading guaranteed. M. Wood

COM 207 The Bible as Literature (see HUM 207)

COM 209 Thinking Translation: Language Transfer and Cultural Communication (see TRA 200)

COM 220 Introduction to Literary Theory   Not offered this year LA
An introductory course in the history of European literary theory. Readings include Plato, Aristotle, Longinus, Boccaccio, Dryden, Corneille, Schiller, Sartre, Lévi-Strauss, Barthes, Derrida. Theories will be related to selected literary texts in an effort to explore how theory illuminates literature while shedding light upon larger human questions. One lecture, one two-hour seminar. S. Bermann

COM 233 East Asian Humanities I: The Classical Foundations (see HUM 233)
COM 234 East Asian Humanities II: Tradition and Transformation (see HUM 234)

COM 300 Junior Seminar: Introduction to Comparative Literature   Fall LA
This course serves as an introduction to comparative literature for concentrators in the department. Course work focuses on four general areas: the idea of "world literature"; the potential and the problems involved in comparing texts, literary and otherwise; the relation between word and image; and the (im)possibility of translation. Some attention will be devoted to the preparation of independent work for the major. Both canonical and non-canonical literature will be read. Western and "non-Western" literature will be considered in the context of other types of artistic endeavor, and translation. One three-hour seminar. B. Conisbee Baer

**COM 301 Theory and Methods of Comparative Literature: Critical and Literary Theory**  Fall LA

A course in the formative issues of contemporary critical theory. Questions of the relationships between literature, philosophy, aesthetics, and linguistics will be treated with regard to the rise of modern philology, new criticism, hermeneutics, speech act theory, semiotics, structuralism, Marxism, the Frankfurt School, and poststructuralism. Readings in Auerbach, Spitzer, Brooks, Wimsatt, Schleiermacher, Gadamer, Ricoeur, Austin, Burke, Frye, Propp, Saussure, Jakobson, Lévi-Strauss, Barthes, Jameson, Adorno, Derrida, de Man. One three-hour seminar. C. Brodsky

**COM 303 Comparative History of Literary Theory**  Spring LA

A historical introduction to literary theory from Plato to the present. By reading philosophers, critics, and creative writers, students consider issues such as mimesis, imagination, religion, sexuality, and ethics, noting how each casts light on our understanding of literature and its cultural roles. Past terms and current problems are related to an inquiry into the nature--and the power--of literature through the ages. Students will read critical works from Plato and Aristotle, through Nietzsche, Beauvoir, Benjamin, Derrida, and Achebe, as well as poetry and plays by Sophocles, Shakespeare, Eliot, and Brecht. One three-hour seminar. S. Bermann

**COM 304 The East European Novel of the 20th Century**  Not offered this year LA

Caught between Russia and the West, traded off among European empires, the peoples of Eastern Europe are again independent in the postcommunist era. For them, surviving the 20th century became, literally, an art. After a geopolitical introduction to the region, students will read modern proseworks from the Polish, Czech, and Serbo-Croatian traditions, including novels cast as national epics during times of total war, as fantasy or science fiction, and as the tragicomedy of everyday life. Five films built off these novels will be screened during the course. Two lectures, one preceptorial. C. Emerson

**COM 305 The European Novel: Cervantes to Tolstoy**  Not offered this year LA

The emergence and development of the major forms of the novel as seen in the works of Cervantes, Mme. de Lafayette, Diderot, Laclos, Goethe, Balzac, Stendhal, Gogol, Turgenev, Flaubert, and Tolstoy. Emphasis is placed on the novel as the expression of human relationships with individuals and with society. Two lectures, one preceptorial. M. Wood

**COM 306 The Modern European Novel: Joyce, Mann, and Proust**  Not offered this year LA

Using Flaubert's *Madame Bovary* as a paradigm of the major thematic and technical preoccupations of the novel, lectures offer detailed interpretations of *Ulysses*, *The Magic Mountain*, *Swann's Way*, and theoretical speculations on symbolism, stream-of-consciousness, linguistic structures, psychoanalysis. Two lectures, one preceptorial. M. DiBattista

**COM 309 The Lyric (also ENG 420/SPA 349)**  Fall LA

The lyric as a form of literary art, as distinct from narrative or drama. Readings encompass a variety of lyrical forms and a number of different cultures. Translations will be used. One lecture, one two-hour seminar. S. Bermann

**COM 310 The Literature of Medieval Europe**  Not offered this year LA

An introductory survey of major representative Latin and vernacular texts in modern English versions, including hagiography, romance, lyric and philosophical poetry, allegory, religious and secular prose, and drama. Special attention will be paid to Christian transformations of classical traditions and to the emergence of the Continental vernaculars of the late Middle Ages. Lecture and preceptorials. D. Heller-Roazen

**COM 313 Topics in Literature and Ethics (see ENG 416)**

**COM 314 The Renaissance (also ART 334)**  Not offered this year LA

An introduction to the literature of the Renaissance in Europe and in England. Emphasis upon major genres--lyric, drama, pastoral, and prose-fiction--as they arise in Italy, France, Spain, and England. Readings from Boccaccio, Castiglione, Lope de Vega, Sidney, Shakespeare, Erasmus, Rabelais, and Cervantes. Two 90-minute seminars. L. Barkan

**COM 315 Cervantes and His Age (see SPA 306)**

**COM 316 The Enlightenment and Romanticism**  LA

Close readings of literary works of the Enlightenment and romanticism. Readings will focus primarily on the ways in which these works articulate and represent problems of knowledge. In the course of this exploration, it will be necessary to consider the primary *topoi* and defining oppositions of Enlightenment thought, with their transformations in romanticism. One three-hour seminar. C. Brodsky

**COM 317 Topics in Germanic Literatures (see GER 324)**

**COM 318 The Modern Period**  Not offered this year LA

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Modern Western literature in the perspective of its development since the Industrial Revolution. The peculiarity of "modernist" style exemplified by various genres. Significant philosophical trends that define the parallel development of modern art and thought. Texts from English, German, French, and other literatures. Two lectures, one preceptorial. S. Draper

COM 320 Masterworks of European Literature: The Romantic Quest (see GER 320)

COM 321 Communication and the Arts (see ECS 330)

COM 323 Self and Society in Classical Greek Drama (see CLA 323)

COM 324 The Classical Tradition (also HLS 324) Spring LA

Classical mythology in the arts from Ovid to Shakespeare, from Zeuxis to Titian, with a particular emphasis on the subject of love. Introductory discussions on the nature of myth in its relation to the literary and visual arts. Readings will include major literary works from antiquity to the Renaissance integrated with the study of mythological painting, principally from 15th- and 16th-century Italy, including the works of Botticelli, Correggio, and Titian. One three-hour seminar. L. Barkan

COM 325 Experimental Fiction (also ENG 342) Not offered this year LA

A study of the more experimental, self-conscious narratives in modernist literature with emphasis on the major formal and stylistic innovations of representative modern texts. M. DiBattista

COM 326 Tragedy (also HLS 326) Not offered this year LA

The tragic vision as expressed by Greek, Renaissance, and modern writers who dramatize the relationship between human suffering and human achievement. Readings in Aeschylus, Sophocles, the Old Testament, Shakespeare, Milton, Chekhov, Ibsen, Sartre, Brecht, Beckett, and T. S. Eliot. One lecture, one two-hour seminar. Staff

COM 327 Modernism in Fiction (also LAS 327) Not offered this year LA

A study of early to mid-20th century fiction, focusing on the question of modernity both as a literary and a historical-philosophical problem. Attention will be given especially to experimentation with literary form and the relation of narrative forms to specific cultural practices. Authors read in the course include Joyce, Woolf, Kafka, Proust, Beckett, Borges. Students will also study essays reflecting the debates of the period (Brecht, Adorno, Lukács, Benjamin). One three-hour seminar. Staff

COM 328 Modernism in Poetry Not offered this year LA

A study of the relation between the writing of poetry and the question of modernity as a theoretical and cultural problem. The course will take into account the various experimental movements that opted for poetry as their primary medium (imagism, dadaism, surrealism, futurism), as well as the work of certain poets who have indelibly marked the 20th century's poetic landscape (Yeats, Brecht, Neruda, Cavafy, and others). Students are expected to know at least one of the foreign languages involved well enough to read the original texts. One three-hour seminar. M. Wood

COM 330 Literature and Law Not offered this year LA

An introduction to literature as a vehicle of thought about law, morality, and the tensions between them. Readings include ancient legal codes, selected biblical texts, Greek tragedies, Norse sagas, medieval satirical epics, Renaissance drama, 18th-century drama, and modern fiction. Emphasis on revenge codes, the shift from prelegal to legal societies, the Christianization of Germanic law, equity, contract, critiques of law and legal systems. One three-hour seminar. Staff

COM 331 Chinese Poetry (see EAS 331)

COM 333 The Chinese Novel (see EAS 333)

COM 334 Modern Transformations of Classical Themes (see CLA 334)

COM 337 Really Fantastic Fiction Not offered this year LA

Fiction by writers of a fundamentally realist persuasion who nevertheless depict in their work the intrusion of the supernatural and the fantastic into everyday life. Gogol, Kleist, James, Olesha, Nabokov, Bradbury, García Márquez, and Calvino are among the authors read. One lecture, one two-hour seminar. E. Reeves

COM 338 Forms of Short Fiction Not offered this year LA

The short story and other forms of brief imaginative prose as they have developed in English and the European languages during the 19th and 20th centuries. The seminar discussions will examine selected works of such authors as Chekhov, Lawrencè, Kafka, Joyce, Hemingway, Faulkner, Borges, Nabokov, W. C. Williams, Welty, Cheever, Flannery O'Connor, Tournier, and Barthelme. One lecture, one two-hour seminar. D. Bellos

COM 340 Literature and Photography (see ECS 340)

COM 344 Postwar Japanese Narrative: Modern to Postmodern (see EAS 344)

COM 346 Modern Latin American Fiction in Translation (see SPA 346)

COM 349 Texts and Images of the Holocaust (also JDS 349) Not offered this year EM
In an effort to encompass the variety of responses to what is arguably the most traumatic event of modern Western experience, the Holocaust is explored as transmitted through documents, testimony, memoirs, creative writing, historiography, and cinema. In this study of works, reflecting diverse languages, cultures, genres, and points of view, the course focuses on issues of bearing witness, collective vs. individual memory, and the nature of radical evil. One three-hour seminar, plus weekly film showings. Staff

COM 354 Topics in Gender and Representation (see SPA 353)

COM 355 Advanced Creative Writing (Literary Translation) (see CWR 305)

COM 356 Advanced Creative Writing (Literary Translation) (see CWR 306)

COM 357 Tales of Hospitality: France, North Africa, and the Mediterranean (see FRE 327)

COM 359 Acting, Being, Doing, and Making: Introduction to Performance Studies (see THR 300)

COM 361 The Cinema from World War II until the Present (see VIS 342)

COM 369 Special Topics in Modern Greek Civilization (see HLS 361)

COM 370 Topics in Comparative Literature Not offered this year LA

Study of a selected theme or topic in comparative literature. Subjects will range from historical and cultural questions (literature and politics, the literature of the avant-garde) to the study of specific literary themes or topics (feminine autobiography, the grotesque in literature). A. Sidikou-Morton

COM 372 The Gothic Tradition (also ENG 303) Spring LA

An exploration of the cultural meanings of the Gothic mode through a study of its characteristic elements, its origins in 18th-century English and German culture and thought, its development across Western national traditions, and its persistence in contemporary culture, including film, electronic media, clothing, social behavior, and belief systems, as well as literature. Films, artifacts, websites, and electronic publications will supplement readings. One three-hour seminar. A. Alliston

COM 393 Nietzsche (see PHI 306)

COM 400 Seminar: Literary Imagination and the Image of History Not offered this year LA

Literary texts from two or more national cultures will be viewed in a historical perspective of a specific period (the Renaissance or the Enlightenment) or a significant event (the French Revolution or World War I) or a social phenomenon (the Industrial Revolution). The mutual relationship between the image of the world created by writers and the impact of writers upon the world they reflect. Staff

COM 401 Seminar. Types of Ideology and Literary Form (also WOM 401) Fall LA

Relationships between conceptions of literary form and developments in intellectual history, spanning different genres and cultural traditions. Some examples: modernism in the context of 20th-century ideological conditions; the rise of the novel traced through philosophies of the 18th and 19th centuries. A. Alliston

COM 403 Seminar. The Aesthetic Movement: Forms of Excitement Not offered this year LA

An examination of selected works of European literature, chiefly around the turn of the 20th century, that provoke distinctive "forms of (literary) excitement." Topics will include decadence, ecstasy, ekphrasis, self-mirroring, asceticism, sadomasochism, dandyism, epiphany, and l'art pour l'art. One three-hour seminar. S. Corngold

COM 404 Literature Across Languages Not offered this year LA

Studies in the international exchange of literary forms and ideas, intellectual and artistic movements. The topic will be drawn from among the following or others similar in scope: the literature of exile, the avant-garde, formalism and structuralism, Byronic hero and antihero, literary relations between East and West, surrealism and its legacy, the international response to individual writers. C. Emerson

COM 405 Senior Seminar Not offered this year LA

The course will deal with a theme, author, or problem in comparative literature studies. Staff

COM 409 Senior Seminar in Translation and Intercultural Communication (see TRA 400)

COM 410 Bakhtin, the Russian Formalists, and Cultural Semiotics (also SLA 410) Not offered this year LA

A survey (in English) of three influential schools of 20th-century Russian literary criticism: the major Russian formalists (1920s); Mikhail Bakhtin (1920s-70s), and the cultural semiotics of Yury Lotman and his "Tartu School" (1960s-80s). The course will include primary and secondary texts; major essays will be read in conjunction with sample literature that illustrates the critical approach. Two 90-minute seminars. C. Emerson

COM 415 Leo Tolstoy, War and Peace, and the Tasks of Literature (also SLA 415) Not offered this year LA

The course is primarily about War and Peace, framed by some earlier and later fiction and by Tolstoy's essays on art and religion. Tolstoy's radical ideas on narrative have a counterpart in his radical ideas on history, causation, and the formation of a moral self. Together, these concepts offer an alternative to "The Russian Idea," associated with
Dostoevsky and marked by mysticism, apocalypse, and the crisis moment. To refute this idea, Tolstoy redefined the
tasks of novelistic prose. Seminar. C. Emerson

COM 418 Vladimir Nabokov (see SLA 417)

COM 420 Latin American Studies Seminar (see LAS 403)

COM 444 Cinema and the Related Arts (see VIS 444)
The Department of Computer Science curriculum encourages students to learn fundamental concepts of the discipline and to become proficient in the use of advanced computer systems. The plan provides opportunities for study in software systems, algorithms and complexity, machine architecture, computer graphics, and other core areas of computer science. Most computer science students enjoy programming and are given ample opportunity to do so within the curriculum.

Information for First-Year Students. Students with a general interest in the sciences or engineering are encouraged to take COS 126 in the first year or in the first semester of the second year. This provides useful background for applications work in any science or engineering major and preserves the option of later electing a computer science major.

Prerequisites

MAT 103, 104, and either 200 or 202; COS 126; COS 217 and 226. Students who do not take both 217 and 226 before the junior year will need to plan their programs carefully, as one or both of these are required prerequisites for all later computer science courses.

Departmental Requirements

Eight additional departmental courses at or above the 300 level must be elected. These eight courses must include two each from the following three areas (asterisk indicates one-time-only course):

Theoretical computer science:

340 Reasoning about Computation
342 Introduction to Graph Theory (see MAT 306)
423 Theory of Algorithms
433 Cryptography
441 Programming Languages
451 Computational Geometry
487 Theory of Computation

Systems:
306 Introduction to Logic Design (see ELE 206)
318 Operating Systems
320 Compiling Techniques
333 Advanced Programming Techniques
375 Computer Architecture and Organization (see ELE 375)
425 Database and Information Management Systems
461 Computer Networks
475 Computer Architecture (see ELE 475)

Applications:
323 Computing for the Physical and Social Sciences
325 Transforming Reality by Computer
402 Artificial Intelligence
426 Computer Graphics
429 Computer Vision
432 Information Security
435 Information Retrieval, Discovery, and Delivery
436 Human-Computer Interface Technology
444 Internet Auctions: Theory and Practice
*491 Information Technology and the Law

Students should consult with a departmental adviser on their course selections after they decide to become computer science concentrators. Students interested in graduate study in computer science are strongly advised to take 318, 320, 340, 375, 423, and 487.

Independent Work

All A.B. concentrators engage in independent work supervised by a member of the department. A junior project normally involves the study and solution of specific problems, often associated with a research project. It may require a significant programming effort, a theoretical study involving the design and analysis of algorithms, or an applications problem in some other field. The results of these efforts must be presented in two written reports that correspond to the work undertaken in each of the terms. The senior thesis may be a study in greater depth of one of the subjects considered in junior independent work, or it may deal with another aspect of computer science and its application.

The department also offers a curriculum leading to the B.S.E. degree. The primary differences between the A.B. and the B.S.E. programs are in the general requirements for the degree programs, and the nature and extent of independent study.

Senior Departmental Examination

An oral examination, consisting of a defense of the thesis research and general questions in the field of computer science, and a poster session, will be held in May.

Integrated Science Sequence

An alternative path into the department is through the integrated science curriculum. ISC/CHM/COS/MOL PHY 231-4 (a double course) can be taken in the freshman year and ISC/CHM/COS/MOL PHY 235/6 can be taken in the sophomore year. These courses can be substituted for CHM 203/204, PHY 103/104 or 105/6, and COS 126 in the freshman year and MOL 214, 342, and 345 in the sophomore year. For full course descriptions and more information, see the integrated science website.

Interdisciplinary Studies. The pervasive nature of modern computing has introduced many interactions between computer science and other disciplines. Basic preparation in computer science is valuable for a broad variety of careers because of the central role played by the computer in society. Professionals who understand computers are far more effective in their work. In the past, a large amount of technical preparation was required before interesting applications could be considered; today's undergraduates are able to use computers to study important problems in other disciplines.

Some possible areas for interdisciplinary study are: mathematics, music, art, economics, electrical engineering, molecular biology, cognitive studies, and linguistics.

Many Princeton undergraduates view their four years at Princeton as an opportunity to gain an education before immersing themselves in rigorous training for careers in law, business, or medicine. Computer science students are no exception. Through the choice of electives, students may create a specialized interdisciplinary program or a broad program with computer science as the core of preprofessional study. The former requires consultation with advisers in the related disciplines to determine what constitutes a reasonable cognate specialization, and the latter is constrained by the requirement of a coherent program of concentration.

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Program in Applications of Computing. Students pursuing some other major field of study, but who are interested in the applications of computer science to that field, may wish to consider the Program in Applications of Computing [add hyperlink].

Program in Quantitative and Computational Biology. The Program in Quantitative and Computational Biology (QCB) is designed for students with a strong interest in multidisciplinary and systems-level approaches to understanding molecular, cellular, and organismal behavior. The curriculum introduces the students to experimental and analytic techniques for acquisition of large-scale quantitative observations, and the interpretation of such data in the context of appropriate models. Strong emphasis is placed on using global genome-wide measurements (e.g., microarray gene expression, sequence, phenotype) to understand physiological and evolutionary processes. At the core of the curriculum is the Project Lab (QCB 301), a double laboratory course, taken during the fall of junior year, where students participate in the design, execution, and analysis of experiments. The required courses provide a strong background in modern methodologies in data analysis, interpretation, and modeling. Courses are chosen with the help of advisers in molecular biology, ecology and evolutionary biology, physics, chemistry, computer science, and other related departments. A certificate in quantitative and computational biology is awarded to students who successfully complete the program requirements.

Courses

COS 109 Computers in Our World (also EGR 109)  Fall QR
Computers are all around us. How does this affect the world we live in? This course is a broad introduction to computing technology for humanities and social science students. Topics will be drawn from current issues and events, and will include discussion of how computers work, what programming is and why it is hard, how the Internet and the Web work, security and privacy. Two 90-minute lectures. Self-scheduled computer laboratory. B. Kernighan

COS 116 The Computational Universe (also EGR 116)  Spring ST
Computers have brought the world to our fingertips. This course explores at a basic level the science "old and new" underlying this new computational universe: propositional logic of the ancient Greeks (microprocessors); quantum mechanics (silicon chips); network and system phenomena (internet and search engines); computational intractability (secure encryption); and efficient algorithms (genomic sequencing). Ultimately, this study makes us look anew at ourselves: our genome; language; music; "knowledge"; and, above all, the mystery of our intelligence. Two 90-minute lectures, one three-hour laboratory. A. Finkelstein

COS 126 General Computer Science (also EGR 126)  Fall, Spring QR
An introduction to computer science in the context of scientific, engineering, and commercial applications. The goal of the course is to teach basic principles and practical issues, while at the same time preparing students to use computers effectively for applications in computer science, physics, biology, chemistry, engineering, and other disciplines. Topics include: hardware and software systems; programming in Java; algorithms and data structures; fundamental principles of computation; and scientific computing, including simulation, optimization, and data analysis. No prior programming experience required. Two lectures, two classes. R. Sedgewick, K. Wayne

COS 217 Introduction to Programming Systems  Fall, Spring QR
An introduction to computer organization and system software. The former includes topics such as processor and memory organization, input/output devices, and interrupt structures. The latter includes assemblers, loaders, libraries, and compilers. Programming assignments are implemented in assembly language and C using the UNIX operating system. Three lectures. Prerequisite: 126 or instructor's permission. J. Singh, J. Rexford

COS 226 Algorithms and Data Structures  Fall, Spring QR
The study of fundamental data structures such as lists, queues, stacks, trees, heaps, hash tables, and their variations. The implementation and analysis of important algorithms for sorting, searching, string processing, geometric applications, and graph manipulation. Introduction to advanced algorithms and techniques. Two lectures, one preceptorial. Prerequisite: 126 or instructor's permission. R. Sedgewick

COS 231 An Integrated, Quantitative Introduction to the Natural Sciences I (see ISC 231)
COS 232 An Integrated, Quantitative Introduction to the Natural Sciences I (see ISC 232)
COS 233 An Integrated, Quantitative Introduction to the Natural Sciences II (see ISC 233)
COS 234 An Integrated, Quantitative Introduction to the Natural Sciences II (see ISC 234)
COS 235 An Integrated, Quantitative Introduction to the Natural Sciences III (see ISC 235)
COS 236 An Integrated, Quantitative Introduction to the Natural Sciences IV (see ISC 236)
COS 306 Introduction to Logic Design (see ELE 206)
COS 314 Computer and Electronic Music through Programming, Performance, and Composition (see MUS

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COS 318 Operating Systems   Fall
A study of the design and analysis of operating systems. Topics include: processes, mutual exclusion, synchronization, semaphores, monitors, deadlock prevention and detection, memory management, virtual memory, processor scheduling, disk management, file systems, security, protection, distributed systems. Two 90-minute lectures. Prerequisites: 217 and 226 or instructor's permission. K. Li, A. Bavier

COS 320 Compiling Techniques   Spring
The principal algorithms and concepts associated with translator systems. Topics include lexical analysis, syntactic analysis, parsing techniques, symbol table management, code generation and optimization, run time system design, implementation issues related to programming language design. Course will include a large-scale programming project utilizing the above topics. Three lectures. Prerequisites: 217 and 226 or instructor's permission. D. August

COS 323 Computing for the Physical and Social Sciences   Fall QR
Principles of scientific computation, driven by current applications in biology, physics, economics, engineering, etc. Topics include: simulation, integration of differential equations, iterative optimization algorithms, stability and accuracy issues. Students will pursue projects in a variety of fields, writing their own computer programs and also using higher-level tools such as Maple. Prerequisite: COS 126 and MAT 104, or instructor's permission. Two 90-minute lectures. K. Steiglitz

COS 325 Transforming Reality by Computer (also MUS 315)   Not offered this year LA
Capturing and transforming sound by computer for artistic purposes. Emphasis is on the student's own creative use of aural material from the real world, on providing a basic foundation in the signal processing theory and technique most useful for computer music, and on the interaction between the artistic and scientific aspects of the endeavor. Two 90-minute lectures, one preceptorial, one laboratory. Prerequisites: 217 and MAT 104. Offered alternate years. Staff

COS 333 Advanced Programming Techniques   Spring
The practice of programming. Emphasis is on the development of real programs, writing code but also assessing tradeoffs, choosing among design alternatives, debugging and testing, and improving performance. Issues include compatibility, robustness, and reliability, while meeting specifications. Students will have the opportunity to develop skills in these areas by working on their own code and in group projects. Two 90-minute lectures. Prerequisites: 217 and 226 (as corequisite). B. Kernighan

COS 340 Reasoning about Computation   Fall QR
An introduction to mathematical topics relevant to computer science. Combinatorics and probability will be covered in the context of computer science applications. The course will present a computer science approach to thinking and modeling through such topics as dealing with uncertainty in data and handling large data sets. Students will be introduced to fundamental concepts such as NP-completeness and cryptography that arise from the world view of efficient computation. B. Chazelle

COS 342 Introduction to Graph Theory (see MAT 306)

COS 375 Computer Architecture and Organization (also ELE 375)   Fall
An introduction to computer architecture and organization. Instruction set design; basic processor implementation techniques; performance measurement; caches and virtual memory; pipelined processor design; design trade-offs among cost, performance, and complexity. Two 90-minute classes, one self-scheduled hardware laboratory. Prerequisites: 217 and 306. D. Clark

COS 397 Junior Independent Work (B.S.E. candidates only)   Fall
Offered in the fall, juniors are provided with an opportunity to concentrate on a "state-of-the-art" project in computer science. Topics may be selected from suggestions by faculty members or proposed by the student. B.S.E. candidates only. V. Pai

COS 399 Junior Independent Work (B.S.E. candidates only)   Spring
Offered in the spring, juniors are provided with an opportunity to concentrate on a "state-of-the-art" project in computer science. Topics may be selected from suggestions by faculty members or proposed by the student. B.S.E. candidates only. V. Pai

COS 401 Introduction to Machine Translation (see TRA 301)

COS 402 Artificial Intelligence   Fall
The fundamental principles, algorithms, and techniques of modern artificial intelligence research and practice. Likely topics include: problem solving using search, game playing, logical inference, probabilistic reasoning in the presence of uncertainty, hidden Markov models, speech recognition, Markov decision processes, machine learning. Two 90-minute lectures. Prerequisite: 226. R. Schapire

COS 423 Theory of Algorithms   Spring
Design and analysis of efficient data structures and algorithms. General techniques for building and analyzing
algorithms. Introduction to NP-completeness. Two 90-minute lectures. Prerequisites: 226 and 341 or instructor's permission. R. Tarjan

COS 425 Database and Information Management Systems  Not offered this year

Theoretical and practical aspects of database systems and systems for accessing and managing semi-structured information (e.g., Web information repositories). Topics include: relational and XML models, storage and indexing structures, query expression and evaluation, concurrency and transaction management, search effectiveness. Two 90-minute lectures. Prerequisites: 217 and 226. A. LaPaugh

COS 426 Computer Graphics  Spring

The principles underlying the generation and display of graphical pictures by computer. Hardware and software systems for graphics. Topics include: hidden surface and hidden line elimination, line drawing, shading, half-toning, user interfaces for graphical input, and graphic system organization. Two 90-minute lectures. Prerequisites: 217 and 226. S. Rusinkiewicz

COS 429 Computer Vision  Not offered this year

An introduction to the concepts of 2D and 3D computer vision. Topics include low-level image processing methods such as filtering and edge detection; segmentation and clustering; optical flow and tracking; shape reconstruction from stereo, motion, texture, and shading. Throughout the course, there will also be examination of aspects of human vision and perception that guide and inspire computer vision techniques. Prerequisites: 217 and 226. Two 90-minute lectures. S. Rusinkiewicz

COS 432 Information Security  Fall

Security issues in computing, communications, and electronic commerce. Goals and vulnerabilities; legal and ethical issues; basic cryptography; private and authenticated communication; electronic commerce; software security; viruses and other malicious code; operating system protection; trusted systems design; network security; firewalls; policy, administration and procedures; auditing; physical security; disaster recovery; reliability. Prerequisites: 217 and 226. Two 90-minute lectures. E. Felten

COS 433 Cryptography (also MAT 443)  Not offered this year

An introduction to modern cryptography with an emphasis on fundamental ideas. The course will survey both the basic information and complexity-theoretic concepts as well as their (often surprising and counter-intuitive) applications. Among the topics covered will be private key and public key encryption schemes, digital signatures, pseudorandom generators and functions, chosen ciphertext security; and time permitting, some advanced topics such as zero knowledge proofs, secret sharing, private information retrieval, and quantum cryptography. Prerequisites: 226 and 341 recommended, or permission of instructor. Two 90-minute lectures. B. Barak

COS 435 Information Retrieval, Discovery, and Delivery  Spring

This course studies both classic techniques of indexing documents and searching text, and also new algorithms that exploit properties of the World Wide Web, digital libraries, and multimedia collections. There is significant emphasis on current methods employed by Web search engines, including methods of employing user profiles to enhance search results. Pragmatic issues of handling very large amounts of information that may be widely dispersed--caching, distributed storage, and networking technology--are also covered. Prerequisite: 226. Two 90-minute lectures. A. LaPaugh

COS 436 Human-Computer Interface Technology (also ELE 469)  Not offered this year

This course covers hardware, sensors, displays, software, signal processing, pattern recognition, real-time computing, systems, and architectures for human computer interfacing. Labs supplement lectures and readings, and final group projects are executed and tested. Prerequisite: COS 217 or ELE 302. Two 90-minute lectures. Staff

COS 441 Programming Languages  Fall

How to design and analyze programming languages and how to use them effectively. Functional programming languages, object-oriented languages; type systems, abstraction mechanisms, operational semantics, safety and security guarantees. Implementation techniques such as object representations and garbage collection will also be covered. Three lectures. A. Appel

COS 444 Internet Auctions: Theory and Practice  Not offered this year SA

The goal of this course is to connect auction theory to real-world auctions. Basic results will be derived and illustrated with experiments in class and observations of behavior on the Internet. Topics include: current Internet auctions, Vickrey auctions, dominant strategies, equilibrium behavior, revenue equivalence, optimal auctions, multi-unit auctions, efficiency, mechanism design, risk aversion, spite, collusion, wars, fraud, ethical and legal considerations. Prerequisites: 226 and 217; or ECO 310; or instructor's permission. Two 90-minute lectures. K. Steiglitz

COS 451 Computational Geometry  Spring

Introduction to basic concepts of geometric computing, illustrating the importance of this new field for computer graphics, solid modelling, robotics, databases, pattern recognition, and statistical analysis. Algorithms for geometric problems. Fundamental techniques, for example, convex hulls, Voronoi diagrams, intersection problems, multidimensional searching. Two 90-minute lectures. Prerequisites: 226 and 340 or 341, or equivalent. B. Chazelle

COS 455 Introduction to Genomics and Computational Molecular Biology (see MOL 455)
COS 461 Computer Networks  Spring
This course studies computer networks and the services built on top of them. Topics include packet-switch and multi-access networks, routing and flow control, congestion control and quality-of-service, Internet protocols (IP, TCP, BGP), the client-server model and RPC, elements of distributed systems (naming, security, caching) and the design of network services (multimedia, peer-to-peer networks, file and Web servers, content distribution networks). Two 90-minute lectures. Prerequisite: 217. M. Freedman

COS 462 Design of Very Large-Scale Integrated (VLSI) Systems (see ELE 462)

COS 463 Computer-Aided Design of Digital Systems (see ELE 463)

COS 475 Computer Architecture (see ELE 475)

COS 487 Theory of Computation (also MAT 447)  Fall
Studies the limits of computation by identifying tasks that are either inherently impossible to compute, or impossible to compute within the resources available. Introduces students to computability and decidability, Gödel's incompleteness theorem, computational complexity, NP-completeness, and other notions of intractability. This course also surveys the status of the P versus NP question. Additional topics may include: interactive proofs, hardness of computing approximate solutions, cryptography, and quantum computation. Two lectures, one precept. Prerequisite: 340 or 341, or instructor's permission. S. Arora

COS 495 Special Topics in Computer Science  Not offered this year
These courses cover one or more advanced topics in computer science. The courses are offered only when there is an opportunity to present material not included in the established curriculum; the subjects vary from term to term. Three classes. Staff

COS 496 Special Topics in Computer Science  Not offered this year
These courses cover one or more advanced topics in computer science. The courses are offered only when there is an opportunity to present material not included in the established curriculum; the subjects vary from term to term. Three classes. Staff

COS 497 Senior Independent Work (B.S.E. candidates only)  Fall
Offered in the fall, seniors are provided with an opportunity to concentrate on a "state-of-the-art" project in computer science. Topics may be selected from suggestions by faculty members or proposed by the student. B.S.E. candidates only. V. Pai

COS 498 Senior Independent Work (B.S.E. candidates only)  Spring
Offered in the spring, seniors are provided with an opportunity to concentrate on a "state-of-the-art" project in computer science. Topics may be selected from suggestions by faculty members or proposed by the student. B.S.E. candidates only. V. Pai

http://www.princeton.edu/ua/
Department of Computer Science - B.S.E.

Chair
Andrew W. Appel

Associate Chair
Vivek S. Pai

Departmental Representative
David P. Walker

Director of Graduate Studies
Jennifer L. Rexford

Professor
Andrew W. Appel
Sanjeev Arora
Bernard Chazelle
Douglas W. Clark
David P. Dobkin
Edward W. Felten, also Woodrow Wilson School
Thomas A. Funkhouser
Brian W. Kernighan
Andrea S. LaPaugh
Kai Li
Larry L. Peterson
Jennifer L. Rexford
Robert E. Schapire
Robert Sedgewick
Jaswinder Pal Singh
Kenneth Steiglitz
Robert E. Tarjan

Associate Professor
David I. August
Boaz M. Barak

Moses S. Charikar
Adam Finkelstein
Vivek S. Pai
Szymon M. Rusinkiewicz
Mona Singh, also Lewis-Sigler Institute for Integrative Genomics
Olga G. Troyanskaya, also Lewis-Sigler Institute for Integrative Genomics
David P. Walker

Assistant Professor
David M. Blei
Michael J. Freedman

Senior Lecturer
Kevin Wayne

Lecturer
Robert M. Dondero Jr.

Associated Faculty
Mung Chiang, Electrical Engineering
Ingrid C. Daubechies, Mathematics
Leonid Kruglyak, Ecology and Evolutionary Biology, Lewis-Sigler Institute for Integrative Genomics
Paul Lansky, Music
Ruby B. Lee, Electrical Engineering
Margaret R. Martonosi, Electrical Engineering
Jeremiah P. Ostriker, Astrophysical Sciences
Paul D. Seymour, Mathematics
Daniel L. Trueman, Music
Robert J. Vanderbei, Operations Research and Financial Engineering

Information and Departmental Plan of Study

The Department of Computer Science curriculum encourages students to learn fundamental concepts of the discipline and to become proficient in the use of advanced computer systems. The plan provides opportunities for study in software systems, algorithms and complexity, machine architecture, computer graphics, and other core areas of computer science. Most computer science students enjoy programming and are given ample opportunity to do so within the curriculum.

Information for First-Year Students. Students with a general interest in the sciences or engineering are encouraged to take 126 in the first year or in the first semester of the second year. This provides useful background for applications work in any science or engineering major and preserves the option of later electing a computer science major.

Prerequisites

All students must meet the general requirements set by the School of Engineering and Applied Science. Students must complete 126, 217, and 226. Students who do not take both 217 and 226 before the junior year will need to plan their programs carefully, as one or both of these are required prerequisites for all later computer science courses.

Departmental Requirements

Eight additional departmental courses at or above the 300 level must be elected. These eight courses must include two each from the following three areas (asterisk indicates one-time-only course):

Theoretical computer science:

340 Reasoning about Computation
342 Introduction to Graph Theory (see MAT 306)

http://www.princeton.edu/ua/
Students should consult with a departmental adviser on their course selections after they decide to become computer science concentrators. Students interested in graduate study in computer science are strongly advised to take 318, 320, 340, 375, 423, and 487.

**Independent Work**

All B.S.E. concentrators engage in independent work supervised by a member of the department, often associated with a research project. It may require a significant programming effort, a theoretical study involving the design and analysis of algorithms, or an applications problem in some other field. The results of these efforts must be presented in a written report. B.S.E. students must elect one semester of independent work by enrolling in 397, 398, 497, or 498. One additional semester of independent work may be counted as one of the departmental courses.

The department also offers a curriculum leading to the A.B. degree [add hyperlink]. The primary differences between the A.B. and the B.S.E. programs are in the general requirements for the degree programs, and the nature and extent of independent study.

**Integrated Science Sequence**

An alternative path into the department is through the integrated science curriculum. ISC/CHM/COS/MOL/PHY 231-4 (a double course) can be taken in the freshman year and ISC/CHM/COS/MOL/PHY 235/6 can be taken in the sophomore year. These courses can be substituted for CHM 203/204, PHY 103/104 or 105/6, and COS 126 in the freshman year and MOL 214, 342, and 345 in the sophomore year. For full course descriptions and more information, see the integrated science website.

**Interdisciplinary Studies.** The pervasive nature of modern computing has introduced many interactions between computer science and other disciplines. Basic preparation in computer science is valuable for a broad variety of careers because of the central role played by the computer in society. Professionals who understand computers are far more effective in their work. In the past, a large amount of technical preparation was required before interesting applications could be considered; today's undergraduates are able to use computers to study important problems in other disciplines.

Some possible areas for interdisciplinary study are: mathematics, music, art, economics, molecular biology, cognitive studies, and linguistics, and any of the departments and programs within the School of Engineering and Applied Science.

Many Princeton undergraduates view their four years at Princeton as an opportunity to gain an education before immersing themselves in rigorous training for careers in law, business, or medicine. Computer science students are no exception. Through the choice of electives, students may create a specialized interdisciplinary program or a broad program with computer science as the core of preprofessional study. The former requires consultation with advisers in the related disciplines to determine what constitutes a reasonable cognate specialization, and the latter is constrained by the requirement of a coherent program of concentration.

**Program in Applications of Computing.** Students pursuing some other major field of study, but who are interested in the applications of computer science to that field, may wish to consider the Program in Applications of Computing.

**Program in Quantitative and Computational Biology.** The Program in Quantitative and Computational Biology (QCB) is designed for students with a strong interest in multidisciplinary and systems-level approaches to understanding molecular, cellular, and organismal behavior. The curriculum introduces the students to experimental
and analytic techniques for acquisition of large-scale quantitative observations, and the interpretation of such data in the context of appropriate models. Strong emphasis is placed on using global genome-wide measurements (e.g., microarray gene expression, sequence, phenotype) to understand physiological and evolutionary processes. At the core of the curriculum is the Project Lab (QCB 301), a double laboratory course, taken during the fall of junior year, where students participate in the design, execution, and analysis of experiments. The required courses provide a strong background in modern methodologies in data analysis, interpretation, and modeling. Courses are chosen with the help of advisers in molecular biology, ecology and evolutionary biology, physics, chemistry, computer science, and other related departments. A certificate in quantitative and computational biology is awarded to students who successfully complete the program requirements.

Courses

COS 109 Computers in Our World (also EGR 109)  Fall QR
Computers are all around us. How does this affect the world we live in? This course is a broad introduction to computing technology for humanities and social science students. Topics will be drawn from current issues and events, and will include discussion of how computers work, what programming is and why it is hard, how the Internet and the Web work, security and privacy. Two 90-minute lectures. Self-scheduled computer laboratory. B. Kernighan

COS 116 The Computational Universe (also EGR 116)  Spring ST
Computers have brought the world to our fingertips. This course explores at a basic level the science "old and new" underlying this new computational universe: propositional logic of the ancient Greeks (microprocessors); quantum mechanics (silicon chips); network and system phenomena (internet and search engines); computational intractability (secure encryption); and efficient algorithms (genomic sequencing). Ultimately, this study makes us look anew at ourselves: our genome; language; music; "knowledge"; and, above all, the mystery of our intelligence. Two 90-minute lectures, one three-hour laboratory. A. Finkelstein

COS 126 General Computer Science (also EGR 126)  Fall, Spring QR
An introduction to computer science in the context of scientific, engineering, and commercial applications. The goal of the course is to teach basic principles and practical issues, while at the same time preparing students to use computers effectively for applications in computer science, physics, biology, chemistry, engineering, and other disciplines. Topics include: hardware and software systems; programming in Java; algorithms and data structures; fundamental principles of computation; and scientific computing, including simulation, optimization, and data analysis. No prior programming experience required. Two lectures, two classes. R. Sedgewick, K. Wayne

COS 217 Introduction to Programming Systems  Fall, Spring QR
An introduction to computer organization and system software. The former includes topics such as processor and memory organization, input/output devices, and interrupt structures. The latter includes assemblers, loaders, libraries, and compilers. Programming assignments are implemented in assembly language and C using the UNIX operating system. Three lectures. Prerequisite: 126 or instructor's permission. J. Singh, J. Rexford

COS 226 Algorithms and Data Structures  Fall, Spring QR
The study of fundamental data structures such as lists, queues, stacks, trees, heaps, hash tables, and their variations. The implementation and analysis of important algorithms for sorting, searching, string processing, geometric applications, and graph manipulation. Introduction to advanced algorithms and techniques. Two lectures, one preceptorial. Prerequisite: 126 or instructor's permission. R. Sedgewick

COS 231 An Integrated, Quantitative Introduction to the Natural Sciences I (see ISC 231)

COS 232 An Integrated, Quantitative Introduction to the Natural Sciences I (see ISC 232)

COS 233 An Integrated, Quantitative Introduction to the Natural Sciences II (see ISC 233)

COS 234 An Integrated, Quantitative Introduction to the Natural Sciences II (see ISC 234)

COS 235 An Integrated, Quantitative Introduction to the Natural Sciences III (see ISC 235)

COS 236 An Integrated, Quantitative Introduction to the Natural Sciences IV (see ISC 236)

COS 306 Introduction to Logic Design (see ELE 206)

COS 314 Computer and Electronic Music through Programming, Performance, and Composition (see MUS 314)

COS 318 Operating Systems  Fall
A study of the design and analysis of operating systems. Topics include: processes, mutual exclusion, synchronization, semaphores, monitors, deadlock prevention and detection, memory management, virtual memory, processor scheduling, disk management, file systems, security, protection, distributed systems. Two 90-minute lectures. Prerequisites: 217 and 226 or instructor's permission. K. Li, A. Bavier

COS 320 Compiling Techniques  Spring

http://www.princeton.edu/ua/
The principal algorithms and concepts associated with translator systems. Topics include lexical analysis, syntactic analysis, parsing techniques, symbol table management, code generation and optimization, run time system design, implementation issues related to programming language design. Course will include a large-scale programming project utilizing the above topics. Three lectures. Prerequisites: 217 and 226 or instructor's permission. D. August

COS 323 Computing for the Physical and Social Sciences Fall QR

Principles of scientific computation, driven by current applications in biology, physics, economics, engineering, etc. Topics include: simulation, integration of differential equations, iterative optimization algorithms, stability and accuracy issues. Students will pursue projects in a variety of fields, writing their own computer programs and also using higher-level tools such as Maple. Prerequisite: COS 126 and MAT 104, or instructor’s permission. Two 90-minute lectures. K. Steiglitz

COS 325 Transforming Reality by Computer (also MUS 315) Not offered this year LA

Capturing and transforming sound by computer for artistic purposes. Emphasis is on the student's own creative use of aural material from the real world, on providing a basic foundation in the signal processing theory and technique most useful for computer music, and on the interaction between the artistic and scientific aspects of the endeavor. Two 90-minute lectures, one preceptorial, one laboratory. Prerequisites: 217 and MAT 104. Offered alternate years. Staff

COS 333 Advanced Programming Techniques Spring

The practice of programming. Emphasis is on the development of real programs, writing code but also assessing tradeoffs, choosing among design alternatives, debugging and testing, and improving performance. Issues include compatibility, robustness, and reliability, while meeting specifications. Students will have the opportunity to develop skills in these areas by working on their own code and in group projects. Two 90-minute lectures. Prerequisites: 217 and 226 (as corequisite). B. Kernighan

COS 340 Reasoning about Computation Fall QR

An introduction to mathematical topics relevant to computer science. Combinatorics and probability will be covered in the context of computer science applications. The course will present a computer science approach to thinking and modeling through such topics as dealing with uncertainty in data and handling large data sets. Students will be introduced to fundamental concepts such as NP-completeness and cryptography that arise from the world view of efficient computation. B. Chazelle

COS 342 Introduction to Graph Theory (see MAT 306)

COS 375 Computer Architecture and Organization (also ELE 375) Fall

An introduction to computer architecture and organization. Instruction set design; basic processor implementation techniques; performance measurement; caches and virtual memory; pipelined processor design; design trade-offs among cost, performance, and complexity. Two 90-minute classes, one self-scheduled hardware laboratory. Prerequisites: 217 and 306. D. Clark

COS 397 Junior Independent Work (B.S.E. candidates only) Fall

Offered in the fall, juniors are provided with an opportunity to concentrate on a "state-of-the-art" project in computer science. Topics may be selected from suggestions by faculty members or proposed by the student. B.S.E. candidates only. V. Pai

COS 398 Junior Independent Work (B.S.E. candidates only) Spring

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The fundamental principles, algorithms, and techniques of modern artificial intelligence research and practice. Likely topics include: problem solving using search, game playing, logical inference, probabilistic reasoning in the presence of uncertainty, hidden Markov models, speech recognition, Markov decision processes, machine learning. Two 90-minute lectures. Prerequisite: 226. R. Schapire

COS 423 Theory of Algorithms Spring

Design and analysis of efficient data structures and algorithms. General techniques for building and analyzing algorithms. Introduction to NP-completeness. Two 90-minute lectures. Prerequisites: 226 and 341 or instructor’s permission. R. Tarjan

COS 425 Database and Information Management Systems Not offered this year

Theoretical and practical aspects of database systems and systems for accessing and managing semi-structured information (e.g., Web information repositories). Topics include: relational and XML models, storage and indexing structures, query expression and evaluation, concurrency and transaction management, search effectiveness. Two 90-minute lectures. Prerequisites: 217 and 226. A. LaPaugh

COS 426 Computer Graphics Spring
COS 429 Computer Vision  Not offered this year

An introduction to the concepts of 2D and 3D computer vision. Topics include low-level image processing methods such as filtering and edge detection; segmentation and clustering; optical flow and tracking; shape reconstruction from stereo, motion, texture, and shading. Throughout the course, there will also be examination of aspects of human vision and perception that guide and inspire computer vision techniques. Prerequisites: 217 and 226. Two 90-minute lectures. S. Rusinkiewicz

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Security issues in computing, communications, and electronic commerce. Goals and vulnerabilities; legal and ethical issues; basic cryptography; private and authenticated communication; electronic commerce; software security; viruses and other malicious code; operating system protection; trusted systems design; network security; firewalls; policy, administration and procedures; auditing; physical security; disaster recovery; reliability. Prerequisites: 217 and 226. Two 90-minute lectures. E. Felten

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This course covers hardware, sensors, displays, software, signal processing, pattern recognition, real-time computing, systems, and architectures for human computer interfacing. Labs supplement lectures and readings, and final group projects are executed and tested. Prerequisite: COS 217 of ELE 302. Two 90-minute lectures. Staff

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How to design and analyze programming languages and how to use them effectively. Functional programming languages, object-oriented languages; type systems, abstraction mechanisms, operational semantics, safety and security guarantees. Implementation techniques such as object representations and garbage collection will also be covered. Three lectures. A. Appel

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The goal of this course is to connect auction theory to real-world auctions. Basic results will be derived and illustrated with experiments in class and observations of behavior on the Internet. Topics include: current Internet auctions, Vickrey auctions, dominant strategies, equilibrium behavior, revenue equivalence, optimal auctions, multi-unit auctions, efficiency, mechanism design, risk aversion, spite, collusion, wars, fraud, ethical and legal considerations. Prerequisites: 226 and 217; or ECO 310; or instructor's permission. Two 90-minute lectures. K. Steiglitz

COS 451 Computational Geometry  Spring

Introduction to basic concepts of geometric computing, illustrating the importance of this new field for computer graphics, solid modelling, robotics, databases, pattern recognition, and statistical analysis. Algorithms for geometric problems. Fundamental techniques, for example, convex hulls, Voronoi diagrams, intersection problems, multidimensional searching. Two 90-minute lectures. Prerequisites: 226 and 340 or 341, or equivalent. B. Chazelle

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COS 462 Design of Very Large-Scale Integrated (VLSI) Systems (see ELE 462)

COS 463 Computer-Aided Design of Digital Systems (see ELE 463)
COS 475 Computer Architecture (see ELE 475)  
COS 487 Theory of Computation (also MAT 447)  Fall
Studies the limits of computation by identifying tasks that are either inherently impossible to compute, or impossible to compute within the resources available. Introduces students to computability and decidability, Godel's incompleteness theorem, computational complexity, NP-completeness, and other notions of intractability. This course also surveys the status of the P versus NP question. Additional topics may include: interactive proofs, hardness of computing approximate solutions, cryptography, and quantum computation. Two lectures, one precept. Prerequisite: 340 or 341, or instructor's permission. S. Arora

COS 495 Special Topics in Computer Science  Not offered this year
These courses cover one or more advanced topics in computer science. The courses are offered only when there is an opportunity to present material not included in the established curriculum; the subjects vary from term to term. Three classes. Staff

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Offered in the fall, seniors are provided with an opportunity to concentrate on a "state-of-the-art" project in computer science. Topics may be selected from suggestions by faculty members or proposed by the student. B.S.E. candidates only. V. Pai

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Program in Contemporary European Politics and Society

Director
Harold James

Executive Committee
Sandra L. Bermann, Comparative Literature
John W. Borneman, Anthropology
Jan T. Gross, History
Marie-Hélène Huet, French and Italian

Harold James, History, Woodrow Wilson School
Andrew Moravcsik, Politics, Woodrow Wilson School
Jan-Werner Müller, Politics
Philip G. Nord, History
Ezra N. Suleiman, Politics
Maurizio Viroli, Politics

The Program in Contemporary European Politics and Society, an affiliate of the Princeton Institute for International and Regional Studies, encourages the interdisciplinary study of modern Europe, with a particular focus on politics, economics, and society in western and central Europe since World War I. The program sponsors a core course and a noncredit thesis writers’ colloquium for seniors. In addition, it sponsors lectures, seminars, and other programs for the entire University community. The program offers a certificate in European politics and society.

Admission to the Program

Successful completion of EPS 300, 301, or 302, typically by the end of sophomore year.

Program of Study

Students who will receive a certificate in contemporary European politics and society must meet the following requirements:

1. Take one of the following courses: EPS 300, 301, or 302.

2. Take at least four other courses from the list of core courses that have an emphasis on European politics and society. Other courses may be approved by the director.

3. Of the four courses, at least one must be chosen from among offerings in history and at least one must be chosen from among offerings in the other social sciences.

4. Fulfill a language requirement by doing one of the following.

   a) Take a 200- or 300-level course in a European language.

   b) Demonstrate fluency in a European language by taking a test administered by the program. Any national language used in a European country may be used to satisfy the requirement. The expectation is that students will have sufficient linguistic competence to use research materials in the foreign language for their senior thesis research.

5. Participate in a senior thesis colloquium sponsored by the program.

6. Write a senior thesis on a subject related to contemporary European politics and society. Students majoring in departments where a senior thesis on modern Europe is not possible may petition the director to have another piece of independent research meet this requirement.

Study Abroad

Studying abroad at a European university is very strongly encouraged by the program. Living overseas is a critical part of gaining a perspective on a foreign society and in developing language fluency. Princeton participates in the Berlin Consortium, has linkages with the Fondation Nationale des Sciences Politiques-Institut d’études (Sciences Po) and the University of Oxford, and also allows students to study at many other European universities. The program allows students to count up to two of the courses they take at a European university toward their course requirement, if those courses pertain to modern European politics, economics, sociology, or 20th-century history.

Certificate of Proficiency

A student who has met requirements of the program and of his or her home department and has maintained satisfactory standing will receive a certificate of proficiency in European politics and society upon graduation.

NOTE: An asterisk indicates a one-time only course or topic.

1. Courses satisfying the history requirement
French and Italian

FRE 222 The Making of Modern France: French Literature, Culture, and Society from 1789 to the Present
FRE 330 Landmarks of French Culture and History
FRE 357 Literature, Culture, and Politics
FRE 367 Topics in 19th- and 20th-Century French Literature and Culture
ITA 309 Topics in Contemporary Italian Civilization

German

207 Studies in German Language and Style: Society, Politics, and Culture in Germany, 1890-1945
208 Studies in German Language and Style: Contemporary Society, Politics, and Culture
307 Topics in Modern German Culture and Society
309 Literature, Philosophy, and Politics in the Weimar Republic

History

212 Europe in the World: Monarchies, Nations, and Empires from 1776 to the Present
281 Approaches to European History
341 Between Resistance and Collaboration: The Second World War in Europe
351 France, 1815 to the Present
354 Intellectual History of Europe since 1880
357 Eastern Europe since 1815
362 The Soviet Empire
363 Mediterranean Europe: 16th to 20th Century
364 International Economic History in the 20th Century
365 Europe in the 20th Century
366 Germany since 1806
370 Britain 1815-1945: Dominance, Democracy, and Decline
*452 Communism and Dissent in Eastern Europe

2. Courses satisfying the social science requirement

Politics

371 Democracy in Europe
372 Political Economy of Western Europe
373 Central and East European Politics
375 Politics after Communism
389 Theory and Practice of International Diplomacy

Courses

EPS 300 European Politics and Society in the 20th Century (also POL 384)   Spring SA

The critical developments of 20th-century Europe and the consolidation of democracy in European countries, including the legacy of the two world wars, Nazism, Stalinism, the Cold War, colonialism and decolonization, the birth and development of the European Community, the development of the welfare state, the problems confronting the European Union (immigration, enlargement, political institutions, military role), and the varieties of democratic institutions in Europe. Two lectures, one preceptorial. J. Müller, P. Nord

EPS 301 Turning Points in European Culture (see ECS 301)

EPS 302 Landmarks of European Identity (also ECS 302)   Fall

This course gives a broad and interdisciplinary perspective on some of the very diverse cultural and historical roots of European identity. It examines contemporary debates over contested identity in the light of long historical trajectories in which identities were continually defined and reshaped. It is conceived as an introduction to many of the courses in Princeton dealing with European issues. The landmarks include, but are not restricted to, written texts. They include Machiavelli, Montesquieu, Marx, and J.S. Mill, but also Fra Angelico, Beethoven and Thomas Mann. One three-hour seminar. H. James

EPS 342 Topics in Country and Regional Economics (see ECO 372)
Program in Creative Writing

**Director**
Susan Wheeler (spring)

**Acting Director**
Paul B. Muldoon (fall)

**Executive Committee**
Jill S. Dolan, English, Lewis Center for the Arts, Theater
Jeffrey Eugenides, Lewis Center for the Arts
Sue Friedrich, Lewis Center for the Arts, Visual Arts
Chang-rae Lee, Lewis Center for the Arts
Susan Marshall, Lewis Center for the Arts, Dance
Paul B. Muldoon, Lewis Center for the Arts
Joyce Carol Oates, Lewis Center for the Arts
James Richardson, English, Lewis Center for the Arts, Creative Writing
Joseph S. Scanlan, Lewis Center for the Arts, Visual Arts
P. Adams Sitney, Lewis Center for the Arts, Visual Arts
Susan Wheeler, Lewis Center for the Arts
Edmund V. White, Lewis Center for the Arts
Stacy E. Wolf, Lewis Center for the Arts, Theater

**Professor**
Jeffrey Eugenides, also Lewis Center for the Arts
Chang-rae Lee, also Lewis Center for the Arts
Paul B. Muldoon, also Lewis Center for the Arts
Joyce Carol Oates, also Lewis Center for the Arts
James Richardson, also English
Edmund V. White, also Lewis Center for the Arts

**Visiting Professor**
Marie L. Moore

**Associate Professor**
Susan Wheeler

**Assistant Professor**
Tracy K. Smith

**Lecturer with Rank of Professor**
C. K. Williams

**Lecturer**
Susan M. Choi
Michael C. Dickman
Sheila M. Kohler
Christina Lazaridi
John McPhee
Susanna P. Moore
Brenda A. Shaughnessy
Whitney S. Terrell

**Visiting Lecturer**
Meghan E. O'Rourke
Mario Vargas-Llosa
Arch C. Whitehead

**Hodder Fellow**
Zuwena Packer
Cynthia Cruz

The Program in Creative Writing, part of the Lewis Center for the Arts, allows undergraduates to work with practicing writers while pursuing a regular liberal arts course of study. Students develop their writing skills; learn the possibilities of modern poetry, fiction, nonfiction, and screenwriting; and gain a special access to the critical understanding of literature through their involvement in the creative process.

Small workshop courses in poetry, fiction, and translation are taught by the program faculty, members of the Department of English, and visiting writers. These courses are limited in enrollment to ensure the benefits of working closely with faculty. Students begin the creative writing course sequence in either the fall or spring with 201, 202, 203, 204, 205, or 206. (Any creative writing course may be repeated for credit with a different instructor). Students who have taken two 200-level courses may apply for the 300 level.

Each workshop focuses on one genre only (poetry, fiction, or translation). Workshops meet for two hours weekly and are primarily devoted to the discussion of student work.

All creative writing program courses are graded pass/D/fail but are not counted in the pass/D/fail budget.

**Program of Study**

Students may earn a certificate in creative writing by successfully completing the following requirements:

1. Candidates for the certificate normally take two 200-level courses in creative writing by the end of sophomore year and two 300-level courses by the end of junior year, though a portion of this requirement may be waived in unusual circumstances. The courses need not be in a single genre; students are encouraged to experiment with kinds of writing new to them.

2. Students may earn a certificate in creative writing by writing a creative senior thesis (e.g., a novel, a collection of poems or stories, or a translation project) under the direction of program faculty.

During the spring term of junior year, candidates for the certificate apply to the Program in Creative Writing for permission to write a creative thesis. The application consists of a short form and an extensive portfolio of work in the relevant genre. Successful applicants are assigned an adviser they meet with weekly (poetry, translation) or every other week (fiction) throughout senior year.

Accepted students seek the permission from their home departments to use the creative thesis to satisfy departmental

http://www.princeton.edu/ua/
thesis requirements. For students in the Department of English creative writing track and Comparative Literature Program D, approval is routine, and several other departments have welcomed creative theses, but some students undertake the creative thesis as a "second thesis." Unlike creative writing workshops, which are pass/D/fail, theses receive letter grades.

**Certificate of Proficiency**

Students who fulfill the requirements of the program receive a certificate of proficiency in creative writing upon graduation.

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**Courses**

**CWR 201 Creative Writing (Poetry)  Fall LA**

Practice in the original composition of poetry supplemented by the reading and analysis of standard works. Each student is expected to prepare a manuscript each week. There will be a weekly workshop meeting and occasional individual conferences. Prerequisite: permission of instructor. Staff

**CWR 202 Creative Writing (Poetry)  Spring LA**

Practice in the original composition of poetry supplemented by the reading and analysis of standard works. Each student is expected to prepare a manuscript each week. There will be a weekly workshop meeting and occasional individual conferences. Prerequisite: permission of instructor. Staff

**CWR 203 Creative Writing (Fiction)  Fall LA**

Practice in the original composition of fiction supplemented by the reading and analysis of standard works. Each student is expected to prepare a manuscript at least every other week. There will be a weekly workshop meeting and occasional individual conferences. Prerequisite: permission of instructor. Staff

**CWR 204 Creative Writing (Fiction)  Spring LA**

Practice in the original composition of fiction supplemented by the reading and analysis of standard works. Each student is expected to prepare a manuscript at least every other week. There will be a weekly workshop meeting and occasional individual conferences. Prerequisite: permission of instructor. Staff

**CWR 205 Creative Writing (Literary Translation)  Fall LA**

Practice in the translation of literary works from another language into English supplemented by the reading and analysis of standard works. Each student is expected to prepare a manuscript each week. There will be a weekly workshop meeting and occasional individual conferences. Prerequisite: permission of instructor. Staff

**CWR 206 Creative Writing (Literary Translation)  Spring LA**

Practice in the translation of literary works from another language into English supplemented by the reading and analysis of standard works. Each student is expected to prepare a manuscript each week. There will be a weekly workshop meeting and occasional individual conferences. Prerequisite: permission of instructor. Staff

**CWR 215 Graphic Design (see VIS 215)**

**CWR 240 Creative Non-Fiction (see JRN 240)**

**CWR 301 Advanced Creative Writing (Poetry)  Fall LA**

Advanced practice in the original composition of poetry for discussion in regularly scheduled workshop meetings. Prerequisites: 201 or 202 and permission of instructor. Staff

**CWR 302 Advanced Creative Writing (Poetry)  Spring LA**

Advanced practice in the original composition of poetry for discussion in regularly scheduled workshop meetings. Prerequisites: 201 or 202 and permission of instructor. Staff

**CWR 303 Advanced Creative Writing (Fiction)  Fall LA**

Advanced practice in the original composition of fiction for discussion in regularly scheduled workshop meetings. Prerequisites: 203 or 204 and permission of instructor. Staff

**CWR 304 Advanced Creative Writing (Fiction)  Spring LA**

Advanced practice in the original composition of fiction for discussion in regularly scheduled workshop meetings. Prerequisites: 203 or 204 and permission of instructor. Staff

**CWR 305 Advanced Creative Writing (Literary Translation) (also COM 355)  Fall LA**

Advanced practice in the translation of literary works from another language into English supplemented by the reading
and analysis of standard works. Prerequisites: 205 or 206 and permission of instructor. Staff

CWR 306 Advanced Creative Writing (Literary Translation) (also COM 356) Spring LA
Advanced practice in the translation of literary works from another language into English supplemented by the reading and analysis of standard works. Prerequisites: 205 or 206 and permission of instructor. Staff

CWR 345 Special Topics in Creative Writing (also LAS 375/SPA 360) Fall LA
Students will gain special access to the critical understanding of literature through their involvement in the creative process. Topics include such specific genres as autobiography, non-fiction, and screenwriting. Students will be expected to prepare a manuscript at least every other week. Specific topics and prerequisites will vary. Staff

CWR 348 Screenwriting I: Screenwriting as a Visual Medium (also VIS 348/THR 348) Fall LA
Students will write a short silent film, then will revise it as a script with dialogue; then as a script with dialogue and voice-over. The subject will derive from a painting or photograph. They will write a second series of short films (silent, dialogue, and dialogue with voice-over) based on a model from world literature. Students will find a newspaper story and write a short film in which an act of violence occurs. They will adapt a short story or non-fiction article as a film treatment so that it reads like a description of an intended film, not a literary work. They will take the treatment and transform it into a short screenplay. Staff

CWR 401 Advanced Creative Writing Tutorial Not offered this year LA
Tutorials in the original composition of fiction, poetry, or translations, open to those who have demonstrated unusual commitment and talent through four terms of creative writing or who provide equivalent evidence of their capacity for advanced work. Open also to qualified graduate students. Individual conferences to be arranged. Staff

CWR 402 Advanced Creative Writing Tutorial Not offered this year LA
Tutorials in the original composition of fiction, poetry, or translations, open to those who have demonstrated unusual commitment and talent through four terms of creative writing or who provide equivalent evidence of their capacity for advanced work. Open also to qualified graduate students. Individual conferences to be arranged. Staff

CWR 448 Screenwriting II: Adaptation (also VIS 448/THR 448) Fall LA
An advanced-level course in screenwriting. Students will write a feature-length screenplay adapted from a work of fiction (a novel or novella) or non-fiction (a biography, history, or book of investigative journalism). Students will start the course by writing a prose piece in which they map out in detail the approach they will be taking, both in content and tone, to adapting the work they have chosen. Once the structure of the script has been laid out, students will write steadily throughout the term, allowing time for revision. C. Lazaridi
Program in Dance

Director
Susan Marshall

Executive Committee
Jill S. Dolan, English, Lewis Center for the Arts, Theater
Jeffrey Eugenides, Lewis Center for the Arts, Creative Writing
Su Friedrich, Lewis Center for the Arts, Visual Arts
Chang-rae Lee, Lewis Center for the Arts, Creative Writing
Susan Marshall, Lewis Center for the Arts
Paul B. Muldoon, Lewis Center for the Arts, Creative Writing
Joyce Carol Oates, Lewis Center for the Arts, Creative Writing

The Program in Dance, part of the Lewis Center for the Arts, familiarizes students with creative, performative, and analytical approaches to dance through exposure to professional choreographers, dancers, critics, and scholars. While pursuing a liberal arts education, students have the opportunity to undertake demanding, studio-based courses in dance with first-class dance professionals. The program provides advanced courses for the pre-professional dancer in addition to creating opportunities for students who have never danced. The creation of original work, both choreographic and written, is emphasized alongside rigorous technical training. The program supports multiple performance opportunities each year, ranging from full professional productions in the Berlind Theatre with choreography by faculty, guests, and students, to site-specific interdisciplinary thesis projects and independent experimental work. Students with a special, perhaps even a career interest in dance, can choose to earn a program certificate.

The curricular wing of the program offers courses in modern, contemporary, ballet, experimental and African dance techniques, repertory, and choreography, as well as in dance history, analysis, and criticism. The program also provides special interdepartmental performance collaborations as well as yearly interdisciplinary opportunities with the Atelier program. In addition, co-curricular ballet and modern classes are offered on a daily basis. Yearly short- and long-term visiting artists enhance curricular offerings by choreographing original work and staging the work of seminal choreographers for dance concerts, or by offering special workshops, seminars, and master classes.

Admission to the Program

Program courses are open to all undergraduates. Past experience in dance is not a requirement for admission to introductory courses, but the program also offers sufficient intermediate and advanced classes, as well as co-curricular opportunities, such that the serious student will, upon graduation, be prepared for advanced study in the field.

Program of Study

A certificate from the Program in Dance will be awarded to students who successfully complete a substantial amount of work in the practical and academic areas of the discipline. Students should enroll in the certificate program during the second term of the sophomore year, but no later than the start of the second term of the junior year. At least two of the required courses, including one from the program listing, should be completed before enrollment in the certificate program.

To obtain a certificate in dance, students need to complete: (1) four studio courses above the introductory level, two must be performance courses: DAN 319/419/420 or Atelier; (2) one course in dance history and criticism: DAN 321 Special Topics in Dance History, Criticism, and Aesthetics offered spring semester only; (3) two additional performances during the junior and/or senior year with a guest choreographer or in a dance-based Atelier; (4) two semesters of twice weekly co-curricular ballet or modern class; and (5) 20 hours of technical work in assisting the dance program’s productions. Students have the option of completing an independent creative project in dance as part of the program.

Students are encouraged to self-design programs with an interdisciplinary focus. All substitutions of requirements will be determined in consultation with the program director.

Advanced Creative Work. The program offers all students the opportunity to do advanced creative work under the supervision of its faculty. These projects may be pursued as extracurricular activities, or they may be used to fulfill the requirement for independent work in the certificate program. With permission of the student’s department of concentration, such a project may also satisfy one of the requirements for independent work in the department, in which case it must consist of or be accompanied by written work, such as a scholarly or critical evaluation. Past independent projects have included performances in the Berlind Theatre, site specific productions in Chancellor Green Rotunda, and video installations. Often, senior certificate dancers choose dance to be the topic of their departmental thesis. For example an anthropology concentrator chose as her thesis subject Sri Lankan dance, a comparative literature thesis explored links between poetry and dance theories, and other certificate students have looked at dance from the viewpoint of computer science, mathematics, neuroscience, and music.

http://www.princeton.edu/ua/
Certificate of Proficiency

Students who fulfill the requirements of the program receive a certificate of proficiency in dance upon graduation.

Courses

DAN 209 Introduction to Movement and Dance  Fall, Spring LA

A mix of movement techniques, improvisation, and composition. Students with no previous dance training will learn how to recognize their own movement potential and how to build their own dances. The essential principles and evolution of 20th-century modern and post-modern dance will be studied through readings and viewings of live and videotaped dance performances. Two two-hour classes. E. Weeks

DAN 211 The American Dance Experience and Africanist Dance Practices (also AAS 211)  Spring LA

A studio course introducing students to American dance aesthetics and practice, with a focus on how American dance has been influenced by African American choreographers and dancers. An ongoing study of movement practices from traditional African dances and those of the African diaspora, touching on American jazz dance, modern dance, and American ballet. Studio work will be complemented by readings, video viewings, guest speakers, and dance studies. Two two-hour classes. D. Harvey Salaam

DAN 219 Modern Dance: Beginning Technique and Choreography  Fall LA

The practice of primarily modern dance and some ballet techniques designed to further expand movement vocabulary and expressive range. Students will be introduced to the influence of Modernism on choreographic practices through structured improvisations, choreographic studies, viewing videotapes, and readings. Two two-hour classes in technique, one two-hour class in choreography. Staff

DAN 220 Modern Dance: Beginning/Intermediate Technique and Choreography  Spring LA

The practice of primarily modern dance and some ballet techniques designed to further expand movement vocabulary and expressive range. Students will be introduced to the influence of Modernism on choreographic practices through structured improvisations, choreographic studies, viewing videotapes, and readings. Two two-hour classes in technique, one two-hour class in choreography. Staff

DAN 304 Special Topics in Contemporary Practice (also THR 304)  Fall LA

Offers students the opportunity to gain a working knowledge of the ways in which dance, dance/theater, and body-based art are created and performed today. Primarily a studio course that stresses learning through doing. Students will have the opportunity to work with leading experimental creators. Topics, prerequisites, and formats will vary from year to year. Staff

DAN 309 Modern Dance: Intermediate Technique and Choreography  Spring LA

To understand and experience contemporary dance through technique, choreography, and reading. In technique, students will be encouraged to expand movement range and increase technical mastery as related to modern and contemporary dance practices. In choreography, students will be encouraged to create dances that articulate their independent vision in solo and group works. Readings about and viewings of live and videotaped dance from mid-20th century dance will supplement studio work and expand knowledge of historical and contemporary trends in the arts. Two two-hour classes in technique, one two-hour class in choreography. Staff

DAN 319 Dance Performance Workshop: Intermediate Repertory and Choreography  Fall LA

In the repertory component, students expand their understanding of the creative process, their technical ability, and expressive range through the development of an original dance, or reconstruction, created in collaboration with a faculty member. The choreography component guides students through improvisation to explore theme, concepts, and structures to develop a personal movement style. Students read essays about and view videos of major figures in 20th-century dance. Two two-hour repertory classes, one two-hour choreography class. Staff

DAN 321 Special Topics in Dance History, Criticism, and Aesthetics  Spring LA

Dance as a theatrical art form and/or a social practice. Topics might include a study of dance as an expression of personal, aesthetic, religious, social, and/or political concerns. Classes will be augmented by film, videos, music, guest speakers, occasional demonstrations, and studio work. One three-hour seminar. Staff

DAN 409 Contemporary Dance: Advanced Technique and Choreography  Spring LA

Advanced dance technique and choreography, with an emphasis on contemporary practices. In technique, students will be challenged to expand their movement range and increase their mastery in ways required by today's dance world. In choreography, students will explore the new territory pioneered by leading choreographers. Selected readings and viewings of live and videotaped dance from the late 20th century will supplement studio work and expand knowledge of contemporary trends in the arts. Two two-hour classes in technique, one two-hour class in choreography. Staff

DAN 419 Dance Performance Workshop: Advanced Repertory and Choreography  Fall LA

http://www.princeton.edu/ua/
Students will master the performance of a technically advanced choreographic work with the aim to further challenge their technical expertise, expressive range, and stylistic clarity. Students will also create choreography infusing movement invention with ideas informed by historical and contemporary dance practices. Two two-hour classes in repertory and one two-hour class in choreography. **Staff**

**DAN 420 Chamber Dance: Repertory and Choreography  Fall LA**

This course covers the study and performance of seminal historical and contemporary chamber dances ranging from solos to septets. It will emphasize performance techniques encouraging rich, subtle, and stylistically accurate renditions of the repertoire while fostering intelligent and imaginative artistic interpretations. Student choreography will be geared toward the creation of small ensembles; the study of existing master works will be done by viewing videotapes of the dance literature, attending live concerts, and reading and analyzing historical works. Two two-hours classes in repertory, one two-house class in choreography. **S. Marshall**

**DAN 431 Approaches to Ballet: Technique and Repertory  Spring LA**

A studio course in ballet technique and repertory for advanced and high intermediate students. This course will consist of a pre-professional ballet class and learning selections of classical, neo-classical, and contemporary ballet. It will be divided into four units, each focusing on a different ballet choreographer such as: Marius Petipa, George Balanchine, Christopher Wheeldon, and Mark Morris. Students will be coached by internationally known guest artists to master and understand the diverse styles of each piece of repertory learned. Readings and viewings of live and videotaped performances. Three two-hour classes. **T. Fehlandt**

**DAN 451 Princeton Atelier (see ATL 498)**
Department of East Asian Studies

The Department of East Asian Studies provides undergraduate concentrators with a broad-ranging knowledge of the languages and cultures of China, Japan, and Korea.

Information and Departmental Plan of Study

Concentrators are expected to achieve proficiency in one East Asian language through the third-year level and to take eight departmental courses. The departments must include the junior seminar, at least one course on premodern East Asia, any combination of two of the four courses HIS/EAS 207-208 and HUM/EAS/COM 233-234, and at least one course covering material outside of a student's primary area of language specialization. A single course may not be used to satisfy two requirements, with the exception of HIS 207 and HUM 233, either of which may be used to satisfy the requirement of a course on premodern Asia.

A minimum of six of the eight departmental must be EAS-prefixed courses. The remaining two departmentals may be chosen from EAS-prefixed courses, cognate courses, language courses at or above the 300 level (after the three-year proficiency requirement is fulfilled), or any language courses in a second East Asian language. Students entering the department with some degree of language proficiency may place out of all or part of the language requirement but still need to fulfill a minimum of eight departmentals.

Advanced Placement

Students seeking advanced placement should consult the departmental representative.

Prerequisites

Students entering the department must have completed at least one year (the 102 level) of language training and preferably completed 107 or its equivalent before the first term of their junior year.

Early Concentration

http://www.princeton.edu/ua/
Students who meet the prerequisites for entrance into the department may be admitted and begin their program of concentration in the second term of sophomore year.

**Independent Work**

**Junior Year.** In the fall term the student participates in the departmental junior seminar (EAS 300), and also writes a junior independent work. In the spring, the student writes a second junior independent work paper under the supervision of an appropriate faculty member. At the end of the junior year, the student begins to draft a proposal for the senior thesis.

**Senior Year.** Each student prepares a senior thesis in consultation with an appropriate member of the faculty. The senior thesis represents the culmination of the undergraduate curriculum. It should be an original contribution to scholarship on East Asia, based at least in part on source materials in the student's language of specialization.

**Senior Departmental Examination**

At the end of the spring term, the student appears before a faculty committee for an oral defense of the thesis. In addition, each senior will take written comprehensive examinations in two fields selected from the core areas of history, literature, culture, and society taught in the department. If the two fields concern the same country, one must be premodern and one modern. Sample questions will be provided.

**Study Abroad**

The Department of East Asian Studies offers varied opportunities for overseas study in East Asia. Majors, certificate students, and non-majors are encouraged to take advantage of intensive summer or year-long language study and/or internships. The programs hosted by East Asian studies are the intensive Chinese and Japanese language programs in Beijing, China, and Kanazawa, Japan. Upon graduation, students will normally find themselves prepared to begin graduate work at a higher level because of such foreign language experience and training. The department also encourages students to participate in extended internships or study programs in East Asia.

Scholarship aid is available to majors and non-majors for both summer and year-long programs. Students should contact the East Asian studies program office for these funding opportunities. Students should also contact the Office of International Programs about other sources of funding. Application deadlines are early in the academic year. More information is available from the directors of the Chinese, Japanese, and Korean language programs, or from the Department of East Asian Studies website.

**Certificate in Language and Culture**

A student majoring in a department other than East Asian studies may earn a certificate in Chinese, Japanese, or Korean by completing three or more language courses beyond the second-year level and one or more East Asian studies or cognate courses in linguistics, religion, history, or anthropology. Students must also complete a substantial piece of independent research based at least in part on Chinese, Japanese, or Korean sources dealing with aspects of East Asia. Its topic has to be in the humanities. The paper could be either an original piece of research or a junior paper or senior thesis. If such a junior paper or senior thesis is written for another department, at least half of the work has to be on East Asia. East Asian studies majors concentrating on one language can earn a language and culture certificate in the other, but may not also earn an East Asian studies program certificate. Students interested in earning a certificate should apply at the department office by the end of their junior year. Students may not earn both East Asian studies department and East Asian studies program certificates.

**Program in East Asian Studies.** Undergraduates who prefer to concentrate in other departments or programs, for example, anthropology, art and archaeology, history, politics, religion, or sociology, or in the Woodrow Wilson School of Public and International Affairs, can combine their work with the study of East Asian languages and civilizations through the Program in East Asian Studies.

**Cognates.** A list of cognate courses in other departments can be found on the departmental website.

**Courses**

**CHI 101 Elementary Chinese I  Fall**

An intensive introductory course in modern spoken and written Chinese, stressing oral-aural facility and the analysis of structure. Five hours of class. *C. Chou*

**CHI 102 Elementary Chinese II  Spring**

Continued intensive study of modern spoken and written Chinese, stressing listening, speaking, reading, writing, and the analysis of structure. Five hours of class. *Staff*

**CHI 103 Intensive Elementary Chinese  Fall**

An intensive course covering 101 and 102 in one semester for students with fair fluency and limited ability in reading
and writing. The course will emphasize reading and writing skills and the analysis of grammar. Prerequisite: instructor's permission (oral interview in Chinese). Five hours of class. Staff

CHI 105 Intermediate Chinese I  Fall
An intensive study of modern spoken and written Chinese, this course shifts the emphasis to the reading of contemporary Chinese dialogue. Five hours of class. Staff

CHI 105C Intermediate Chinese I in Beijing
A four-week summer intensive language course taught in Beijing, China, at Beijing Normal University. Students work on developing a strong foundation for modern spoken and written Chinese, with emphasis on the reading of contemporary Chinese dialogue. Admission by application. Prerequisite: 101-102, or equivalent. Five two-hour classes, five two-hour drill sessions, plus individual tutorial sessions. Staff

CHI 107 Intermediate Chinese II  Spring
Continuing the intensive study of modern spoken and written Chinese, this course shifts the emphasis to the reading of contemporary Chinese cultural and social issues. Five hours of class. Staff

CHI 107C Intermediate Chinese II in Beijing
A four-week summer intensive language course taught in Beijing, China, at Beijing Normal University, which is a continuation of 105C. This course continues the intensive study of modern spoken and written Chinese and includes the study of modern cultural and social issues. Admission by application. Prerequisite: 105C or equivalent. Five two-hour classes, five two-hour drill sessions, plus individual tutorial sessions. Staff

CHI 108 Intensive Intermediate Chinese  Spring
An intensive course that covers 105 and 107 in one semester for students who have completed 103. Conducted in Chinese, with emphasis on reading and writing. Prerequisite: 103 or instructor's permission. Five hours of class. Staff

CHI 301 Introduction to Classical Chinese I  Fall
Introduction to the grammar of classical Chinese through study of selections from ancient texts. Readings include the Analects and the Mencius. Prerequisite: 107 or 108, or instructor's permission. Four hours of classes, conducted in Chinese. J. Chiang

CHI 302 Introduction to Classical Chinese II  Spring
Continuation of 301. Introduction to the grammar of classical Chinese through study of selections from ancient texts. Readings include the Analects, the Mencius, Zhuangzi, and selections from Han historical texts and essays written in later periods. Four hours of classes, conducted in Chinese. J. Chiang

CHI 303 Third-Year Modern Chinese I  Fall
Designed to develop further the student's overall language skills through reading and discussion of contemporary affairs published in Chinese newspapers. Four hours of class, conducted in Chinese. Prerequisite: CHI 105-107, or instructor's permission. Staff

CHI 303C Third-Year Modern Chinese I in Beijing
A four-week summer intensive language course taught in Beijing, China, at Beijing Normal University. This course is designed for students who are interested in current political and social issues in China and Taiwan. Reading materials will be selected from newspapers of the People's Republic of China. Admission by application. Prerequisite: CHI 103-108, 105-107, or equivalent. Five two-hour classes, five two-hour drill sessions, plus individual tutorial sessions. Staff

CHI 304 Third-Year Modern Chinese II  Spring
A continuation of CHI 303, designed to improve the student's facility in written and oral expression through a close study of newspaper essays and commentaries. Four hours of class, conducted in Chinese. Prerequisite: CHI 303 or instructor's permission. Staff

CHI 304C Third-Year Modern Chinese II in Beijing
A four-week summer intensive language course taught in Beijing, China, at Beijing Normal University, which is a continuation of 303C. This course is designed to further improve the student's facility in written and oral expression through a close study of newspaper essays and commentaries. Prerequisite: 303C or equivalent. Five two-hour classes, five two-hour drill sessions, plus individual tutorial sessions. Staff

CHI 305 Intensive Third-Year Modern Chinese I  Fall
Designed for students who are interested in current political and social issues in Chinese affairs. Reading materials will be selected from newspapers of the People's Republic of China. Four hours of class, conducted in Chinese. Prerequisite: 103-108, or instructor's permission. Staff

CHI 306 Intensive Third-Year Modern Chinese II  Spring
A continuation of 305, designed to further improve the student's facility in written and oral expression through a close study of essays published in contemporary Chinese newspapers and magazines. Four hours of class, conducted in
Chinese. Prerequisite: 305 or instructor’s permission. **Staff**

**CHI 401 Advanced Classical Chinese I**  Not offered this year LA

Intensive introduction to classical Chinese through the study of selections from ancient texts. Four classes conducted in Chinese. **J. Chiang**

**CHI 402 Advanced Classical Chinese II**  Not offered this year LA

Continuation of 401. Intensive introduction to classical Chinese through the study of selections from ancient texts. Four classes conducted in Chinese. **J. Chiang**

**CHI 403 Fourth-Year Modern Chinese I**  Fall

Reading and discussion of selections from Chinese scholarly journals and newspapers on contemporary Chinese political, economic, and social issues. Four hours of class, conducted in Chinese. Prerequisite: 304 or instructor's permission. **Staff**

**CHI 403C Fourth-Year Modern Chinese I in Beijing**

A four-week summer intensive language course taught in Beijing, China, at Beijing Normal University. Readings and discussions from Chinese scholarly journals including essays and newspaper articles. Students are exposed to a variety of modern Chinese literary genres, as well as some of the major substantive issues that modern Chinese intellectuals have faced. Admission by application. Prerequisite: 303-304, 305-306, or equivalent. Five two-hour classes, five two-hour drill sessions, plus individual tutorial sessions. **Staff**

**CHI 404 Fourth-Year Modern Chinese II**  Spring

A continuation of 403. Reading and discussion of scholarly writings in the fields of Chinese literature and modern Chinese intellectual history. Four hours of class, conducted in Chinese. Prerequisite: 403, or instructor's permission. **Staff**

**CHI 404C Fourth-Year Modern Chinese II in Beijing**

A four-week summer intensive language course taught in Beijing, China, at Beijing Normal University, which is a continuation of 403C. Continued readings and discussion on academic written materials and scholarly writings on literature. This course also exposes students to the social issues China has faced in recent years while discussing various aspects of contemporary Chinese society. Prerequisite: 403C or equivalent. Five two-hour classes, five two-hour drill sessions, plus individual tutorials. **Staff**

**CHI 405 Intensive Fourth-Year Modern Chinese I**  Fall

Reading and discussion based on Chinese scholarly journals, popular essays, and newspaper articles. Students are exposed to a variety of modern Chinese literary genres, as well as some of the major substantive issues that modern Chinese intellectuals have faced. Four hours of class, conducted in Chinese. Prerequisite: 306 or instructor's permission. **Staff**

**CHI 406 Intensive Fourth-Year Modern Chinese II**  Spring

Continued reading and discussion of scholarly writings on modern Chinese literature. This course also exposes students to the social issues China has faced in recent years, while discussing various aspects of contemporary Chinese society. Four hours of class, conducted in Chinese. Prerequisite: 405 or instructor's permission. **Staff**

**CHI 411 Readings in Modern Chinese Intellectual History**  Fall LA

Designed to give students who have had advanced training in both classical and modern Chinese an opportunity for directed readings in their own fields. The focus of readings is modern Chinese intellectual history. One class, two hours of discussion, conducted in Chinese. Prerequisite: three or more years of modern Chinese, or instructor's permission. **C. Chou**

**CHI 412 Readings in Classic Chinese Short Stories**  Spring LA

Focuses on reading and discussing selections from Feng Menglong's Sanyan, the most popular and well-known collection of classic Chinese short stories published in the late 16th century. One class, two hours of discussion, conducted in Chinese. Prerequisite: three or more years of modern Chinese, or instructor's permission. **C. Chou**

**CHI 451C Fifth-Year Modern Chinese I in Beijing**

A four-week summer intensive language course taught in Beijing, China, at Beijing Normal University. Materials are drawn from modern Chinese literature, film, and intellectual history, and include readings on contemporary issues as well. Admission by application. Prerequisite: 403-404, 405-406, or equivalent. Five two-hour classes, five two-hour drill sessions, plus individual tutorial sessions. **Staff**

**CHI 452C Fifth-Year Modern Chinese II in Beijing**

A four-week summer intensive language course taught in Beijing, China, at Beijing Normal University, which is a continuation of 451C. Continued readings and discussion on modern Chinese literature, film, and intellectual history. This course, which is designed to bring students to near-native competence in all aspects of modern Chinese, prepares students for advanced research or employment in a variety of China-related fields. Admission by application. Prerequisite: 451C or equivalent. Five two-hour classes, five two-hour drill sessions, plus individual tutorial sessions.
EAS 207 History of East Asia to 1800 (see HIS 207)
EAS 208 East Asia since 1800 (see HIS 208)
EAS 217 The Arts of Japan (see ART 217)
EAS 221 Introduction to Modern Japanese Literature  Fall LA

The course will cover major writers and works of the 20th century. We will examine how Japanese writers responded to modern fictional and linguistic forms imported from the West, how they negotiated what they had inherited from their long and illustrious literary past, and how postwar writers view their newly "democratized" world. A. Ueda

EAS 225 Japanese Society and Culture (also ANT 225)  SA

An exploration of Japanese labor, gender and feminism, crime and social control, race and notions of homogeneity, nationalism and youth culture. The course considers Japan's struggle to come to terms with the West while at the same time integrating its past. It also looks at American misperceptions of Japanese society and economics. Two lectures, one preceptorial. A. Borovoy

EAS 226 The Religions of China (see REL 226)
EAS 228 Religion in Japanese Culture (see REL 228)
EAS 231 The Chinese Classics: A Comparative Approach (also HUM 231)  Not offered this year LA

Intensive reading and comparative analysis of canonic texts of classical Chinese learning, including Book of Changes, Book of Songs, Book of History; Confucian Analects. Texts will be related to parallel readings in Western scripture and classics, to pursue seminal patterns of conceptualization and expression in the two civilizations. One three-hour class. Staff

EAS 232 Introduction to Chinese Literature  Spring LA

The development of classical Chinese literature, traced through close readings of original texts in English translation. Topics include the nature of the Chinese language and writing system, classical literary thought, religious and philosophical influences, dominance of poetry, emergence of historical writing, and vernacular fiction. Two lectures, one preceptorial. Staff

EAS 233 East Asian Humanities I: The Classical Foundations (see HUM 233)
EAS 234 East Asian Humanities II: Tradition and Transformation (see HUM 234)

EAS 240 The Perception of China and Asia in the West (also HIS 240)  Not offered this year HA

Presents some of the major themes in the Western perception of China since 1250, from Marco Polo to Chairman Mao, and introduces students to the nature of history and historical writing. Students will be challenged to conduct their own critical historiographical analysis. Readings will focus on primary sources in translation and relevant secondary studies. Two lectures, one preceptorial. B. Elman

EAS 282 A Documents-based Approach to Asian History (see HIS 282)

EAS 300 Junior Seminar  Fall SA

Designed to introduce departmental majors, in the fall of their junior year, to the tools, methodologies, and topics related to the study of East Asian history and culture. The focus of the course will vary each year, and will be cross-national and multidisciplinary, covering both premodern and modern periods. One three-hour seminar. D. Leheny

EAS 303 Strategic Asia (see SOC 303)

EAS 320 Early Japanese History (also HIS 320)  Spring HA

The history of Japan from the origins of the Japanese people to the establishment of Tokugawa rule in 1600, using the epic war tale The Tale of the Heike as a lens. Particular emphasis will be placed on institutional and cultural history. One three-hour seminar. M. Collcutt

EAS 321 Early Modern Japan (also HIS 321)  Not offered this year HA

The history of Japan during the period of Samurai rule. Distinctive features of Tokugawa society and culture from the foundation of the regime in 1600 to its decline in the 19th century, the opening of Japan to Western contact, the course of economic development, and the consolidation of the Meiji State. Two lectures, one preceptorial. Staff

EAS 322 Buddhism in Japan (see REL 322)
EAS 324 20th-Century Japan (see HIS 322)

EAS 331 Chinese Poetry (also COM 331)  LA

Close reading of classical Chinese poetry through transliteration, word-to-word explication, notes on allusions and background, and literal translation. Discussion of Chinese theories of poetry and the comparison between Chinese and
Western poetic traditions. Knowledge of the Chinese language is not required or expected. One three-hour seminar. P. Wang

EAS 333 The Chinese Novel (also COM 333) Not offered this year LA

Extensive readings in the six "classic" Chinese novels: Romance of the Three Kingdoms, Water Margin, Golden Lotus, Journey to the West (Monkey), Story of the Stone (Dream of the Red Chamber), and The Scholars, in English translations. Discussions will focus on interpretive and comparative issues. One three-hour seminar. Alternates with 433. Staff

EAS 334 20th-Century Chinese Literature Fall, Spring LA

Analysis through selected literary works, mostly fiction, of authors' ideas, hopes, and worries about the fate of modern China. Consideration of literary technique and literary history and of the larger historical context. Readings in English. One lecture, one two-hour conference. Staff

EAS 335 Early Chinese History to 221 (also HIS 318) Not offered this year HA

History of China from the earliest times until the end of the first unified empire in A.D. 200. Political developments will be related to the underlying social and economic changes and the development of early systems of thought. Primary documents will be read in translation, where possible, and the results of recent archaeological discoveries will be related to the written record. Two lectures, one preceptorial. Staff

EAS 336 The Making and Transformation of Medieval China: 300-1200 (also HIS 319) Spring HA

This course provides a survey of the history of China from the dissolution of the first unified empire to the eve of the Mongol invasion. Key issues include the Tang-Song transformation, influence of Buddhism and Neo-Confucianism, the rise of literati culture, the development of autocratic rulership, and commercialism. Readings in English. Two lectures, one preceptorial. Staff

EAS 340 Culture and Society in Late Imperial China: 1000-1900 (also HIS 340) Not offered this year HA

A survey of the major cultural and social developments from early Song to high Qing that have particular relevance for understanding China in its modern predicament. Emphasis will be placed on the interplay between ideas and society, growth of new social institutions, emergence of classical elites and religious groups. Two lectures, one preceptorial. B. Elman

EAS 341 The Tale of Genji in the World Fall LA

Examination of selected literary texts from premodern and modern Japan and from contemporary Western critical writings. Topics will include modern interpretations of tradition, narrative as a mode of knowledge, translation and interpretation, and the general problems involved in the study of a non-Western literature. One three-hour seminar. Knowledge of Japanese is not required. R. Okada

EAS 343 Modern Japanese Literature: Early Years Spring LA

An introduction to major literary works in the early modern period when Japanese literature was attempting to re-establish itself through Western influences. Readings in English translation include works by Ogai, Soseki, Ichiyo, Toson, and Shiga. Topics include the evolution of modern Japanese fiction vis-a-vis the modernization of Japan, representations of self, individualism, and nationalism. Staff

EAS 344 Postwar Japanese Narrative: Modern to Postmodern (also COM 344) Spring LA

A critical survey of important literary, critical, and popular texts in postwar Japan. Readings and discussion of translated texts by writers and thinkers such as Kawabata, Oe, Maruyama, and Abe as well as by lesser-known women writers, avant-garde poets, and comic writers. Topics include the impact of war and urbanization, existentialism, ethnicity, postmodernism, and feminism. One three-hour seminar. A. Ueda

EAS 345 Sexuality and Desire in Modern Japan Spring LA

An examination of texts written by women in Japan during the premodern and modern periods in the context of feminist and cross-cultural criticism. The premodern period will focus on how we read products of a culture in which women had their own gendered discursive style. The modern period will focus on what happened when women found themselves negotiating a field dominated by a male- and Western-oriented writing establishment. Offered in alternate years. One three-hour seminar. R. Okada

EAS 346 The Chinese Economy (see ECO 379) EAS 354 Early Modern China (see HIS 324)

EAS 355 China, 1850 to the Present (see HIS 325)

EAS 415 Intellectual History of China to the Fifth Century (also HIS 415) Fall EM

Considers the developing repertoire of ideas in China to the end of the Qin period, with key philosophical, political, ethical, and scientific concepts treated in terms of their social context and subsequent influence. One three-hour seminar. A prior course in East Asian studies is desirable but not required. W. Peterson

EAS 416 Intellectual History of China from the Ninth to the 19th Century (also HIS 416) Spring HA

http://www.princeton.edu/ua/
The main facets and changes in the outlook of the intellectual elite in society and politics from the establishment of the literati in the 11th century to their survival under the Manchu conquest and incursions from Western powers. The focus is on the preservation of cultural integrity in the face of internal and external political and ideological challenges. One three-hour seminar. A prior course in East Asian studies is desirable but not required. W. Peterson

EAS 417 Modern Chinese Thought Fall HA
A systematic study of problems and concepts connected with the development of modern Chinese thought: antitraditionalism, the rise of Communism, the emancipation of women, the promotion of Western ideologies, and the process of modernization. Readings in English, with supplementary materials for students with reading knowledge of Chinese. One three-hour seminar. C. Chou

EAS 447 Introduction to Japanese Linguistics Fall SA
Introduction to the theories and techniques of linguistic analysis as applied to modern Japanese, with a focus on interface between language and culture. The course examines similarities and differences between Japanese and English. Knowledge of Japanese at least to the 105 level, or concurrent enrollment, is desirable. Two 90-minute classes. S. Makino

EAS 462 Special Topics in Public Affairs (see WWS 462)

JPN 101 Elementary Japanese I Fall
An introduction to modern Japanese stressing oral-aural facility but including an introduction to written Japanese. Two classes, three hours of drill and conversation. Staff

JPN 102 Elementary Japanese II Spring
A continuation of 101. An introduction to modern Japanese still stressing oral-aural facility but including an introduction to written Japanese. Prerequisite: 101. Two classes, three hours of drill and conversation. Staff

JPN 105 Intermediate Japanese I Fall
Continued intensive study of modern Japanese. This course will develop conversational skills. Audio- and videotaped materials will be used for aural comprehension. Prerequisite: 102 or equivalent. Five classes. H. Matsui, K. Loetscher

JPN 105J Intermediate Japanese I in Japan
A four-week intensive language course taught in Ishikawa, Japan, equivalent to 105. This course will develop conversational skills. Audio and videotaped materials will be used for aural comprehension. Prerequisite: 102 or equivalent. Five three-hour classes, extracurricular activities, and a trip. Staff

JPN 107 Intermediate Japanese II Spring
A continuation of 105. Continued study of modern Japanese. This course will develop conversational skills. Audio- and videotaped materials will be used to develop aural comprehension. Prerequisite: 105. Five classes. H. Matsui, K. Loetscher

JPN 107J Intermediate Japanese II in Japan
A four-week intensive language course taught in Ishikawa, Japan, equivalent to 107. A continuation of 105J. A continued intensive study of modern Japanese. This course is designed to further students' aural-oral skills. Emphasis will be increasingly on readings, and writing skills. Prerequisite: 105J or equivalent. Five three-hour classes and extracurricular activities. Staff

JPN 301 Advanced Japanese I Fall
Further reading in modern written Japanese with subsidiary grammatical and oral-aural training. The course covers some authentic materials and includes videotaped materials to increase oral-aural comprehension. Three 90-minute classes. Staff

JPN 301J Advanced Japanese I in Japan
A four-week intensive language course taught in Ishikawa, Japan, equivalent to 301. This course covers further reading on academic written Japanese. Authentic materials including videotaped materials to increase oral-aural comprehension. Five three-hour classes, extracurricular activities, and a trip. Staff

JPN 302 Advanced Japanese II Spring
A continuation of 301. Further reading in modern written Japanese with subsidiary grammatical and oral-aural training. The course covers some authentic materials and includes videotaped materials to increase oral-aural comprehension. Five three-hour classes, extracurricular activities, and a trip. Staff

JPN 302J Advanced Japanese II in Japan
A four-week intensive language course taught in Ishikawa, Japan, equivalent to 302. A continuation of 301J. The course covers some authentic materials including academic written materials, contemporary essays, and newspaper articles. Prerequisite: 301J or equivalent. Five three-hour classes and extracurricular activities. Staff

JPN 305 Integrative Advanced Japanese I Fall

http://www.princeton.edu/ua/
Designed to enhance reading, writing, and oral skills of students who need class work to achieve proficiency. Prerequisites: 302 or its equivalent. Four classes. Staff

JPN 306 Integrative Advanced Japanese II Spring
A continuation of 305. Designed to enhance reading, writing, and oral skills of students who need class work to achieve advanced proficiency level. Prerequisites: 302 or its equivalent. Four classes. Y. Tokumasu

JPN 401 Readings in Modern Japanese I Fall
Selected readings from short stories, essays, and newspapers. Three class hours, one conversation period. S. Makino

JPN 402 Readings in Modern Japanese II Spring
Selected readings from short stories, essays, and newspapers. Three classes, one conversation period. Prerequisite: 401 or instructor's permission. Staff

JPN 403 Introduction to Classical Japanese Not offered this year
Introduction to the fundamentals of classic Japanese grammar. This course trains students to read premodern Japanese historical and literary texts. Texts: *Taketori monogatari, Makura no soshi, Tosa Nikki*, etc. Prerequisite: two years of modern Japanese. Three hours. K. Ono

JPN 404 Readings in Classical Japanese Not offered this year
Close reading of selected premodern Japanese texts from Nara to Meiji. Texts: *Oku no hosomichi, Uji shui monogatari*, etc. Prerequisite: 403 or instructor's permission. Three hours. K. Ono

JPN 405 Readings in Selected Fields I Not offered this year
Designed to give students who have had advanced training in modern Japanese an opportunity for directed readings in their own fields. Three classes. Prerequisite: 402 or instructor's permission. Staff

JPN 406 Readings in Selected Fields II Not offered this year
Designed to give students who have had advanced training in modern Japanese an opportunity for directed readings in their own fields. Three classes. Prerequisite: 402 or instructor's permission. Staff

KOR 101 Elementary Korean I Fall
An intensive introduction to modern Korean, stressing balanced competence in four language skills. Five classes. J. Suh

KOR 102 Elementary Korean II Spring
A continuation of 101. Continued development of competence in basic communication. Prerequisite: KOR 101 Five classes. J. Suh

KOR 105 Intermediate Korean I Fall
A course intended for students who have learned the basics of Korean and who want to further their proficiency level. Continued development in four skill areas with increasing attention to complex functions of communication. Short stories and video strips will be incorporated. Five classes. J. Noh

KOR 107 Intermediate Korean II Spring
A continuation of 105. Intensive intermediate-level study of modern Korean with increasing attention to complex grammatical structures and practical vocabulary together with continued training in reading, writing, and conversation. Prerequisite: 105. Five classes. J. Noh

KOR 301 Advanced Korean I Fall
A course intended for active command of Korean through class discussions and short readings. Video strips will be integrated to stimulate discussions. Readings include different styles of writings on Korean society, culture, and literature. Practice in reading comprehension and writing is gradually emphasized. Approximately 100 hanjas are taught. Three classes. J. Noh

KOR 302 Advanced Korean II Spring
A continuation of 301. Emphasizes vocabulary learning and discourse functions. Simple technical materials written for the general audience are covered. Three classes. J. Noh

KOR 401 Contemporary Korean Language and Culture I Fall
A fourth-year language course designed to accelerate students' Korean proficiency to the high advanced level and to promote a deeper understanding of Korea and its people. Readings dealing with a variety of historical, cultural, and social topics in contemporary society are drawn from texts including newspaper articles, essays, and short literary works, as well as from various audiovisual materials. Class discussions conducted in Korean. Prerequisite: 302 or instructor's permission. Two 90-minutes classes or one three-hour seminar. J. Suh

http://www.princeton.edu/ua/
KOR 402 Contemporary Korean Language and Culture II  Spring LA

A continuation of 401 focusing on the relationship between Korean language and contemporary Korean society. Covers a wide range of sociolinguistic issues (i.e., gender, dialects, slang, honorific system, historical development of Korean, North and South Korean use of the language) through various media resources (e.g., TV drama, advertisements, commercials, newspapers, Internet, films, songs) as well as short stories and poems. Class discussions conducted in Korean. Prerequisite: 401, or instructor's permission. One three-hour seminar. J. Suh
The Program in East Asian Studies is an interdepartmental plan of study directed by representatives of the cooperating departments: anthropology, art and archaeology, comparative literature, East Asian studies, economics, history, politics, religion, sociology, and the Woodrow Wilson School of Public and International Affairs. It provides an opportunity for students who plan to major in the humanities, social sciences, or other disciplines simultaneously to pursue the study of an East Asian language and culture. The program's purpose is to educate internationally minded men and women with basic competence in an Asian area as well as to enhance the student's understanding of Western civilization through perspectives gained from the study of the non-Western world. The student's work is supervised by the appropriate representative of a cooperating department in consultation with the East Asian studies program director.

Students pursuing the program certificate are encouraged to take advantage of intensive summer language programs and of the numerous opportunities for study or travel in Asia, including an intervening year abroad. A limited amount of scholarship aid for this purpose is available. For a student whose career plans make it appropriate, the program will encourage a year of intensive study at an approved center in Asia, usually at Beijing, Kyoto, or Tokyo. To be eligible for consideration, a student completes two years' study of Chinese or Japanese by the end of junior year and must be nominated for scholarship assistance by the program committee. Upon returning to Princeton, the student makes use of Chinese or Japanese materials studied for the preparation of the senior thesis. At graduation the student is prepared to begin graduate work at a higher level because of the language training and experience gained abroad.

**Admission to the Program**

Students must satisfy the established requirements for admission to one of the cooperating departments, or to some other department with whose plan of study this interdepartmental program may, by special arrangement, be combined.

**Program of Study**

Students enrolled in the program must complete eight one-term courses in East Asian studies. No more than four of the eight one-term courses may be language courses; at least two of the language courses must be at the second-year level or higher. Applicable language and cognate courses are listed in the East Asian studies section of this announcement; successful completion of at least one 200-level East Asian studies cognate course is required. Additional courses, including those taken abroad, may count toward the certificate, but will need to be approved by the program office.

In addition to the course work, the student will submit a paper dealing with an area of East Asia, for which the use of Asian language sources is strongly recommended. The student may submit his/her senior thesis or substitute a junior paper or another substantial piece of original research that meets the same standards of relevance to Asia and use of Asian-language sources. The seminar for which a junior paper or independent research paper was written cannot count toward the course requirements for the certificate; it must be a ninth course.

**Certificate of Proficiency**

A student who has met the requirements of the program and of the cooperating department and has maintained satisfactory standing will receive a certificate of proficiency in addition to the A.B. degree.

Interested students are advised to contact the program office. For the most current information see the program's website.

**Courses**
EAP 201 The East Asian Challenge  SA

An interdisciplinary introduction to contemporary China, Japan, South Korea, Taiwan, Hong Kong, and Singapore. Methodologies are drawn from sociology, politics, economics, history, and anthropology. A foundation course for studying China, Japan, and Korea and comparing East Asia and the U.S. Two lectures, one preceptorial. Staff
Department of Ecology and Evolutionary Biology

Chair
Daniel I. Rubenstein

Departmental Representative
James L. Gould
Lars O. Hedin

Director of Graduate Studies
Bryan T. Grenfell

Professor
Andrew P. Dobson
James L. Gould
Bryan T. Grenfell, also Woodrow Wilson School
Lars O. Hedin, also Princeton Environmental Institute
Henry S. Horn
Leonid Kruglyak, also Lewis-Sigler Institute for Integrative Genomics
Laura F. Landweber
Simon A. Levin
Stephen W. Pacala
David L. Stern
David S. Wilcove, also Woodrow Wilson School

Visiting Professor
Robert M. May
William H. Schlesinger

Assistant Professor
Peter Andolfatto, also Lewis-Sigler Institute for Integrative Genomics
Iain D. Couzin
Andrea L. Graham

Senior Lecturer
Eileen Zerba

Lecturer with Rank of Professor
Stuart A. Altmann

Associated Faculty
Asif A. Ghazanfar, Psychology, Princeton Neuroscience Institute
Alan E. Mann, Anthropology
Ignacio Rodríguez-Iturbe, Civil and Environmental Engineering
Saeed Tavazoie, Molecular Biology, Lewis-Sigler Institute for Integrative Genomics
Bess B. Ward, Geosciences

Information and Departmental Plan of Study

Courses in the biological sciences at Princeton are offered in two departments. Students with an interest in whole-organism and large-scale processes—evolution (including molecular evolution and developmental evolution), physiology, disease, behavior, neuroscience, ecology, ecosystem biology, conservation, and climate change—should enroll in the Department of Ecology and Evolutionary Biology (EEB). Those with interests in molecular, cellular, and developmental processes should enroll in the Department of Molecular Biology (MOL). Both departments provide an excellent background for medical school.

The EEB department emphasizes research and teaching from an evolutionary perspective, combining theory and empiricism and linking areas that are often treated as separate disciplines. Many of the research projects and courses are interdisciplinary. A description of these core areas, faculty interests, and unique features of the program, including details about the department's field programs, can be found on the department's website.

Every student considering majoring in EEB should attend the departmental open house held in the spring term. It introduces potential majors to departmental courses, faculty, and the wide-ranging research and field-course opportunities open to students. See the department's website for examples of recent student research activities.

Advanced Placement

Advanced placement will be granted to students who received a 5 on the Biology AP exam. This excuses EEB majors from taking 211.

Prerequisites

The Department of Ecology and Evolutionary Biology requires the following prerequisites of its concentrators:

- Mastery of calculus to the level of MAT 102 or 103, or advanced placement (an AP score of 5 on the AB test or an AP score of 4 on the BC test);
- Two terms of introductory chemistry (or equivalent, or an AP score of 5);
- The first term of introductory physics (or the equivalent, or an AP score of 5; note that medical schools require two terms; physics can be delayed to the junior or senior year if necessary);
- An introductory statistics course (EEB 355 is preferred and counts as a departmental; other appropriate, but non-departmental, courses are: ECO 202; ORF 245; POL 345; PSY 251; or SOC 301);
- Two terms of introductory biology (an AP score of 5 can substitute for EEB 211, but not the second introductory course chosen, either EEB/MOL 214 or EEB/MOL 215).

Early Concentration

http://www.princeton.edu/ua/
Students who are passionate about solving problems in the areas of ecology, evolution, behavior, conservation, and disease may apply for early concentration in ecology and evolutionary biology. Students having advanced placement in biology and having taken at least one upper-level EEB course, in addition to having completed many of the department's required pre-and co-requisite courses with grades of at least B-, are eligible. Early concentrators will begin independent work during the spring of their sophomore year. Exploration of an interesting problem will commence with an intensive reading course culminating in the development of a research project that will be carried out in the laboratory, or at a field site, of a faculty mentor. Students interested in early concentration should contact a departmental representative at the end of the freshman year or at the start of the sophomore year.

**Program of Study**

**Requirements.** The following courses are required for graduation:

1. Students in ecology and evolutionary biology must successfully complete at least eight upper-level departmental courses, five of which must be EEB or MOL courses. One of the eight must be a lab course, 314, 324, 417B, and all field courses count as lab courses.

**Choice of Courses.** Students must take at least one course from each of the following three general areas:

- **Behavior and Physiology:** 301, 311, 314, 323, 350, 404, PSY 315;
- **Evolution and Genetics:** 309, 320, 360, 414, MOL 342;

2. **Organic chemistry:** CHM 301 or 303; (Students interested in mathematical biology may take one of the following courses instead of organic chemistry: PHY 203; MAT 200, 201, 202, 203, 204; COS 126, 226);

   Students may take 309, 321, and 323 in the fall term of junior year to sample all three areas. Pay particular attention to the timing of the courses that are taught in alternate years.

   No course taken pass/D/fail can be counted as a departmental. The minimum grade for a course to count as a departmental is C-. Only one course with a policy perspective can be counted as a departmental. Only Princeton courses can count as departmentals; the one exception is for pre-approved courses taken during a study abroad term.

**Special Features of the Plan of Study.** EEB offers three tropical field study programs: a semester in Panama, a semester in Kenya, and a summer in Bermuda. Details of these programs can be found on the department's website.

**Specializations.** Because some EEB students are interested in specializing within the department, EEB offers several areas of focus, the most common of which are listed below with their relevant courses.

- **Theoretical biology:** 309, 320, 321, 322, and 324;
- **Field biology:** 309, 311, 321, and a tropical field program;
- **Conservation biology:** 308, 309, 311, 321, 323, 417, and a tropical field program;
- **Medical biology:** 309, 311, 314, 321, 323, 327, and 328;

   Note: MOL 214 is required for medical school. A full year of physics is required for medical school and by some graduate programs (especially in neurobiology). A full year of organic chemistry is required for medical school, and is a prerequisite for many molecular biology courses; the second term also counts as an EEB departmental. At least one term of organic chemistry is usually required by graduate programs in biology. Completing the organic chemistry requirement before junior year is strongly recommended.

**Independent Work**

**Junior Independent Work.** Students attend a weekly junior tutorial in the first half of the fall term. Faculty members present summaries of their work and research opportunities open for senior independent work. During the second half of the fall term, students work closely with one faculty member to investigate a problem using the current literature, and then write a paper. In the spring semester, students carry out a program of independent work with a faculty adviser. In some instances this may include empirical or theoretical work. Either a paper summarizing this project or a research proposal for the senior thesis is due in early May.

**Senior Independent Work.** During the fall of the junior year each student selects a senior thesis adviser. The adviser and the student choose a research project that the student generally pursues during the summer preceding the senior year and both terms of the senior year. The research project can involve primarily laboratory, field, data mining, theoretical, or library study that will be written and presented as a senior thesis.

**Senior Departmental Examination**

A one-hour oral examination, consisting of a defense of the thesis research and general questions in the biological sciences, and a poster session, will be held in May.

**Tropical Field Programs.** Students interested in learning about or undertaking research in the tropics have a number of options.

1. **Panama.** The department offers a spring term in Panama in conjunction with the Smithsonian Tropical Research Institute. Students take four intensive three-week courses in sequence, beginning with an introduction of key concepts in tropical ecology and conservation, followed by a course that incorporates extensive field trips and research projects. The program continues with an anthropology course and a final three-week course on a particular aspect of tropical
biology. Prerequisite: EEB 321.

2. **Kenya.** This four-course program, also taught in three-week segments, takes place at Princeton University's Mpala Research Centre in central Kenya and other sites in Kenya, in collaboration with scientists there, EEB faculty, and other appropriate faculty from Princeton University. The courses delve into conservation in Africa, restoration ecology, the natural history of mammals, and global technology and engineering. Prerequisite: EEB 321.

3. **Bermuda.** During June, the department, along with the Bermuda Institute of Ocean Sciences, offers Marine Biology. This four-week course focuses on the ecology, physiology, and behavior of marine organisms, particularly from the coral reef. Almost half of the labs involve field trips to the reefs or intertidal zone. Prerequisite: EEB 211.

4. **Other.** Individual students are welcome to pursue other independent field opportunities, with scientists from the Smithsonian Institution and the Bermuda Institute of Ocean Sciences, or other research institutions, such as the School for Field Studies at the University of Cape Town, South Africa, or James Cook University in Australia.

**Program in Teacher Preparation.** As the need for qualified science teachers increases, some students may wish to earn a teaching certificate. Working with the departmental representative and the teacher preparation program, an appropriate course of study can be arranged.

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**Courses**

**EEB 210 Evolutionary Ecology (also MOL 210)**  Not offered this year ST

An introduction to the mechanisms and processes of population biology. Emphasis on understanding the structure, dynamics, and evolution of natural ecosystems, how plants and animals work and behave, and how genotypes and environments interact to mold evolutionary change. Counts toward requirements for entrance to medical school; premedical students as well as students planning to major in science or engineering will find 211 more appropriate. Three lectures, one class, one three-hour laboratory. *D. Rubenstein, S. Pacala*

**EEB 211 The Biology of Organisms (also MOL 211)**  Fall ST

An introduction to the biology of organisms and populations. Topics include evolution of life and biological diversity, physiology of plants and animals, neurobiology and behavior, ecology, evolution, and conservation biology. Counts toward requirements for entrance to medical school. Three lectures, one class, one three-hour laboratory. *J. Gould*

**EEB 214 Introduction to Cellular and Molecular Biology (see MOL 214)**

**EEB 215 Quantitative Principles in Cell and Molecular Biology (see MOL 215)**

**EEB 255 Life in the Universe (see GEO 255)**

**EEB 301 Evolution and the Behavior of the Sexes (also WOM 301)**  Not offered this year

Psychological, biological, and cross-cultural approaches to the study of sex and gender. Topics include biological components and development of sex differences; acquisitions of gender identity; social organization of key life cycle events; evolutionary considerations in the study of sex differences. One 90-minute lecture, one 90-minute class. *J. Altmann*

**EEB 305 Field Ecohydrology (see CEE 307)**

**EEB 306 Human Evolution (see ANT 206)**

**EEB 308 Conservation Biology**  Spring

A detailed application of ecological principles to the conservation of biological resources, including island biogeography, population genetics and viability, and landscape ecology. Analysis of case studies in conservation. Individual project on a conservation issue of the student's choice. Two lectures, one preceptorial. *Staff*

**EEB 309 Evolutionary Biology**  Fall

All life on Earth has evolved and continues to evolve. This course examines how natural selection generates biological diversity, how the genome enables and constrains particular evolutionary paths, and how the unthinking apparently selfish behavior of genes leads to altruistic behavior amongst individuals. The course examines the mechanisms of speciation and the causes of extinction. Evolution provides the glue that makes all the disparate facts in biology stick together. This course will provide the basic tools to understand how and why this is true. Three lectures, one preceptorial. Prerequisite: 210 or 211. *Staff*

**EEB 311 Animal Behavior**  Spring

An examination of the mechanisms and evolution of the behavior of human and other animals. Topics include the sensory worlds of animals, the nature of instinct, neural mechanisms of perception, comparative studies of communication, learning, cognition, mate choice, and social behavior, and the biology of human development and language acquisition. Two 90-minute lectures, one preceptorial. *J. Gould*

**EEB 312 Marine Biology (also ENV 312)**  ST

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[http://www.princeton.edu/ua/]
An intensive four-week course in Bermuda. Covers elements of the ecology, evolution, physiology, and behavior of marine organisms and ecosystems. Habitats examined will include the intertidal zone, seagrass beds, marshes, mangroves, and the open ocean, with special attention to coral reefs. Topics range from the physiology and behavior of individuals in the habitat, to the flow of energy, predator/prey interactions, symbioses, and population dynamics. Prerequisites: 210 or 211, ability to swim. Three hours of lectures, three hours of laboratory and field trips per day. J. Gould

EEB 314 Comparative Physiology  Spring

The study of how animals function with emphasis on the integration of physiological processes at the cellular, organ, and whole organism levels in ecological and evolutionary contexts. Comparisons among species and higher taxa are used to illustrate general physiological principles and their evolutionary correlates. Three lectures, one preceptorial. Prerequisite: 214. L. Landweber

EEB 315 Human Adaptation (see ANT 215)

EEB 320 Molecular Evolutionary Genetics (also MOL 330)  Spring

The use of DNA sequence comparisons to infer both micro- and macroevolutionary trends. Topics include the evolution of early life, eucaryotes, eucaryotic organelles, genome organization, protein synthesis, and intron processing. Three lectures, one preceptorial. Prerequisite: 210 or 211. Staff

EEB 321 Introduction to Population and Community Ecology  Fall

A comprehensive introduction to the ecology of populations, communities, and ecosystems. The course will first examine the dynamics of single-species populations of plants and animals. It will then examine the ecological interactions between pairs of species such as competition, mutualism, predation, parasitism, and herbivory. Finally, it will consider the dynamics and structure of whole communities of plants and animals. Two 90-minute lectures, one lab. Staff

EEB 322 Advanced Ecology  Not offered this year

An advanced overview of the structure of ecological communities, particularly temperate and tropical forests. Emphasis will be on factors governing species diversity and abundance on both local and global scales. Other topics will include the impact of humans on biodiversity at global scales, and the effects of biodiversity on the regulation of climate and the cycling of key elements such as carbon and nitrogen. Prerequisite: 321; one year of calculus recommended. Two 90-minute lectures, one preceptorial. S. Pacala

EEB 323 Integrative Dynamics of Animal Behavior  Fall

An exploration of the fundamental principles underlying the organization and function of animal behavior. This course will examine how complex actions emerge from simple rules. Since forces shaping behavior naturally cross scales and disciplinary boundaries, this course will draw on information from neuroscience, evolutionary biology, ecology, physiology, genetics, and the biology of complex systems. Two 90-minute lectures, one preceptorial. I. Couzin

EEB 324 Theoretical Ecology  Spring QR

Current and classical theoretical issues in ecology and evolutionary biology. Emphasis will be on theories and concepts and on mathematical approaches. Topics will include population and community ecology, epidemiology and evolutionary theory. Two lectures, one preceptorial/computer laboratory. Prerequisite: one year of calculus. Staff

EEB 328 Ecology and Epidemiology of Parasites and Infectious Diseases  Spring

An introduction to the biology of viruses, bacteria, fungi, protozoa, worms, arthropods, and plants that are parasitic upon other animal and plant species. The major emphasis will be on the parasites of animals and plants, with further study of the epidemiology of infectious diseases in human populations. Studies of AIDS, anthrax, and worms, and their role in human history, will be complemented by ecological and evolutionary studies of mistletoe, measles, myxomatosis, and communities of parasitic helminths. Two lectures, one preceptorial. Prerequisite: 210 or 211; one year of calculus recommended; 321. A. Dobson

EEB 332 Pre-Columbian Peoples of Tropical America and Their Environments (also LAS 350)  Spring SA

The pre-European history of Amerind cultures and their associated environments in the New World tropics will be studied. Topics to be covered include the people of tropical America; development of hunting/gathering and agricultural economies; neotropical climate and vegetation history; and the art, symbolism, and social organization of native Americans. This intensive course entails daily lectures, field trips, and laboratory experiences and incorporates methods and problems in field archaeology, paleoethnobotany and paleoecology, and archaeoecology. Limited to students in the Tropical Ecology Program in Panama. Prerequisite: 321. R. Cooke

EEB 333 Pre-Columbian Peoples of Tropical America and Their Environments (also LAS 350)  Spring SA

The pre-European history of Amerind cultures and their associated environments in the New World tropics will be studied. Topics to be covered include the people of tropical America; development of hunting/gathering and agricultural economies; neotropical climate and vegetation history; and the art, symbolism, and social organization of native Americans. This intensive course entails daily lectures, field trips, and laboratory experiences and incorporates methods and problems in field archaeology, paleoethnobotany and paleoecology, and archaeoecology. Limited to students in the Tropical Ecology Program in Panama. Prerequisite: 321. R. Cooke

EEB 338 Tropical Biology (also LAS 351)  Spring ST

This intensive field course, at various sites in Panama, examines the origins, maintenance, and major interactions among elements of the tropical-terrestrial biota. Study topics include identification of common orders and families of neotropical organisms; tropical climate and hydrology; biotic interactions; and contemporary and historical factors in shaping tropical landscapes, with emphasis on the Isthmian Landbridge and subsequent floral and faunal interactions. Two hours of lecture/discussion, six hours of laboratory, and two hours of data analysis daily. Limited to students in the Tropical Ecology Program in Panama. Prerequisite: 321. Y. Basset

EEB 346 Biology of Coral Reefs  Spring ST

http://www.princeton.edu/ua/
This intensive field course provides an in-depth introduction to the biology of tropical coral reefs, with an emphasis on reef fish ecology and behavior. Students learn to identify fishes, corals, and invertebrates, and learn a variety of field methods including underwater censusing, mapping, videotaping, and the recording of inter-individual interactions. Two hours of lecture/discussion, six hours of laboratory, and two hours of data analysis daily. Snorkeling in open ocean and walking in wild terrain is common. Limited to students in the Tropical Ecology Program in Panama. Prerequisite: 321. S. Pacala

EEB 350 Vertebrate Tropical Ecology Spring

This intensive field course addresses the life-history characteristics of tropical vertebrates and the physiological traits that underlie them. Students will learn how tropical life histories differ from those in the temperate zone and will use eco-physiological techniques while conducting experiments and observations at a Smithsonian Institute field station. Two hours of lecture/discussion, six hours of laboratory, and two hours of data analysis daily. Limited to students in the Tropical Ecology Program in Panama. Prerequisite: 321. M. Wikelski

EEB 404 Natural History of Mammals Spring ST

Students examine how mammals interact with diverse and potentially conflicting features of their environment in order to understand the concepts, methods, and material of comparative natural history. Perspectives include morphology, identification, evolution, ecology, behavior, habitat, and conservation. Original observations and experiments culminate in class, group, and individual research projects. This intensive field course entails two hours of lecture/discussion, six hours of laboratory, and two hours of data analysis daily. Limited to students in the Tropical Ecology Program in Kenya. Prerequisite: 210 or 211. D. Rubenstein

EEB 414 Genetics of Human Populations (also MOL 414) Spring

This advanced seminar surveys the evolutionary history of modern humans and the genetic basis of variation in our species through reading and discussion of classic and contemporary primary literature. Topics include the evolutionary origins of modern human populations, signatures of natural selection in the human genome, and approaches for discovering genetic variants that affect disease susceptibility and variation in normal traits. Significant emphasis is placed on recent advances made possible by the human genome project. Prerequisites: 309, or 320, or MOL 342, or CHM 236. One three-hour seminar. L. Kruglyak, P. Andolfatto

EEB 417A Ecosystems and Global Change (also ENV 417A) Not offered this year

An introduction to the concepts, approaches, and methods for studying complex ecological systems, from local to global scales. Students will examine nutrient cycling, energy flow, and evolutionary processes, with emphasis on experimental approaches and comparisons between terrestrial, freshwater, and marine ecosystems. Particular attention will be on effects of human activities, including climate change, biodiversity loss, eutrophication, and acid rain. Prerequisites: 210 or 211 or equivalent; CHM 301 or equivalent. Two 90-minute classes. L. Hedin

EEB 417B Ecosystems and Global Change (also ENV 417B) Fall

An introduction to the concepts, approaches, and methods for studying complex ecological systems, from local to global scales. Students will examine nutrient cycling, energy flow, and evolutionary processes, with emphasis on experimental approaches and comparisons between terrestrial, freshwater, and marine ecosystems. Particular attention will be on effects of human activities, including climate change, biodiversity loss, eutrophication, and acid rain. Prerequisites: 210 or 211 or equivalent; CHM 301 or equivalent. Two 90-minute classes, one three-hour laboratory. L. Hedin

EEB 419 Environmental Microbiology (see GEO 417)

EEB 422 Evolutionary Developmental Biology (also MOL 422) Not offered this year

What makes a butterfly different from a fly and a chimpanzee different from a human? This course explores how the genetic mechanisms that control development have evolved to generate the diversity of life on Earth. How can conserved genes and genetic networks produce a stable phenotype and yet evolve to generate diversity? Topics include body-plan evolution, flower developmental evolution, life-history evolution, phenotypic plasticity, allometry, social insects, canalization and developmental constraints, evolvability and evolutionary dead-ends. Prerequisites: 309 and either MOL 348 or MOL 342. Three lectures. D. Stern

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Chair
Gene M. Grossman

Associate Chair
Anne Case

Departmental Representative
Faruk R. Gul
Smita Brunnermeier

Director of Graduate Studies
Patrick J. Kehoe

Professor
Dilip J. Abreu
Yacine Aït-Sahalia
Orley C. Ashenfelter
Marco Battaglini
Roland J. Benabou, also Woodrow Wilson School
Alan S. Blinder, also Woodrow Wilson School
Markus K. Brunnermeier
Anne C. Case, also Woodrow Wilson School
Angus S. Deaton, also Woodrow Wilson School
Henry S. Farber
Gene M. Grossman, also Woodrow Wilson School
Faruk R. Gul
Harrison G. Hong
Bo E. Honoré
Patrick J. Kehoe
Nobuhiro Kiyotaki
Alan B. Knueger, also Woodrow Wilson School
Paul R. Krugman, also Woodrow Wilson School
David S. Lee, also Woodrow Wilson School
Burton G. Malkiel
Alexandre Mas, also Woodrow Wilson School
Stephen E. Morris
Christina H. Paxson, also Woodrow Wilson School
Wolfgang Pesendorfer
Stephen J. Redding, also Woodrow Wilson School
Uwe E. Reinhardt, also Woodrow Wilson School
Harvey S. Rosen
Esteban A. Rossi-Hansberg, also Woodrow Wilson School
Cecilia E. Rouse, also Woodrow Wilson School
Yuliya Sannikov
José A. Scheinkman
Harold T. Shapiro, also Woodrow Wilson School
Hyun Song Shin
Christopher A. Sims
James Trussell, also Woodrow Wilson School
Mark M. Watson, also Woodrow Wilson School
Robert D. Willig, also Woodrow Wilson School
Wei Xiong

Visiting Professor
Jean Jacod
Wolfgang Keller

Sebastien Pouget
Nancy Reichman
Thomas J. Sargent

Associate Professor
Ulrich Mueller

Visiting Associate Professor
Anne Morrison Piehl
Carol Hua Shiue

Assistant Professor
Sylvain Chassang, also Woodrow Wilson School
Jan DeLoecker, also Woodrow Wilson School
Taryn L. Dinkelman, also Woodrow Wilson School
Jakub W. Jurek
Ilyana Kuziemko, also Woodrow Wilson School
Andriy Norets
David Snider
Satoru Takahashi

Visiting Assistant Professor
Yan Bai
Francisco Buera
Damon Clark
Paolo Colla
Doireann Fitzgerald
Jordan Matsudaira

Instructor
Andrew Shephard

Senior Lecturer
Elizabeth C. Bogan

Lecturer with Rank of Professor
Gregory C. Chow

Visiting Lecturer with Rank of Professor
Eric S. Maskin

Lecturer
Swati Bhatt
Smita B. Brunnermeier
Jean Baldwin Grossman, also Woodrow Wilson School
Thomas C. Leonard
Silvia Weyerbrock, also Woodrow Wilson School

Visiting Lecturer
Ana Babus
O. Griffith Sexton
Iqbal Zaidi, also Woodrow Wilson School

Associated Faculty
Thomas J. Espenshade, Sociology
Jianqing Fan, Operations Research and Financial Engineering
Adam Meirowitz, Politics
Thomas Romer, Woodrow Wilson School, Politics

Information and Departmental Plan of Study

http://www.princeton.edu/ua/
Further details and updates regarding undergraduate requirements and procedures may be found at the website of the Department of Economics.

**Advanced Placement**

Students who scored 5 on the AP microeconomics exam are exempted from ECO 100. Students who scored 5 on the AP macroeconomics exam are exempted from ECO 101. Students who scored 5 on the AP statistics exam are exempted from ECO 202. (Note: Exemption from 100 and 101 will be accorded to students who pass the British A-levels with a grade of A, and to those who earn a 7 on the higher-level International Baccalaureate.)

Students exempted from ECO 100, 101, and 202 may still benefit from taking these courses, which provide important basic materials for the study of economics. However, proficient freshmen (those exempted from ECO 100 and 101 and who receive a 4 on the Math AB AP exam), may wish to consider ECO 200 Advanced Principles of Economics: Concepts and Applications. This course applies the economic ideas and techniques learned in the AP courses to some contemporary economic problems.

The department will permit freshmen to enroll in ECO 310, 311, or 312, only in very rare instances, subject to the approval of the instructor for the course. The requirements are: (1) completion of, or exemption from, ECO 100, 101, and/or 202, as appropriate in each case, and (2) sufficient knowledge of multivariable calculus and vector and matrix algebra. For the latter, ask the mathematics department to certify that they regard your previous knowledge of mathematics as equivalent to completion of MAT 200, or MAT 201-202, or better.

**Prerequisites**

To enter the department, a student must complete, by the end of sophomore year, the prerequisite courses ECO 100, 101, 202, and MAT 103 (or equivalents), earning a letter grade of C- or better in each. ORF 245 can be substituted for 202; PSY 251 and SOC 301 are not acceptable; WWS 303 may be depending on each year's content.

A meeting for sophomores interested in joining the department will be announced in the spring. Underclass students are welcome to discuss department requirements with the departmental representative. Students considering study abroad are urged to meet with the departmental representative at the earliest opportunity in their freshman year.

**Mathematics Prerequisites.** MAT 103 (or equivalent) is sufficient preparation for the less mathematical versions of the department's core courses, ECO 300, 301, and 302 (see Core Courses). The sequence MAT 101-102 is acceptable as equivalent to MAT 103, but students with this background should consult with the departmental representative. The more mathematical versions of the department's core courses, ECO 310, 311, and 312, and some other electives, require MAT 200 or better.

Students considering graduate work in economics or finance or who wish to continue in mathematics should take MAT 201-202 (or MAT 203-204 or MAT 217-218) rather than MAT 200, which is a terminal course.

Students who are not considering advanced training, and who wish to take only one 200-level mathematics course, are advised to take MAT 200. This one-semester course covers, in less depth but with applications to economics, topics in multivariable calculus and linear algebra that are also covered in the two-semester advanced calculus sequences (MAT 201-202, 203-204 and 217-218). MAT 201 provides most of the sufficient background for the courses for which MAT 200 is a prerequisite, although some matrix algebra covered in MAT 202 is useful in ECO 310 and ECO 312. MAT 201 alone is acceptable, but the department strongly recommends following it with MAT 202. (Mathematics courses beyond MAT 201 may be taken on a pass/D/fail basis, but the department strongly recommends that they be taken on a graded basis).

**Program of Study**

**General Requirements.** The department requires concentrators to complete, and pass on a graded basis, the following:

- **Core Courses:** Microeconomics (ECO 300 or 310), Macroeconomics (ECO 301 or 311), and Econometrics (ECO 302 or 312), to be completed the junior year.

- **Elective courses:** Five other departmentals (see Other Departmentals for details).

- Junior independent work.
- Senior thesis.
- Senior comprehensive exam.

Furthermore, the student must have a departmental average of at least C.

**Core Courses.** All concentrators must pass, on a graded basis, core courses in microeconomics (ECO 300 or 310), macroeconomics (ECO 301 or 311), and econometrics (ECO 302 or 312). These courses must be completed during or before the junior year.

Each of the three core courses is offered in two versions to accommodate different levels of preparation in mathematics: ECO 300, 301, and 302 require MAT 103 or equivalent, ECO 310, 311, and 312 require MAT 200, or MAT 201 plus MAT 202.

Qualified students are encouraged to take the more mathematical versions. It is not necessary to take all three courses in the same version.

**Other Departmentals.** In addition to the three core courses, concentrators must pass, on a graded basis, five other
departmental courses. Departmentals may be any 300-, 400-, or 500-level economics course, or an approved cognate (see Cognates).

Students planning a senior thesis with empirical emphasis are strongly encouraged to take ECO 313; students planning a theoretical senior thesis are strongly encouraged to take ECO 317 and/or ECO 418.

Cognates. Concentrators may, with the written approval of the departmental representative before the semester's deadline for the grading option change (the end of the ninth week of the term), designate as economics departmentals up to two upper-level courses from other departments. The cognate approval form, which is submitted to the departmental representative, is available in the "Forms" section of the department's website.

Independent Work

Junior Independent Work and Senior Thesis. Independent work is designed to afford concentrators the opportunity to identify and explore their research interests in depth. Students are expected to develop a carefully reasoned exposition that critically analyzes a problem using basic principles of economics. Juniors complete a year-long research project, which consists of a research prospectus submitted in December and a final paper submitted in April. The senior thesis is expected to be more extensive, with a topic of greater scope and, correspondingly broader analysis and interpretation. Further details, from the assignment of advisers to the final deadlines, are available in the junior independent work and senior thesis sections of the department's website.

Senior Departmental Examination

The senior comprehensive examination is a written, multiple-choice examination that emphasizes the department's required courses through intermediate microeconomics, macroeconomics, and econometrics. Additional required questions are drawn from other fields in economics, with students given a liberal choice among fields. The senior comprehensive exam grade will appear on the student's transcript.

Study Abroad

Potential economics concentrators who expect to study abroad for one or two semesters must plan well ahead. Because the department only rarely permits core courses to be taken abroad, and because core courses may not be postponed to senior year, potential economics concentrators planning study abroad must complete the appropriate core courses in their sophomore year. It is almost never feasible to spend a semester abroad in the senior year.

Economics courses taken abroad may be pre-approved as departmentals by the departmental representative, ordinarily up to one per semester. Plans for junior independent work must also be approved in advance.

Preparation for Graduate Study

Graduate study in economics requires special preparation and advanced planning, starting as early as the freshman year. Students contemplating graduate study in economics should see the departmental representative as early as possible. Preparation for graduate school should include the following: the more mathematical versions of the core courses (310, 311, and 312), two years of calculus (up through MAT 202, 204, or 218), two or more upper-level mathematics courses such as MAT 301, 305, 309, 310, 314, or 325, and an advanced econometrics or theory course such as ECO 313 or 317. Students may find the Program in Applied and Computational Mathematics or the Program in Engineering and Management Systems an interesting option. It is not necessary to be an economics concentrator to enter a graduate economics program, but the economics courses listed above are highly recommended. Graduate courses in economics (500 level) are open to qualified undergraduates. These courses are very demanding and must be started in the fall term. Taking one of these courses can be useful for students who intend to enter an economics graduate program, because it begins the student's advanced training, gives the student a flavor of graduate school, and provides evidence during the admissions process of the ability to do advanced work in economics.

Courses

ECO 100 Introduction to Microeconomics  Fall, Spring SA
How price systems solve social choice problems. The operation of competitive, oligopolistic, and monopolistic product and factor markets. Proposals to alter markets (such as income redistribution, regulation of monopolies, pollution controls). Comparison of the operation of price systems with alternative methods of making social decisions. Two lectures, one class. R. Willig

ECO 101 Introduction to Macroeconomics  Fall, Spring SA
The theory of the determination of the level of national income and economic activity, including an examination of the monetary system. Emphasis on such economic problems as inflation, unemployment, and recession, and on the appropriate policy responses. Some attention is also paid to international economic issues and to problems of economic growth. Two lectures, one class. E. Bogan

ECO 108 Games of Strategy  Spring SA

http://www.princeton.edu/ua/
The basic ideas of game theory. Examines strategically interdependent choices, where each person must take into account how the others will react. Involves little formal theorizing; the approach is through examples and case studies drawn from business, politics, sports, and even fiction and movies. Two lectures, one preceptorial. Staff

ECO 200 Advanced Principles of Economics: Concepts and Applications Fall SA

This course, which is taught in three modules, builds on students' previous knowledge of economic theory by analyzing a number of economic issues of topical and intellectual interest. Module topics, which vary from year to year, may include game theory, international trade, health and economic development, monetary policy, and industrial organizations. Designed for first-year students who have completed a rigorous year of economics before coming to Princeton. Two 90-minute lectures, one preceptorial. D. Abreu

ECO 202 Statistics and Data Analysis for Economics Spring QR

An introduction to probability and statistical methods for empirical work in economics. Probability, random variables, sampling, descriptive statistics, probability distributions, estimation and hypothesis testing, introduction to the regression model. Economic data sources, economic applications, and the use of statistical software packages will be emphasized. Two 90-minute classes, one preceptorial. Prerequisites: 100 and 101. P. Mizen

ECO 300 Microeconomic Theory Fall SA

This class is about markets. When do they work? When do they fail? And what can be done about it? Over the course of the class we will cover (1) choices made by consumers and firms, (2) competitive equilibrium, and (3) market failures. It will also touch on game theory and information economics. Two lectures, one class. Prerequisites: 100, MAT 103. S. Chassang

ECO 301 Macroeconomics Spring SA

The determinants of national income, unemployment, and inflation. Includes analysis of business cycle fluctuations, monetary and fiscal policy, consumption and saving, investment, growth, and international macroeconomic issues. Uses mostly verbal and geometric arguments. Two lectures, one class. Prerequisites: 100 and 101. P. Mizen

ECO 302 Econometrics Fall QR

The objective of this course is to prepare students for basic empirical work in economics. In particular, topics will include basic data analysis, regression analysis, testing, and forecasting. Students will be provided with the opportunity to use actual economic data to test economic theories. Prerequisites: 100 or 101, and 202, or ORF 245; MAT 103. Two 90-minute classes, one preceptorial. A. Norets

ECO 310 Microeconomic Theory: A Mathematical Approach Fall, Spring SA

Consumer and firm behavior, market structures, and the determination of value. Some attention is given to the interdependence of markets, to the social consequences of externalities in the economy, and to their policy implications. Uses multivariable calculus and linear algebra to treat the topics in greater depth and to better prepare for the 300-level courses on financial markets. Two lectures, one class. Prerequisites: 100; MAT 200 or 201. S. Potter

ECO 311 Macroeconomics: A Mathematical Approach Spring SA

The determinants of national income, unemployment, and inflation. Includes analysis of business cycle fluctuations, monetary and fiscal policy, consumption and saving, investment, growth, and international macroeconomic issues. Uses more formal mathematical models to treat the topics in greater depth. Two lectures, one class. Prerequisites: 100 and 101; MAT 200 or 201. S. Morris

ECO 312 Econometrics: A Mathematical Approach Fall QR

Statistical analysis of economic data. The two-variable regression model, multiple regression. Techniques for dealing with violations of the regression model's assumptions, including autocorrelation, heteroscedasticity, specification error, and measurement error. Dummy variables, discrete-choice models, time series models, and forecasting. Introduction to simultaneous equations. Estimation and testing of economic models will be an important part of the course. Prerequisites: 100 and 101 and 202 (or ORF 245); MAT 200 or 201 or equivalent. Two 90-minute lectures, one class. B. Honoré

ECO 313 Econometric Applications Spring QR

This course provides hands-on experience in econometric analysis designed to help students to acquire the skills necessary to carry out their own empirical research in economics. Various aspects of empirical research in economics will be covered, including development of testable economic models, appropriate use of data, and specification and estimation of econometric models. Prerequisites: 302 or 312; and calculus. Two lectures, one preceptorial. H. Farber

ECO 315 Topics in Macroeconomics Spring SA

Designed to provide students with the opportunity to study several topics in macroeconomics in depth, the course is taught in two modules. Module topics, which vary from year to year, may include economic growth, financial markets, political economy of central banking, speculative bubbles and financial panics, among others. Two 90-minute lectures, one preceptorial. Staff

ECO 317 The Economics of Uncertainty Spring SA

The microeconomic theory of individual decision making under uncertainty and economic interaction under asymmetric information. Topics include expected utility, value of information, risk-sharing in insurance and asset

http://www.princeton.edu/ua/
markets, contracting with moral hazard and adverse selection, and auctions. Applications include health insurance and finance. Two lectures, one preceptorial. Prerequisites: 310, MAT 200 or equivalent, and basic probability. S. Morris

ECO 318 Theory of Games (see MAT 308)

ECO 321 Industrial Organization Spring SA

An economic analysis of the structure of markets and of corporate behavior. The development and interpretation of public policies, including antitrust legislation and direct regulation related to market structure, corporate mergers, restrictive and discriminatory practices, advertising, and research and development. Two lectures, one class. Prerequisites: 300 or 310, and MAT 102 or MAT 103. Staff

ECO 324 Law and Economics Fall SA

An introduction to the economics of legal rule-making and enforcement. Application of elementary price theory and welfare analysis to problems and actual cases in the common law—property, contracts, torts—and to criminal and constitutional law. Topics include the Coase Theorem, intellectual property, product liability, deterrence, and social choice. Prerequisite: 100. Two 90-minute lectures. T. Leonard

ECO 329 Environmental Economics (also ENV 319) Fall SA

An introduction to the use of economics in thinking about and dealing with environmental issues. Stress on economic externalities and the problem of dealing with them as instances of organizing gains from trade. Applications to a wide variety of problems, among them air pollution (including, importantly, global climate change), water pollution, solid waste and hazardous substances management, species preservation, and population policy. Prerequisite: 100, basic calculus. Two lectures, one preceptorial. S. Brunnermeier

ECO 331 Economics of the Labor Market Fall SA

Applies microeconomic analysis to the demand for labor, labor supply, and the determination of wages. Examines investments in human capital, unemployment, discrimination, unions, government intervention in the labor market. Empirical findings as well as theoretical models are studied. Two lectures, one preceptorial. Prerequisites: 100, 302, and MAT 102 or 103. Staff

ECO 339 Introduction to Population Problems (also SOC 351) Not offered this year SA

A survey of demographic trends throughout the world, the factors underlying them, and their social and economic implications, including the analysis of mortality, fertility, migration, changes in composition, problems of prediction, and issues of policy. Two lectures, one preceptorial. Prerequisite: 100. J. Goldstein

ECO 341 Public Finance Spring SA

The role of government in attaining an efficient allocation of resources and an equitable distribution of income. Emphasis is placed on criteria for the evaluation and selection of public expenditure and tax programs, including the problem of coordinating federal, state, and local finance. Special attention is given to current policy issues. Two lectures, one class or problem-oriented seminar. Prerequisite: 100. M. Manacorda

ECO 342 Money and Banking Fall SA

This course explores the role that money, financial markets and institutions, and monetary policy play in shaping the economic environment. The class investigates why these markets and institutions arise and may lubricate the resource allocation analytically (rather than descriptively), using tools of economic theory. Two lectures, one class. N. Kiyotaki

ECO 349 Economics and Public Policy (see WWS 307)

ECO 351 Economics of Development Fall SA

Surveys development economics including current issues, historical background, growth theories, trade and development, markets and planning, strategies for poverty alleviation, agriculture, technology, employment, industry, population, education, health, and internal and external finance. Selective attention to particular countries and regimes. Two lectures, one class. Prerequisites: 101 and 300 or 310, or instructor's permission. Staff

ECO 352 International Trade Spring SA

Examination of the causes and economic consequences of international trade in goods and services, investment and migration. Stress on the possibility of aggregate national gains from trade, and the distributional conflicts generated by trade. Analysis of policies regarding these issues from the perspective of economics and political economy. Two lectures, one preceptorial. Prerequisites: MAT 102 or 103, and ECO 300 or 310. A. Dixit

ECO 353 International Monetary Economics Fall SA

Foreign exchange markets and balance-of-payments accounts. Effects of incomes, prices, interest rates, and exchange rates on trade and capital flows. Effects of exchange rate arrangements and capital mobility on macroeconomic policies. Current policy issues: exchange rate management, macroeconomic policy coordination, managing currency crises, the roles of international institutions. Two lectures, one preceptorial. Prerequisites: 100 and 101. A. Adsera

ECO 354 Special Topics in Public Affairs (see WWS 476)

ECO 362 Financial Investments Fall SA
A survey of the field of investments with special emphasis on the valuation of financial assets. Issues studied include how portfolios of assets should be formed, how to measure and control risk, how to evaluate investment performance, and how to test alternative investment strategies and asset pricing models. Prerequisites: 202 or equivalent, 310, and MAT 200. ECO 202 or equivalent may be taken concurrently, but students would remain responsible for statistical concepts as they arise in 362. Two lectures, one preceptorial. **H. Hong**

**ECO 363 Corporate Finance and Financial Institutions**  
Spring SA  
Investigates the financing decisions of companies and financial institutions in the wider context of the workings of financial markets. Topics include capital budgeting, capital structure choice, risk management, liquidity, corporate governance, and the interactions between corporate finance and the workings of financial institutions and markets. Prerequisite: 362. Two lectures, one class. **Y. Sannikov**

**ECO 364 Introduction to Financial Mathematics** (see ORF 335)

**ECO 370 American Economic History (also HIS 378)**  
Spring HA  
Survey of the growth and development of the U.S. economy from colonial times to the present. Introduction to the use of economic models and quantitative evidence in interpreting significant historical issues. Emphasis on technological change, property rights, credit markets, and labor markets. Two lectures, one preceptorial. **E. Bogan**

**ECO 371 Topics in Country and Regional Economics (also LAS 346)**  
SA  
These courses will provide an opportunity to apply the concepts and methods studied in economics core courses and electives to analyze the economic problems confronting particular countries or groups of countries. The choice of the country or region, and of the economic problem, will change from year to year. Prerequisites depend on topic. Two 90-minute lectures. **Staff**

**ECO 372 Topics in Country and Regional Economics (also EPS 342)**  
Fall SA  
These courses will provide an opportunity to apply the concepts and methods studied in economics core courses and electives to analyze the economic problems confronting particular countries or groups of countries. The choice of the country or region, and of the economic problem, will change from year to year. Prerequisites depend on topic. Two 90-minute lectures. **S. Weyerbrock**

**ECO 379 The Chinese Economy (also EAS 346)**  
Fall SA  
Economic analysis of the Chinese economy after 1949. Economic planning, market institutions, agriculture, industry, consumption, national income and capital formation, population and human capital, finance, banking, foreign trade and investment, economic reforms since 1979, and current issues. Prerequisites: 100 and 101. Two 90-minute lectures. **G. Chow**

**ECO 385 Ethics and Economics (also CHV 345)**  
Spring EM  
Introduction to ethical issues in market exchange and in laws that regulate it. How ethical commitments evolve and influence cooperation. The moral dimension of low wages, price discrimination, distribution of resources, trade in inalienable property, and the separation of choice and consequence. As time permits, the influence of economic ideas on moral reasoning. Prerequisite: 100. Two 90-minute lectures. **T. Leonard**

**ECO 414 Introduction to Economic Dynamics**  
Not offered this year QR  
Mathematical analysis of the evolution of markets and economies over time. Topics include growth, business cycles, asset pricing, and responses to policy changes. Particular attention is given to expectations as a determinant of economic behavior. Mathematical methods (difference equations, dynamic optimization, time series analysis) are introduced as needed. Prerequisites: 310, 311, and 312; and either MAT 201 and 202, MAT 203 and 204, or MAT 217; or instructor's permission. Two 90-minute lectures. **Staff**

**ECO 418 Strategy and Information**  
Fall SA  
Explores basic themes in modern game theory and information economics. Non-cooperative solution concepts for games will be developed and applied to the study of repeated games and dynamic interaction in oligopolistic industries, reputation formation, auctions, and bargaining. Prerequisites: MAT 200, 201, or equivalent. Two lectures, one preceptorial. **D. Abreu**

**ECO 461 Trading and Securities Markets**  
Spring SA  
An overview of the organization and regulation of major securities markets, such as the stock market. Topics include trading rules and systems in secondary markets and their effects on liquidity, volatility, and information revelation; primary securities markets and securities underwriting; financial intermediation; the structure of securities and the link to corporate governance; rules concerning insider trading and disclosure; and government regulation of financial markets. Prerequisites: 202 or equivalent; 310 and 362; or instructor's permission. Two lectures, one preceptorial. **Staff**

**ECO 462 Portfolio Theory and Asset Management**  
Spring SA  
This course studies the asset allocation decisions and overall management of the risk and return characteristics of portfolios. It focuses on quantitative approaches to portfolio optimization, including dynamic strategies to control risks and to achieve investment goals; empirical studies of asset returns; and the money management industry. Prerequisites: 202 or ORF 245; 310; 362 (no exceptions). Two 90-minute lectures, one preceptorial. **A. Sarkar**

http://www.princeton.edu/ua/
ECO 463 International Financial Markets  Spring SA

A study of the assets and institutions of international financial markets. A key difference between these markets and others is the role of exchange rates relating the value of two or more national currencies. The course studies the market-making institutions, the market conventions and market practices as well as the interrelationships between different assets, their pricing, their trading and their use by corporations. Prerequisites: MAT 200 and ECO 202 or equivalent. Two 90-minute lectures. Staff

ECO 464 Corporate Restructuring  Fall SA

This course applies topics from microeconomics and corporate finance to study corporate restructuring. Topics include mergers, acquisitions, joint ventures, divestiture and share repurchases. Each of these is discussed in the context of the relevant economic theory, institutional and regulatory environment, and with a focus on shareholder value. Prerequisites: 362 and 363. One three-hour seminar. O. Sexton

ECO 465 Options, Futures and Financial Derivatives  Fall SA

Derivative securities are assets whose value depends on the value of other more basic underlying assets. Derivative securities are not only an important asset in their own right, but the central intuition provided by derivative securities pricing—the no-arbitrage principle—ties together many areas in finance. This course discusses the consequences of no-arbitrage for asset pricing and corporate finance. Prerequisites: 310 and 362; or instructor's permission. Two 90-minute lectures. W. Xiong

ECO 466 Fixed Income: Models and Applications  Fall SA

A study of no-arbitrage models of contracts based on interest rates, including bonds, forward and future contracts, swaps, options, and other derivatives. The course develops the theory of arbitrage-free pricing of financial assets in discrete and continuous time, as well as special models that can be used to price and hedge fixed income securities. Prerequisites: ECO 362 (or FIN 501) and ECO 465. Two 90-minute lectures, one class. J. Jurek

http://www.princeton.edu/ua/
Department of Electrical Engineering

Chair
Peter J. Ramadge

Associate Chair
Mansour Shayegan

Departmental Representative
Antoine Kahn

Director of Graduate Studies
Mung Chiang

Professor
Ravindra N. Bhatt
A. Robert Calderbank, also Mathematics, Applied and Computational Mathematics
Stephen Y. Chou
Bradley W. Dickinson
Claire F. Grachl
Niraj K. Jha
Antoine Kahn
Sanjeev R. Kulkarni
Sun-Yuan Kung
Ruby B. Lee
Bede Liu
Stephen A. Lyon
Sharad Malik
Margaret R. Martonosi
H. Vincent Poor
Paul R. Prucnal

Associate Professor
Mung Chiang
Jason W. Fleischer

Assistant Professor
Paul W. Cuff
Andrew A. Houck
Hakan E. Tureci
Naveen Verma
Gerard Wysocki

Visiting Lecturer with Rank of Professor
Ed Zschau

Associated Faculty
Craig B. Arnold, Mechanical and Aerospace Engineering
David I. August, Computer Science
Douglas W. Clark, Computer Science
Ingrid C. Daubechies, Mathematics, Applied and Computational Mathematics
Kai Li, Computer Science
Yueh-Lin Loo, Chemical and Biological Engineering
Jennifer Rexford, Computer Science
Kenneth Steiglitz, Computer Science

Information and Departmental Plan of Study

The Department of Electrical Engineering offers an academic program of study spanning a wide range of disciplines. This program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone (410) 347-7700. Although all electrical engineering students begin with a unifying foundation, the areas of specialization available to a student range from communication technology to microprocessors to opto-electronics. Students may select one of a long list of predefined concentrations, or tailor their own in consultation with their faculty adviser to suit special interests.

Students enter the department with a variety of career objectives in mind. Some intend to enter industry directly upon graduation or to continue their studies in graduate school. Others wish to take an electrical engineering program as background for careers in other fields ranging from business to law to medicine. Some have not decided on a career plan. Sufficient flexibility is built into the undergraduate program to allow any of these objectives to be achieved and to allow a student to see a wide cross-section of electrical engineering before deciding on an area of concentration.

A student may also formally combine electrical engineering with studies in biology, computer science, physics, materials, engineering and management systems, energy and environmental studies, and several other fields.

General Requirements

All candidates for the B.S.E. degree are required to satisfy the general University requirements and the School of Engineering and Applied Science requirements. An introductory computer science course should be taken during the freshman year if possible.

Each student's academic program must have depth in at least one area plus a reasonable degree of breadth to produce a sound basis for future development. All programs are required to have a strong design component and a strong engineering science component. The specific plan of study is determined in consultation with the student's academic adviser, taking into account ABET program guidelines. All such plans must include the following:

1. Foundations: Electrical Engineering 201, 203, 206, 208. This requirement is normally satisfied by the end of the sophomore year. These courses are all open to qualified freshmen.

http://www.princeton.edu/ua/
2. **Core:** Electrical Engineering 301 and 302. This requirement is normally satisfied by the end of the junior year.

3. **Mathematics:** At least one upperclass mathematics course, not to be counted toward the concentration requirement or as a departmental (see 4 and 9 below). This may be MAE 305/MAT 301, MAE 306/MAT 302, ORF 309/MAT 309, COS 340, or other 300-level or higher mathematical courses. The course selected to satisfy this requirement may not be counted toward the concentration requirement, the breadth requirement, or as a departmental.

4. **Concentration:** Three courses in a chosen concentration. (See Program of Study.) For the concentration requirement Physics 208 and 305 count as one course only.

5. **Breadth:** At least one course in each of two of the following different general areas. Only one of these two courses may be counted for the concentration requirement.
   
   a) Communications, Signal Processing, and Control 382, 481, 482, 483, 485, 486, 488
   
   b) Computer Engineering/Computer Science 375, 386, 462, 463, 465, 466, 475, 573, COS 318, 320, 333, 402, 426, 429, 432, 441, 461 (Note: COS 217, COS 226, required for many upper-level computer science courses, do not satisfy breadth but do satisfy the engineering science requirement.)
   
   c) Solid-State Electronics 341, 342, PHY 208/305--must take both PHY 208 and PHY 305*, 396, 401, 402, 441, 442 (Note: For the concentration requirement, Physics 208 and 305 count as one course only.)
   
   d) Optical Engineering 351, 352, 453, 454, 455

6. **Engineering Science:** At least one of the following engineering science courses outside the electrical engineering department must be taken. This course cannot also be used to satisfy the concentration requirement or the breadth requirement. An equivalent or higher-level course offered by the School of Engineering and Applied Science may be substituted if approved by the departmental representative.
   
   COS: 217, 226, 320, 402, 423, 425, 444, 451, 487
   MAE: 206 (or PHY 203/205), 221, 222, 324, 344, 345, 433, 434
   CEE: 205, 303, 305, 471
   MSE: 301, 302
   CBE: 245, 246, 341, 415, 445, 447
   ORF: 307, 311, 405, 406, 417

7. **Design:** At least one upperclass electrical engineering course with substantial design content beyond ELE 302 must be selected. These courses include 352, 375, 401, 402, 454, 462, 463, 475, 482, 483, and COS 426, 436. This requirement may also be satisfied with junior or senior independent work with a substantial design component (see Independent Work).

8. **Balance:** Normally at least two upperclass technical courses 300 level or above in CEE, CHM, CBE, COS, EEB, ELE, MAE, MAT, MOL, MSE, ORF, or PHY should be taken each semester in the junior and senior years.

9. **Completeness:** Eight courses at 300 level or above including at least five ELE courses. The additional three courses must relate to the program from the following subject areas: CEE, CHM, CBE, COS, EEB, ELE, MAE, MAT, MOL, MSE, ORF, or PHY. Courses outside electrical engineering counted toward this requirement must be closely related to the student's academic program.

10. **Oral presentation:** Each student must give a presentation to an audience based on some technical work done in a class or in an independent project.

11. **Independent work:** Each student is required to complete at least one semester of independent study normally in the senior year.

**Program of Study**

Each student is expected to develop depth in a specific area of concentration in the department. This can be done by fulfilling the requirements of one of the predefined areas of concentration listed below, or by defining a new area in consultation with the academic adviser. The areas of concentration span the general fields of information science and systems, solid-state electronics, computer engineering, and optical engineering. Some consist of a focused concentration in a traditional academic discipline, while others are more topical in nature and consist of a unified set of courses drawn from several traditional areas. The concentrations may also be interdisciplinary and include courses from other departments in the School of Engineering and Applied Science as well as related fields such as physics, chemistry, and biology.

For each area defined below, a student must take the courses, marked in bold, and other courses from the list to a total of three. Graduate courses (500 level) are open to undergraduates after the completion of a permission form containing the signatures of the instructor and departmental representative. (Titles of relevant graduate courses may be obtained from the department.)

**Telecommunications and Networks:** Basic concepts and principles of communication and communication networks. Wireless communications. **486; ORF 309**; 382, 485; 525; 528; 531; COS 461.

**Information and Systems:** Principles of communication systems, control systems, and digital signal processing. **ORF 309**; two from **382, 482, 483, 485**, or **MAE 433 or MAE 434**.

**Robotics and Control:** Automatic control systems with applications to robotics and machine vision. **483 or MAE 433 or MAE 434; ORF 309**; 481; 488; 521, **COS 402**.
**Signal and Image Processing:** Digital processing of signals, for example, speech, images, and video. 482; 488; 375; ORF 309**; 462; 475; 481; 527; COS 429.

**Digital Video and Graphics:** Principles of computer graphics, animation, and video processing. 488; COS 426; 481; COS 451.

**Microelectronics and Integrated Circuits:** Design and fabrication of very large-scale integrated (VLSI) circuits. 401 and/or 402; 462; 441; 341; 549.

**Electronic and Opto-electronic Materials:** Science of materials related to microelectronics and opto-electronics. 342 (or PHY 208 and 305*); at least one of MSE 301, CHM 305, MAE 324; and at least one of ELE 341, 351, 441, 541, 542, 546. (At least one of the concentration courses must be in ELE.)

**Solid-State Devices:** Electronic and opto-electronic devices. 341; 342--highly recommended (or PHY 208 and 305*); 351; 401 or 402 (count only one of 401/402); 441; 442; 453; 540; 544; 545; 549.

**Solid-State Physics:** The physics of electrons in solids and the interaction of solids with light. 342 (or PHY 208 and 305*); 441; 341; 351; 442; 453; 544; 545; 546.

**Optical Communications and Fiber Optics:** Application of photonic technology to lightwave communication. 351; 453; 454; 455.

**Optical and Opto-electronic Engineering:** The generation, transmission, control, detection, and applications of photons. 351; 341; 352; 453; 454; 455; 544; 546; 551, 552, 553; MAE 521.

**Computer Systems and Software:** Integration of hardware and software in computers. 375; at least one of 386, 475, 482, 572; at least one of COS 318, COS 320, COS 425, COS 426, COS 461.

**Computer Design:** Structured design principles for computer-based systems. 375; 402; 462; 463; 464; 465; 466; 475; 572; 580.

**Computer Architecture:** The principles of microprocessors and high-performance computers. 375; 475; 386; 462; 465; 572; 580.

**Electronic Computer-Aided Design (CAD):** Algorithms and software used for design and analysis of integrated circuits. 462; 382; 463; 466; COS 423; ORF 307.

**Real-Time Computing:** Use of computers for time-critical processing and control. 482; 464; 475; (count only one of 483 or MAE 433 or MAE 434).

**Note:** ORF 309 may be used to satisfy the upperclass mathematics requirement or the concentration requirement, but not both.

**Independent Work**

Independent projects or research projects outside normal structured lecture or laboratory courses are a valuable educational experience and highly recommended for all students at either the junior or senior level. The projects are often extremely challenging on both a personal and academic level but also extremely fulfilling. All electrical engineering majors are required to complete at least one semester of independent study, normally in the senior year. Independent work cannot be used to fulfill the breadth or concentration requirements. Each student doing independent work will be required to give a poster presentation during a 60-minute session given at the end of each semester.

**Interdisciplinary Programs.** Interested students may combine their work in electrical engineering with that in other departments through interdisciplinary certificate programs such as engineering and management systems, engineering physics, materials science and engineering, engineering biology, sustainable energy, neuroscience, finance, applications of computing, robotics and intelligent systems, environmental studies, applied and computational mathematics, and the Woodrow Wilson School (the last by application only). Students completing a certificate program will receive a special certificate upon graduation. In some cases, the programs closely overlap with defined areas of concentration within electrical engineering. In other cases students should consult with their advisers to develop an electrical engineering program that best combines their electrical engineering interest with the interdisciplinary program.

**Further Information.** Additional information on the departmental academic program and requirements is given in the "Electrical Engineering Handbook," available from the departmental undergraduate office, Room B304, Engineering Quadrangle. Prospective concentrators in electrical engineering should consult the departmental representative as early as possible for purposes of planning an academic program.

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**Courses**

**ELE 102 New Eyes for the World: Hands-On Optical Engineering (also EGR 103) Not offered this year ST**

This lab course introduces students to modern topics of engineering optics. Teams of students will carry out four different projects: holography, lasers, free-space optical communication, and nanotechnology. Teaches the foundations and broader societal issues of these technologies. The laboratory sessions involve hands-on training as well as experimentation and exploration. Skills acquired in this course include computer programming of user interfaces, data...
acquisition and interpretation, wet chemical processing, and electronics design assembly. One 90-minute lecture, one three-hour laboratory. C. Gmachl

ELE 201 Introduction to Electrical Signals and Systems  Fall ST

An introductory overview of electrical systems that process information-carrying signals. Acquisition, distribution, storage, and utilization of common information, such as text, voice, image, and video. Important attributes and characterization of analog and digital signals. Conversion between analog and digital signals. Modeling of information-distributing systems. Introduction to modulation. Limitations of physical information processing systems. Elementary coding for error detecting and correcting. Simple control systems, feedback principle. Three hours of lectures, one three-hour laboratory. Prerequisite: knowledge of elementary calculus S. Kulkarni

ELE 203 Electronic Circuits  Fall ST


ELE 206 Introduction to Logic Design (also COS 306)  Spring ST

Boolean algebra and digital logic gates. Design with two- and multilevel combinational logic. Basic memory elements, latches, flip-flops, SRAM and DRAM cells. Timing methodologies. Synchronous and asynchronous designs. Counters. Finite-state machines. Designs with programmable logic. Basic computer organization. Three lectures, one laboratory. Prerequisite: an introductory programming course, or equivalent programming experience. S. Malik

ELE 208 Semiconductor Devices, ICs, and Micro-Fabrication  Spring ST

An examination of what is inside a microchip, how it works, and how it is made. Operating principles of semiconductor devices and their function in circuit applications such as digital gates and analog amplifiers. Devices to include p-n junction diodes, bipolar transistors, MOS capacitors, and field-effect transistors (MOSFET's). Microfabrication technology for semiconductor devices, integrated circuits, photolithography, etching, evaporation, and other thin-film processing. Hands-on integrated circuit microfabrication laboratory for diodes and MOSFET's. Three lectures, one laboratory. Prerequisite: CHM 201 or 203. Corequisite: PHY 102 or 104. S. Chou, C. Silvestre

ELE 211 Digital Systems and Microprocessors  Not offered this year ST

An introduction to the structure, organization, and operation of digital electronic systems for nondepartmental students. Implementation of digital subsystems using small-scale integrated circuits as functional modules. Introduction to microprocessor-based digital systems and applications. Three hours of lectures, one laboratory. Prerequisite: an introductory computer science course. Staff

ELE 218 Learning Theory and Epistemology (see PHI 218)

ELE 222A The Computing Age (also EGR 222A)  Not offered this year

The past several decades have seen an exponential growth in computing as reflected in modern computers as well as consumer products such as music/video players and cell phones. This course will explore the reasons for this growth through studying the core principles of computing. It will cover representation of information including video and music, the design of computers and consumer devices, and their efficient implementation using computer chips. Finally, it will examine the technological factors that will likely limit future growth and discuss the societal impact of this outcome. Two 90-minute lectures, one preceptorial. Staff

ELE 222B The Computing Age (also EGR 222B)  Not offered this year ST

The past several decades have seen an exponential growth in computing as reflected in modern computers as well as consumer products such as music/video players and cell phones. This course will explore the reasons for this growth through studying the core principles of computing. It will cover representation of information including video and music, the design of computers and consumer devices, and their efficient implementation using computer chips. Finally, it will examine the technological factors that will likely limit future growth and discuss the societal impact of this outcome. Two 90-minute lectures, one three-hour laboratory. Staff

ELE 301 Circuits and Signal Processing  Fall

Basic principles and implementations of analog and digital signal processing illustrated with weekly circuit/simulation laboratories. Signals, signal operations, and convolution. AM and FM signals. Fourier and Laplace analysis, sampling, oscillators, feedback, and stability. MATLAB and SPICE computer simulation tools. Three hours of lectures, weekly laboratory, optional preceptorial. Prerequisites: 201, 203. P. Cliff

ELE 302 System Design and Analysis  Spring

Comprehensive laboratory-based course in electronic system design and analysis. Covers formal methods for the design and analysis of moderately complex real-world electronic systems. Course is centered around a semester-long design project involving a computer-controlled vehicle designed and constructed by teams of two students. Integrates microprocessors, communications, and control. Three lectures, one laboratory; open laboratory during final month. Prerequisites: 206 and 301 or permission of instructor. B. Dickinson

ELE 341 Solid-State Devices  Fall

http://www.princeton.edu/ua/
The physics and technology of solid-state devices. Topics include: p-n junctions and two terminal devices, transistors, silicon controlled rectifiers, field effect devices, silicon vidicon and storage tubes, metal-semiconductor contacts and Schottky barrier devices, microwave devices, junction lasers, liquid crystal devices, and fabrication of integrated circuits. Three hours of lectures. Prerequisite: 208 or the equivalent. A. Kahn

**ELE 342 Physical Principles of Electronic Devices**  
Spring

Fundamental principles of solid-state and optoelectronic device operation. Principles of quantum mechanics (Schrödinger equation, operator and matrix methods) important to a basic understanding of solid-state and quantum electronics. Topics in statistical mechanics, including distribution functions, density of states, Maxwell-Boltzmann, Fermi-Dirac, and Bose-Einstein statistics. Applications to atoms, molecules, lasers, and solids, with special emphasis on semiconductors. Three hours of lectures. R. Bhatt

**ELE 351 Electromagnetic Field Theory and Optics**  
Fall

Electromagnetic field theory with emphasis on engineering applications. Review of static fields, Maxwell's equations, wave propagation, reflection and refraction, dielectric and metallic waveguides, fiber optics and practical concepts in lightwave communications systems. Three hours of lectures, one laboratory. Prerequisite: PHY 104. G. Wysocki

**ELE 352 Physical Optics**  
Spring

Fundamental and practical aspects of physical optics. Lenses and ray optics, lens maker's formula, wave propagation, Fourier optics, Gaussian beams are all considered. Design and use of practical optical systems including optical beam steering in medicine, fiber optics. Three hours of lectures. Prerequisite: PHY 104. J. Fleischer

**ELE 375 Computer Architecture and Organization (see COS 375)**

**ELE 382 Distributed Algorithms and Optimization Methods for Engineering Applications**  
Fall

Introduces distributed algorithms to optimize networked systems in electronic, mechanical, or biochemical substrates and other methodologies of optimization, both structures and numerical algorithms, for a variety of engineering applications. Applications will be selectively drawn from the following: computer networking, Internet protocols, communication systems, signal processing, circuit design, controlled dynamic systems, computational geometry, and financial engineering. Two 90-minute lectures. Prerequisite: MAT 202. No previous exposure to optimization theory, algorithms, or any specific application areas is required. Staff

**ELE 386 Cyber Security (also EGR 386)**  
Spring

The technology underlying secure transactions and safe interactions in a public Internet and wireless world. Humans interact daily with each other, with information, and with services through cyberspace. Topics include policy, economic, and social issues related to cyber security needs such as confidentiality, data integrity, user authentication, trust, non-repudiation, availability, privacy and anonymity, case studies in electronic commerce, denial of service attacks, viruses and worms, digital rights management, surveillance, and cyber-terrorism. Two 90-minute lectures. R. Lee

**ELE 391 The Wireless Revolution: Telecommunications for the 21st Century (also EGR 391)**  
Spring

This interdisciplinary course addresses technological, regulatory, economic, and social issues arising in the rapidly developing field of wireless communications. The course introduces students to a major technological trend that will be a significant force in worldwide commercial and social development throughout the 21st century. Prerequisites: MAT 103 or permission of instructor. Two 90-minute lectures. S. Kulkarni

**ELE 397 Junior Independent Work**  
Fall

Provides an opportunity for a student to concentrate on a "state-of-the-art" project in electrical engineering. Topics may be selected from suggestions by faculty members or proposed by the student. The final choice must be approved by the faculty member. B. Dickinson

**ELE 398 Junior Independent Work**  
Spring

Provides an opportunity for a student to concentrate on a "state-of-the-art" project in electrical engineering. Topics may be selected from suggestions by faculty members or proposed by the student. The final choice must be approved by the faculty member. B. Dickinson

**ELE 401 Analog Electronics**  
Not offered this year

Bipolar and field effect transistors; operational amplifiers; general feedback amplifiers; low- and high-power amplifiers; differential amplifiers; amplifier chains; high-frequency models; D/A and A/D integrated circuits; computer-aided circuit modeling. Three hours of lectures, one hour of preceptorial, weekly laboratory. Prerequisites: 203 or equivalent: 208/301 recommended or concurrent. Staff

**ELE 402 Digital Electronics**  
Not offered this year

Application of semiconductor devices to the implementation of digital logic functions, with an emphasis on integrated circuits. MOS and bipolar transistor operation and their use in logic families such as NMOS, CMOS, TTL, ECL. Static and dynamic circuits. Speed, power, layout, area, and other performance tradeoffs, computer simulation. Principles of semiconductor memory circuits (ROM, SRAM, DRAM, EPROM, and others). Three hours of lectures, one laboratory. Prerequisite: 203 (206 is desirable). Staff

**ELE 412 Electrical Engineering Design Laboratory**  
Not offered this year

http://www.princeton.edu/ua/
A project-oriented design laboratory. Topics may include analog and digital electronic systems, feedback control systems, power electronic systems, microprocessor system applications, digital control systems, computer simulation as a design tool, and communication systems. Emphasis will be on a systematic approach to design and the implementation or simulation of the resulting design project. Seminar-type lectures, one laboratory. Staff

ELE 441 Solid-State Physics I Fall

An introduction to the properties of solids. Theory of free electrons--classical and quantum. Crystal structure and methods of determination. Electron energy levels in a crystal: weak potential and tight-binding limits. Classification of solids--metals, semiconductors, and insulators. Types of bonding and cohesion in crystals. Lattice dynamics, phonon spectra, and thermal properties of harmonic crystals. Three hours of lectures. Prerequisite: 342, or PHY 208 and 305, or equivalent. M. Shayegan, S. Lyon

ELE 442 Solid-State Physics II Spring


ELE 449 Materials and Solid-State Device Laboratory Not offered this year

This course comprises several experiments that exemplify materials characterization, handling, and fabrication techniques in current solid-state device technology. Examples are: minority carrier drift, pnp transistor fabrication and characterization, planar technology, thin film device fabrication and characterization, Hall mobility in semiconductors, and photoconductivity. One laboratory, some laboratory lectures. Prerequisite: 208, 342. Staff

ELE 453 Optical Electronics Fall

Electromagnetic waves. Gaussian beams. Optical resonators. Interaction of light and matter. Lasers. Mode locking and Q-switching in lasers. Three hours of lectures. Prerequisites: 351 or 352 or PHY 304 or permission of instructor. H. Türeci

ELE 454 Photonics and Light Wave Communications Spring

Introduction to fiber-optic communication systems. Optical detectors and receivers. Design and performance of direct detection systems. Coherent light wave systems. Multichannel WDM communication systems. Optical amplifiers. Soliton communication systems. Three hours of lectures. Prerequisite: 351 or 352. P. Prucnal

ELE 462 Design of Very Large-Scale Integrated (VLSI) Systems (also COS 462) Fall

The implementation of digital systems using integrated circuit technology. Emphasis on structured design methodologies for VLSI systems. Topics include: design rules for metal oxide semiconductor (MOS) integrated circuits, implementation of common digital components, tools for computer-aided design, novel architectures for VLSI systems. Three hours of lectures. Prerequisite: 206. N. Verma

ELE 463 Computer-Aided Design of Digital Systems (also COS 463) Not offered this year

Algorithms and methodologies for the synthesis, analysis, and verification of digital systems. Topics include layout synthesis, logic synthesis, sequential synthesis, and data management. Three hours of lectures. Prerequisite: 206. Recommended: 462 and COS 226. Staff

ELE 465 Switching and Sequential Systems Fall

Theory of digital computing systems. Topics include logic function decomposition, reliability and fault diagnosis, synthesis of synchronous circuits and iterative networks, state minimization, synthesis of asynchronous circuits, state-identification and fault detection, finite-state recognizers, definite machines, information lossless machines. Three hours of lectures. Prerequisite: 206. S. Kung

ELE 466 Digital System Testing Not offered this year

Component-level issues related to testing and design/synthesis for testability of digital systems. Topics include test generation for combinational and sequential circuits, design and synthesis for testability, and built-in self-test circuits. Three hours of lectures. Prerequisite 206. Staff

ELE 469 Human-Computer Interface Technology (see COS 436)

ELE 475 Computer Architecture (also COS 475) Spring

An in-depth study of the fundamentals of modern processor and system design. Students will develop a strong practical and theoretical background in the technical and economic issues that govern the design of computer architectures and implementations. The course will emphasize the skills required to design and evaluate current and future systems. Three hours of lectures. Prerequisites: 206, 375. M. Martonosi

ELE 481 Machine Vision Not offered this year

Introduction to the basic theory and methods of machine vision. Topics include image formation, edge detection and image segmentation, shape from shading, stereo, texture, motion, variation and Markov random field methods, interpretation of line drawings, surface and shape representations, model-based recognition. Three hours of lectures, one laboratory. Prerequisite: 301, MAT 201-202 or MAT 203-204. Staff
ELE 482 Digital Signal Processing  Spring
The lectures will cover: (1) Basic principles of digital signal processing. (2) Design of digital filters. (3) Fourier analysis and the fast Fourier transform. (4) Roundoff errors in digital signal processing. (5) Applications of digital signal processing. B. Liu

ELE 483 Feedback Systems  Not offered this year
The study of automatic control systems. Classical scalar input-output analysis and design using root locus and graphical techniques in the frequency domain. Modern multiple input-output analysis and design using state space methods and optimization theory. Three hours of lectures. Prerequisites: 301; MAT 301 or equivalent. Staff

ELE 485 Signal Analysis and Communication Systems  Fall
Modulation of analog and digital information: continuous-wave modulation; pulse modulation of digital data; multiplexing and pulse modulation of analog signals. Review of probability, random variables, and random signals; correlation functions and power spectra. Analysis of communication systems: probability of error in digital modulation and signal-to-noise ratio analysis of analog modulation. Three hours of lectures, one three-hour laboratory. Prerequisites: 301, MAT 301 or equivalent. Staff

ELE 486 Digital Communications and Networks  Spring
Introduction to digital communication systems and networks, introductory information and coding theory, digital modulation, layered architecture concept of networks, introductory traffic and queuing theory, local area networks and media access control, error control in networks, switching and multiplexing, ATM (asynchronous transfer mode) in B-ISDN (broadband integrated services digital networks). Three hours of lectures. Prerequisites: 301, ORF 309. P. Henry

ELE 488 Image Processing  Spring
Introduction to the basic theory and techniques of two- and three-dimensional image processing. Topics include image perception, 2-D image transforms, enhancement, restoration, compression, tomography and image understanding. Applications to HDTV, machine vision, and medical imaging, etc. Three hours of lectures, one laboratory. Prerequisite: 301. B. Liu

ELE 491 High-Tech Entrepreneurship (also EGR 491/ORF 491)  Fall, Spring
Designed for seniors in the sciences and engineering who are interested in starting a high-tech company early in their careers or who want to join emerging technology companies after graduation. The course is open to any student with a strong background in technology who is interested in launching new enterprises. Two 90-minute lectures. E. Zschau

ELE 497 Senior Independent Work  Fall
Subjects chosen by the student with the approval of the faculty for independent study. A final report is required. B. Dickinson

ELE 498 Senior Independent Work  Spring
Subjects chosen by the student with the approval of the faculty for independent study. A final report is required. B. Dickinson
Program in Engineering Biology

**Director**
Robert K. Prud'homme

**Executive Committee**
Jannette L. Carey, Chemistry
Bradley W. Dickinson, Electrical Engineering
Philip G. Felton, Molecular Biology
Christodoulos A. Floudas, Chemical and Biological Engineering
Peter R. Jaffé, Civil and Environmental Engineering
Andrea S. LaPaugh, Computer Science
A. James Link, Chemical and Biological Engineering
Michael G. Littman, Mechanical and Aerospace Engineering
Robert K. Prud'homme, Chemical and Biological Engineering
Stanislav Y. Shvartsman, Chemical and Biological Engineering, Lewis-Sigler Institute for Integrative Genomics
Mona Singh, Computer Science, Lewis-Sigler Institute for Integrative Genomics
Winston O. Soboyejo, Mechanical and Aerospace Engineering

The Program in Engineering Biology is designed for those highly motivated students who are interested in pursuing careers or graduate education in the areas of biotechnology or bioengineering. The interface between engineering science and the life sciences is an area of dramatic growth and intellectual vigor. Innovations and new developments in this area require multidisciplinary approaches and greater exposure to life science and engineering science fundamentals than is available from a single department. For engineering majors, in addition to courses in those subjects fundamental to the student's major, the program encourages the study of cellular and molecular biology, genetics, physiology, biochemistry, and neuroscience. For biological and chemical sciences majors, the program offers study in biotechnology, biomechanics, thermodynamics, control theory, hazardous waste management, electronics, computer graphics, and information theory.

**Admission to the Program**

Students are formally admitted to the program once they have declared a major. Any student enrolled in the School of Engineering and Applied Science or the Departments of Chemistry, Ecology and Evolutionary Biology, or Molecular Biology is eligible to participate in the program. A student planning to enroll in the program should submit an application, which is available in A201 EQquad or on the program's website. Freshmen are encouraged to do this as early as possible to begin planning appropriate course sequences.

**Program of Study**

An engineering biology student will normally satisfy both program and departmental requirements. The program will be developed by the student and his or her departmental adviser in consultation with the special adviser in engineering biology. In some cases courses taken under the program requirements may be applied toward the fulfillment of regular departmental requirements. The program requirements are as follows:

1. Five biology/life science courses selected with the approval of the student's engineering biology adviser. The courses should represent a coherent program in some aspect of biological science. To ensure depth as well and breadth, at least two of the courses should be upper-division courses.

2. Five engineering courses selected with the approval of the student's engineering biology adviser. The courses should represent a coherent program in engineering science, such as biotechnology, waste management, biomechanical sensor technology, neural networks, or computer graphics, although they need not be in a single department. At least two of these courses should be at the upper-division level or required courses taken by departmental majors. Many upper-division engineering courses require calculus and/or differential equations (MAT 104, MAT 202, and MAE 305, or equivalent), and students should allow for these requirements in planning course selections.

3. Close collaboration with faculty is expected. Students are required to complete, with the grade of B- or better, at least one semester of independent work in an appropriate area in engineering biology. This independent work is coordinated with the student's department in order to satisfy departmental requirements for the senior thesis or senior independent research.

The growth of interdisciplinary research in bioengineering has led to the creation of several courses in the engineering school that satisfy the biology/life science course requirement, and courses taught in molecular biology that satisfy the engineering course requirements. Several physiology-oriented courses in the psychology department satisfy the life science course requirement. Students should consult the program's website for an updated list of courses that satisfy the program requirements.

Program students are expected to demonstrate strong academic performance. To qualify for the engineering biology certificate upon graduation, a minimum grade average of B- in the program courses is required. Program courses may not be taken on a pass/D/fail basis.

Additional information can be obtained at the Program in Engineering Biology website [http://www.princeton.edu/engbio/].

**Certificate of Proficiency**

http://www.princeton.edu/ua/
Students who fulfill the requirements of the program receive a certificate of proficiency in engineering biology upon graduation.
Program in Engineering Physics

Director
Edgar Y. Choueiri

Executive Committee
Edgar Y. Choueiri, Mechanical and Aerospace Engineering
Zahid Hasan, Physics

Antoine Kahn, Electrical Engineering
Stephen A. Lyon, Electrical Engineering
Daniel R. Marlow, Physics
Athanassios Panagiotopoulos, Chemical and Biological Engineering

Interdisciplinary areas in physical sciences in engineering such as energy, environment, materials, microelectronics, astronautics, and photonics promise to become increasingly relevant in the 21st century. The Program in Engineering Physics, which provides students with a fundamental knowledge of physics, together with problem-solving skills and an understanding of engineering, is designed to address the needs of students seeking innovative careers in today's technological age. In addition, it allows students to keep their options open between physical sciences and engineering. Following completion of the engineering physics program, students typically enter careers in engineering, applied science, or applied physics through research, teaching, or entrepreneurial engineering. Past graduates have also pursued other careers as diverse as medicine, business, and law.

The program offers a unique combination of engineering, mathematics, and physics. It is directed toward students who have interest and ability in both engineering and physics. For engineering majors, in addition to courses in those subjects fundamental to the student's field of interest, the program requires courses in quantum mechanics and encourages study of subjects such as electromagnetism, statistical mechanics, thermodynamics, condensed matter physics, mathematical physics, complex analysis, and partial differential equations. For physics majors, the program requires courses in engineering design plus specialization in topics such as solid-state electronics, fluid mechanics, optics/optoelectronics, control theory, computers and computational methods, or a variety of other applied disciplines. Computer science A.B. students are required to meet the technical course requirements needed to satisfy the B.S.E. degree. An engineering physics certificate is awarded upon graduation to students successfully completing the program. Exceptionally outstanding students are awarded the Jeffrey O. Kephart Prize (one per year). The program committee also selects yearly winners of independent work awards, conference travel support, and summer fellowships.

Additional information on the program, faculty, and past and current students can be found on the program's website.

Admission to the Program

Any student who satisfactorily completes the B.S.E. freshman year program or its equivalent is eligible for admission to the program. Engineering students entering the program are strongly encouraged to complete PHY 203, 208 and MAT 201, 202 or their equivalents by the end of the sophomore year.

In applying for admission to the program, a student should indicate interest in a particular area of engineering and should be enrolled as a major in one of the five participating engineering departments or in physics. A student planning to enroll in the program should consult the director of the program, who will assign a special adviser to help plan a curriculum.

Program of Study

An engineering physics major will normally satisfy both program and departmental requirements. The curriculum for each student is worked out by the student and his or her departmental adviser in consultation with the special adviser in engineering physics. In some cases, courses taken under the program requirements may be applied toward the fulfillment of regular departmental requirements. The program requirements are as follows:

1. All students must take two upperclass courses in mathematics (300 and 400 level).

2. Engineering majors must take a minimum of six advanced courses in physics (which may include the following 200-level courses: PHY 205, 207, 209, and 210), including the quantum mechanics sequence (PHY 208, PHY 305). At least five of the courses must be listed (or cross-listed) in the physics department. In order to accommodate specific student interests, there is particular flexibility with regard to the sixth course, which may be a course with a strong physics content from other departments such as astrophysical sciences or chemistry, but must be approved in advance by the program's committee.

Physics majors enrolled in the program must have five engineering courses, chosen in consultation with their adviser. In order to gain exposure to the design-oriented philosophy of engineering, physics students are required to take at least two of their engineering courses in a coherent area of study so that a clear engineering stem can be identified, and a "core" engineering design course selected from those designated as such by five of the departments in the School of Engineering and Applied Science (CBE 442, CEE 366, CEE 477, COS 217, ELE 302, MAE 321).

3. Close collaboration with faculty is expected. Students are required to complete, with a grade of B- or better, at least one semester of independent work in an appropriate area. Physics students are encouraged to have a professor in engineering serve as a reader on their senior thesis.

http://www.princeton.edu/ua/
4. Program students are expected to demonstrate strong academic performance. To qualify for the engineering physics certificate upon graduation, a minimum grade average of B- in the program courses is required. Courses taken pass/D/fail are permitted, but a pass counts as a C in determining grade average.

Further details can be obtained by contacting the director or visiting the program's website.

**Certificate of Proficiency**

Students who fulfill the requirements of the program will receive a certificate of proficiency in engineering physics upon graduation.

http://www.princeton.edu/ua/
The undergraduate educational mission of the School of Engineering and Applied Science of Princeton University is to educate future leaders in engineering practice, research and education, business and finance, public service, and other professions. Students learn fundamental engineering principles and how to apply them to real-world problems whose solutions require an interdisciplinary perspective. Princeton offers its students a liberal education and encourages them to take advantage of its outstanding resources and facilities. The engineering school provides a rich educational environment that fosters interaction between talented students and an internationally renowned faculty. Through independent projects that require students to frame research questions, identify solutions, define priorities, and communicate findings, our students are uniquely prepared for challenging careers. Princeton engineering alumni are recognized for their ability, creativity, initiative, integrity, and vision for making the world a better place.

Engineering education at Princeton emphasizes the fundamental principles of mathematics and the physical and engineering sciences. It is broadened by substantial opportunities for study of the social sciences, the life sciences, and the humanities. Each engineering undergraduate can develop an academic program that reflects his or her aspirations and interests within a general framework of requirements. The depth and flexibility of the program make it a sound background for engineering practice or graduate study in engineering, science, business, law, or medicine. Curricula in engineering fields are offered through six academic departments:

- Chemical and Biological Engineering
- Civil and Environmental Engineering
- Computer Science
- Electrical Engineering
- Mechanical and Aerospace Engineering
- Operations Research and Financial Engineering

Design is the primary distinction between engineering and science, connoting the application of scientific and mathematical principles not only to the understanding of physical phenomena but the solution of specific problems. It is important that all B.S.E. students be exposed to technical course materials in the context of engineering design, have the opportunity for significant design experiences, and be apprised explicitly of the ways in which design is integrated within the engineering curriculum. Each department addresses this important issue in tailoring its programs to the needs of individual students, as articulated in descriptions of its courses and curriculum.

Interdepartmental curricula are presented in the following programs:

- Applications of Computing
- Architecture and Engineering
- Engineering and Management Systems
- Engineering Biology
- Engineering Physics
- Geological Engineering
- Information Technology and Society
- Materials Science and Engineering
- Robotics and Intelligent Systems
- Sustainable Energy

Students also may combine an engineering curriculum with study in depth in other fields, such as foreign area studies or public and international affairs.

Most University programs and opportunities are available to B.S.E. as well as to A.B. candidates. A description of these is contained in the "Special Features of the Undergraduate Program" section. Of particular interest to B.S.E. students are the sections concerning advanced placement, advanced standing, writing requirement, auditing courses, graduate courses, and optional additional courses. Engineering students should also be aware of their eligibility for the Programs in Applied and Computational Mathematics, Creative Writing, Dance, Environmental Studies, Linguistics, Musical Performance, Teacher Preparation, Theater, Visual Arts, Women and Gender, and the Woodrow Wilson School of Public and International Affairs, and many other certificate programs.

Engineering students are encouraged to obtain international experience through participation in the University's Study Abroad Program or through summer internships and language study abroad. Interested students should begin planning early by meeting with the associate dean for undergraduate affairs to discuss suitable programs at foreign universities.

**Preparation for Graduate Study.** The curriculum of the School of Engineering and Applied Science provides a strong foundation for graduate study. Graduate courses are readily accessible to qualified undergraduates.

**Keller Center for Innovation in Engineering Education.** The Keller Center for Innovation in Engineering Education
Engineering (EGR) Courses. The School of Engineering and Applied Science offers several courses that have interdisciplinary content integrating engineering, natural sciences, social sciences, and humanities and are of broad interest to students from across the University. These courses typically have no prerequisites. Additional EGR courses are those with focused computer science, engineering, or mathematical content. These courses are relevant to students beyond the home department. These courses are listed in Course Offerings under engineering and bear the label EGR. For a list of all EGR courses by category, please check the Keller Center’s website.

Courses

EGR 102A Engineering in the Modern World (see CEE 102A)

EGR 102B Engineering in the Modern World (see CEE 102B)

EGR 103 New Eyes for the World: Hands-On Optical Engineering (see ELE 102)

EGR 105 Lab in Conservation of Art (see CEE 105)

EGR 106 The Science and Technology of Decision Making (see ORF 105)

EGR 109 Computers in Our World (see COS 109)

EGR 116 The Computational Universe (see COS 116)

EGR 126 General Computer Science (see COS 126)

EGR 191 An Integrated Introduction to Engineering, Mathematics, Physics (also MAT 191/PHY 191) Fall ST

Taken concurrently with EGR/MAT/PHY 192. An integrated course that covers the material of PHY 103 and MAT 201 with the emphasis on applications to engineering. Physics topics include: mechanics with applications to fluid mechanics, wave phenomena, and thermodynamics. The lab revolves around a single project to build, launch, and analyze the flight dynamics of water-propelled rockets. One lecture, three preceptorials, one three-hour laboratory. R. Austin, J. Rexford

EGR 192 An Integrated Introduction to Engineering, Mathematics, Physics (also MAT 192/PHY 192) Fall QR

Taken concurrently with EGR/MAT/PHY 191. An integrated course that covers the material of PHY 103 and MAT 201 with the emphasis on applications to engineering. Math topics include: vector calculus; partial derivatives and matrices; line integrals; simple differential equations; surface and volume integrals; and Green’s, Stokes’s, and divergence theorems. One lecture, two preceptorials. I. Daubechies, J. Rexford

EGR 193 An Integrated Introduction to Engineering, Mathematics, Physics (also MAT 193/PHY 193) ST

Taken concurrently with EGR/MAT/PHY 194. These two courses will address the material of PHY 104 and offer an introduction to the various disciplines of engineering. The physics part of the course covers the basic laws of electricity, magnetism, and optics from Coulomb’s law to Maxwell’s equations and the prediction of electromagnetic waves. The course concludes with an introduction of quantum theory with a treatment of matter waves, quantization, and the Schroedinger equation. Students who were enrolled in both EGR/MAT/PHY 191 and 192 concurrently in the fall semester will continue in the spring in both EGR/MAT/PHY 193 and 194. F. Calaprice

EGR 194 An Introduction to Engineering Spring

This project-based course offers an introduction to the various disciplines of engineering. Current projects include: energy conversion and the environment; robotic remote sensing; and wireless image and video transmission. Projects focus on engineering disciplines and their relationship to the principles of physics and mathematics. Three lectures, one three-hour laboratory. J. Rexford, J. Benziger, M. Littman

EGR 199 Great Inventions That Changed the World (see CBE 199)

EGR 218 Learning Theory and Epistemology (see PHI 218)

EGR 222A The Computing Age (see ELE 222A)

EGR 222B The Computing Age (see ELE 222B)

EGR 228 Energy Solutions for the Next Century (see MAE 228)

EGR 245 Fundamentals of Engineering Statistics (see ORF 245)

EGR 251 Engineering Projects in Community Service (EPICS) Fall, Spring
In the Engineering Projects in Community Service (EPICS) program, students earn academic credit for their participation in multidisciplinary design teams that solve technology-based problems for local not-for-profit organizations. The teams are: multidisciplinary--drawing students from across engineering and around the University; vertically integrated--maintaining a mix of freshmen through seniors each semester; and long-term--each student may participate in a project for up to six semesters. The continuity, technical depth, and disciplinary breadth of these teams enable delivery of projects of significant benefit to the community. M. Littman, W. Soboyejo

EGR 260 Ethics and Technology: Engineering in the Real World (see CBE 260)

EGR 262A Structures and the Urban Environment (see CEE 262A)

EGR 262B Structures and the Urban Environment (see CEE 262B)

EGR 277 Technology and Society (also SOC 277/HIS 277) Spring SA
Technology and society are unthinkable without each other: each provides the means and framework in which the other develops. To explore this dynamic, this course investigates a wide array of questions on the interaction between technology, society, politics, and economics, emphasizing the themes of innovation and maturation, systems and regulation, risk and failure, and ethics and expertise. Specific topics covered include nuclear power and waste, genetically modified organisms, regulation of the Internet, medical mistakes, intellectual property, the financial crisis of 2008, and the post-fossil-fuels economy. No prerequisites. Two lecture M. Gordin

EGR 305 Mathematics in Engineering I (see MAE 305)

EGR 307 Optimization (see ORF 307)

EGR 309 Probability and Stochastic Systems (see ORF 309)

EGR 328 Energy for a Greenhouse-Constrained World (see MAE 328)

EGR 351 Engineering Projects in Community Service (EPICS) Fall, Spring
In the Engineering Projects in Community Service (EPICS) program, students earn academic credit for their participation in multidisciplinary design teams that solve technology-based problems for local not-for-profit organizations. The teams are: multidisciplinary--drawing students from across engineering and around the University; vertically integrated--maintaining a mix of freshmen through seniors each semester; and long-term--each student may participate in a project for up to six semesters. The continuity, technical depth, and disciplinary breadth of these teams enable delivery of projects of significant benefit to the community. M. Littman, W. Soboyejo

EGR 386 Cyber Security (see ELE 386)

EGR 391 The Wireless Revolution: Telecommunications for the 21st Century (see ELE 391)

EGR 445 Entrepreneurial Engineering (see MAE 445)

EGR 451 Engineering Projects in Community Service (EPICS) Fall, Spring
In the Engineering Projects in Community Service (EPICS) program, students earn academic credit for their participation in multidisciplinary design teams that solve technology-based problems for local not-for-profit organizations. The teams are: multidisciplinary--drawing students from across engineering and around the University; vertically integrated--maintaining a mix of freshmen through seniors each semester; and long-term--each student may participate in a project for up to six semesters. The continuity, technical depth, and disciplinary breadth of these teams enable delivery of projects of significant benefit to the community. M. Littman, W. Soboyejo

EGR 491 High-Tech Entrepreneurship (see ELE 491)

EGR 492 Technical Innovation and Foreign Policy (also WWS 493) Fall
This course analyzes how technical innovation in the private sector serves to create or resolve international disputes. Students learn to assess the impact of rapid, discontinuous innovation on foreign policy outcomes, how to trace the underlying scientific source of these innovations, and how business managers and government regulators grapple with technical innovation. Students also become handy with basic decision-tree analysis. From a theoretical perspective, this course focuses on the interface between regulatory policy and markets, between the theory of public goods and the hard realities of private profit. Two 90-minute lectures. J. Shinn

EGR 493 Managing High-Growth Entrepreneurial Ventures
This course focuses on the management of growth in entrepreneurial settings, both in smaller growing companies and larger corporations. In addition to developing analytical skills through case method readings and discussions, students also participate in a sophisticated multi-week simulation exercise in which student teams compete to build high growth companies in a competitive, rapidly changing environment. The course will be useful to both engineering and non-engineering students who have interests in growing their own entrepreneurial companies and/or using entrepreneurial tools and concepts to manage the growth of existing companies. J. Lange

EGR 495 Special Topics in Entrepreneurship Fall, Spring
Covers topical issues highlighting the impact of engineering on society through entrepreneurship. Topics and course format vary from year to year. Staff

http://www.princeton.edu/ua/
Program in Engineering and Management Systems

Director
Warren B. Powell

Executive Committee
Christodoulos A. Floudas, Chemical and Biological Engineering
Alain L. Kornhauser, Operations Research and Financial Engineering
Sanjeev Kulkarni, Electrical Engineering
Robert E. Schapire, Computer Science
James A. Smith, Civil and Environmental Engineering
Robert F. Stengel, Mechanical and Aerospace Engineering

The certificate Program in Engineering and Management Systems provides students with tools for the complex decision-making problems that arise in engineering and management. It is aimed at three types of students:

1. Engineering students interested in preparing for careers in management or consulting.

2. Students in the liberal arts looking to acquire the analytical tools typically used for careers in corporate or government settings.

3. Students in the sciences interested in a stronger exposure to analytical methods, and potentially careers in management or public policy.

It offers a coherent, integrated set of core courses that are based on analytical methods with applications in the planning and control of complex systems required by a modern technological society. Emphasis is placed on rigorous modeling and analysis, taking advantage of the vast flow of data and ubiquitous computing power available today.

The EMS certificate program complements both the Program in Finance certificate and the certificate Program in Applied and Computational Mathematics. Our emphasis is on developing analysis skills that are useful in engineering and management.

Admission to the Program

The EMS certificate program is open to both B.S.E. and A.B. majors.

B.S.E. students are eligible for admission to the program once they have completed the engineering school core program (or its equivalent):

1. Mathematics through MAT 202
2. PHY 103 and 104
3. CHM 201
4. One course in computing at the level of COS 126

The certificate is available to A.B. students who have completed:

1. The required two science and technology courses (with laboratory)
2. Mathematics through MAT 202, and
3. One course in computing (typically COS 126)

These requirements are satisfied if a student (A.B. or B.S.E.) has received AP credit in the course.

To be admitted, interested students should e-mail the director of the program, stating that you would like to participate in the program. Please include your class and major, and let the director know if you have placed out of any course requirements. Send your request to Professor Powell [mailto:powell@princeton.edu].

Program of Study

The program for each student is worked out by the student and his or her departmental adviser. In some cases, a course can fulfill both a certificate program requirement and a regular departmental requirement. The program requirements are as follows:

Course requirements. All students must take courses from the following six areas:

1. ECO 100 Introduction to Microeconomics
2. An introductory statistics course:
   ORF 245 Fundamentals of Engineering Statistics
   ECO 202 Statistics and Data Analysis for Economics
   PSY 251 Quantitative Methods
3. PHY 301 Thermal Physics and PHY 312 Experimental Physics (both courses must be taken)
3. An introductory optimization course:
   ORF 307 Optimization
   ELE 382 Distributed Algorithms and Optimization Methods for Engineering Applications
   CBE 442 Design, Synthesis, and Optimization of Chemical Processes
   MAE 433 Automatic Control Systems

4. A course in probability:
   ORF 309 Probability and Stochastic Systems
   MAT 390 Probability Theory

5. A course integrating optimization and uncertainty:
   ORF 311 Optimization under Uncertainty
   ORF 417 Dynamic Programming
   ORF 418 Optimal Learning
   ORF 547 Dynamic Programming (graduate level)
   ECO 317 Economics of Uncertainty
   ECO 418 Strategy and Information
   WWS 312/PSY 321 Psychology of Decision Making and Judgment

6. ORF 411 Operations and Information Engineering

AP credit is allowed for ECO 100 (requires a 5 on the AP exam). AP credit is not allowed for statistics.

**Independent Work**

Acceptable theses can be on a wide range of topics, as long as a significant portion of the thesis uses tools from some part of the core program (statistics, probability and stochastic processes, optimization). Topics do not have to be drawn from business or finance.

Theses that are not allowed include "soft" topics such as the history of the Chinese economy, and hard-science theses (laboratory-based theses) that do not have a significant data-analysis component.

**Certificate of Proficiency**

Students who fulfill the requirements of the program receive a certificate of proficiency in engineering and management systems upon graduation.
Department of English

Chair
Claudia L. Johnson

Acting Chair
Anne A. Cheng (fall)

Associate Chair
Anne A. Cheng

Acting Associate Chair
Michael G. Wood (fall)

Departmental Representative
Esther H. Schor

Director of Graduate Studies
Deborah E. Nord

Professor
Daphne A. Brooks, also African American Studies
Eduardo L. Cadava
Anne A. Cheng, also African American Studies
Lawrence N. Danson
Maria A. DiBattista, also Comparative Literature
Jill S. Dolan, also Lewis Center for the Arts, Theater
Diana J. Fuss
Simon E. Gikandi
William A. Gleason
Claudia L. Johnson
Lee C. Mitchell
Deborah E. Nord
Jeff E. Nunokawa
James Richardson, also Lewis Center for the Arts, Creative Writing
Esther H. Schor
D. Vance Smith

Nigel Smith
Valerie A. Smith, also African American Studies
Susan A. Stewart
Susan J. Wolfson
Michael G. Wood, also Comparative Literature

Associate Professor
Andrew Cole
Jeffrey Dolven
Sophie G. Gee
Tamsen O. Wolff

Visiting Associate Professor
Maureen Mclane

Assistant Professor
Zahid R. Chaudhary
Meredith Anne Martin
Sarah Rivett
Gayle M. Salamon
Benjamin L. Widiss
Alexandra T. Vazquez, also African American Studies

Lecturer
Sarah M. Anderson, also Council of the Humanities
Russell Leo, also Council of the Humanities
Richard Montez, also Council of the Humanities
Robert N. Sandberg, also Lewis Center for the Arts, Theater

Visiting Lecturer
T. Colm Tóibín, also Lewis Center for the Arts, Creative Writing

Associated Faculty
April Alliston, Comparative Literature
Leonard Barkan, Comparative Literature

Information and Departmental Plan of Study

In the Department of English, students read widely across the genres and periods of British, American, and Anglophone literature and explore approaches to literary study with a distinguished, internationally renowned faculty. The department's ranks include historicists and formalists, theorists and poets, postcolonialists and feminists; the faculty teach not only poetry, prose, and drama, but film, music, art, architecture, and technology. The department is united by a passion for works of the imagination, for thinking about what and how they mean and the difference they make in the world.

The department offers courses that cover more than two millennia of literature and culture, in settings ranging from large lectures to small seminars to one-on-one advising. A typical program of study embraces new and experimental writing, important rediscoveries, and the most hallowed texts of the Western literary tradition, the news that stays news. The department cultivates a common critical vocabulary and joins in debating enduring questions about art, language, and society. The junior year begins with a diverse array of junior seminars, which couple the study of a specific subject with methodological training in critical reading and writing. Juniors and seniors pursue independent work on subjects of their choosing in collaboration with the faculty, and they may elect tracks in British, American, or Anglophone literatures, arts and media, theory and criticism, creative writing, theater and performance studies, or comparative literatures. The department also encourages concentrators who wish to pursue interdisciplinary work through certificate programs.

English concentrators graduate as incisive readers, cogent thinkers, and persuasive writers. They carry with them a lasting ability to take informed pleasure in all forms of literature, in the process of writing, and in the meanings and powers of culture. Graduates go on to become leaders in such fields as education, law, medicine, journalism, business, politics, and the creative arts. Simply put, learning to read closely and write fluently--the twin pillars of the discipline--are among the most valuable skills graduates can bring to the world's work.

Prerequisites

http://www.princeton.edu/ua/
English department prerequisites provide a background in literary history, and familiarity with one of the major genres. Concentrators take both ENG 200 (British Literature from the 14th to the 18th Centuries) and one of the 200-level Reading Literature courses: ENG 205 (Poetry), ENG 206 (Fiction), ENG 207 (Drama), ENG 208 (The Essay).

**Program of Study**

English concentrators must take a total of 11 courses: two 200-level prerequisites, the Junior Seminar, and eight departmental courses, seven of which must be at the 300 level or above. With the permission of the departmental representative, concentrators may count one cognate course from another department, where that course adds depth or perspective to their studies in English. (Some optional tracks may permit more cognates or specify their nature: see below.)

**Distribution Requirements.** Departmental distribution requirements ensure historical and generic breadth in each concentrator's program of study. Foundations (two courses in British literature before 1800, only one of which can be Shakespeare, and one course in American literature before 1900) grounds concentrators in the history of English. Modernity (one course in literature after 1800) brings them up to date. Diasporas (one course in Anglophone or U. S. minority literatures) explores the racial, cultural, and geographical diversities that inform literary tradition. Theory and Criticism (one course) provides tools for thinking critically across all these periods, identities, and genres. Each semester, the department offers a wide variety of courses in each area, and a full list is available on the department website. (By arrangement with the departmental representative, some courses may satisfy two requirements simultaneously.)

**Tracks.** Optional tracks offer the chance for students with special interests to focus their programs of study within the discipline of English and on questions that lie between disciplines. Concentrators may elect a track at any time: a junior may already know she wants to focus on literary theory; a second-semester senior may realize he has been writing about literature and the arts all along. Some tracks, however, have more requirements than others (comparative literatures, theater and performance studies, and creative writing in particular), and students are advised to make a start as early as the sophomore year. Most concentrators take one day of the comprehensive exams with an emphasis on their track (see below).

**Literature, Culture, Language:**
Concentrators may focus on a particular national or international body of work: British, American, or Anglophone.

British: literature and culture of the British Isles. Requirements: four courses in British literature; one junior paper and the senior thesis on a British topic. One cognate course in another department (history, art and archaeology, etc.) on a British topic may be counted.

American: literature and culture of the territories that become the United States, from native peoples and the first European settlers to the present day. Requirements: four courses in American literature (including at least one of ENG 201, ENG 353, or ENG 366); one junior paper and the senior thesis on an American topic. One cognate course in another department (history, art and archaeology, etc.) on an American topic may be counted. This track is often combined with a certificate in American studies or African American studies.

Anglophone: literature and culture of English as a global language. Four courses in Anglophone literature; one junior paper and the senior thesis on an Anglophone topic. Up to two cognate courses in another department (history, art and archaeology, etc.) on an Anglophone topic may be counted.

**Arts and Media:**
Literature in relation to other arts, including architecture, visual art, film, photography, music (classical, popular, or other); and/or in relation to its circumstances of production and transmission, from manuscript to print to radio, television, and the Internet. Requirements: three courses in topics related to the arts and media, including up to two cognates from other departments; one junior paper and the senior thesis on a related topic.

**Comparative Literatures:**
English in relation to the literature of another language. Requirements: at least three and no more than four 300-level courses in a single foreign language (with no other cognates permitted); one junior paper and the senior thesis on a comparative topic (including translation). With permission of the departmental representative, some foreign language classes may be used to satisfy the departmental distribution requirements.

**Theory and Criticism:**
For students interested in thinking about the underlying principles by which we understand literature. Considers the history and theory of literary interpretation from Plato to the present, including such methods and movements as linguistics, structuralism, feminism, psychoanalysis, Marxism, cultural studies, sex and gender studies, race studies, postcolonial studies, and deconstruction. Requirements: three courses in literary or cultural theory and literary criticism, including either ENG 305 or ENG 306; one junior paper and the senior thesis on a topic in theory and criticism, or making imaginative use of critical methodologies.

**Theater and Performance Studies:**
A home for the study of dramatic literature, performance culture and/or performance studies. Includes traditional theater, live and recorded music, popular culture performances, avant-garde arts, stand-up comedy, street theater, contemporary dance, and slam poetry. Requirements: one introductory class in theater by the end of sophomore year; at least two and not more than three 300- or 400-level courses in theater, counted as departmental courses (no other cognates are allowed); departmental courses must also include one upper-level Shakespeare course, one course in drama and/or performance before 1700, and one course in drama and/or performance after 1700; one junior paper and the senior thesis on a related topic.

**Creative Writing:**
Students elect the creative writing track provisionally; final admission depends on the permission of the Program in
Creative Writing to write a creative thesis. The Department of English recommends that students take at least one 200-level creative writing course by the end of sophomore year. Requirements: minimum of two and a maximum of three courses at the 300 level or above in creative writing counted as departmental courses (no other cognates are allowed); creative thesis.

Individual Program of Study:
By special arrangement with the departmental representative, students may design an interdisciplinary track in an area not covered by the above, counting two courses in other departments toward their eight departmentals.

Independent Work

Senior Theses. For English concentrators, senior theses are typically 20,000 words (or 80 pages) in length, on a topic chosen in collaboration with the thesis adviser and approved by the committee of departmental studies. Twenty pages of the thesis are due in December.

Senior Departmental Examination

Comprehensive examinations are set at the end of the senior year, in two four-hour parts on successive days. The first day consists of 15 to 20 passages from the full range of genres, periods, and geographies taught in the department; students write about three. The second day poses questions on period, genre, and theory; students in one of the tracks will focus on questions particular to their specialization.

Study Abroad

The department encourages students to consider studying abroad for a semester or a year. Courses taken abroad may, with approval, receive both departmental and distribution credit (in general, the department can accept two to three courses for each semester abroad). Students considering study abroad should consult the departmental representative at an early stage.

Certificate Programs. The department encourages concentrators to pursue certificates from other programs in conjunction with their studies in English. The creative writing and theater and performance studies tracks are specifically designed to accommodate students seeking the relevant certificates, and most students who specialize in comparative literatures get a certificate in their second language. Concentrators who specialize in American literature, culture, and language will find the program fits well with certificates in American studies or African American studies, but students in almost any track will find that their work in English can be profitably combined with such certificates as women and gender, Judaic studies, Latin American studies, medieval studies, visual arts, environmental studies, or other programs.

Further Information. For further information, consult the departmental representative and the department's website.

Courses

ENG 132 Imagining America  Not offered this year LA
An introduction to the cross-cultural study of American literatures, with special attention to the multiple points of connection, conflict, dialogue, and exchange that characterize American writings. Texts may be drawn from a broad range of periods, regions, and cultures. One lecture, two classes. Staff

ENG 200 Introduction to English Literature: 14th to 18th Century  Spring LA
An introduction to English literary history. Centered on four great writers--Chaucer, Spenser, Milton, and Pope. Two lectures, 90-minute preceptorial. N. Smith, A. Cole

ENG 205 Reading Literature: Poetry  Fall LA
An introduction to the art of poetry in English from Shakespeare to Mother Goose, from free verse to sestinas, from the beginnings to the 21st century. Discussions will range from the minutiae of how poetry works--rhythm, syntax, trope, image, lineation, sound--to the role of its unique kinds of thinking and feeling in our world. Two lectures, one 90-minute preceptorial. S. Stewart

ENG 206 Reading Literature: Fiction  Fall LA
This course is designed to provoke and cultivate an interest both in close reading of particular texts and in the huge range of different forms of fiction. The goal is to enrich our understanding of the real world by knowing more about how the imagination works. Works studied will run from The Odyssey to contemporary English and American fiction. Two lectures, one 90-minute preceptorial. M. Wood

ENG 207 Reading Literature: Drama  Spring LA
This course is designed to teach students how to read plays as literature written for performance. Key assumptions are that every act of reading is an act of interpretation, that a good reader of dramatic literature engages in an activity nearly identical to that of a good director or actor or designer, and that a reader might learn from theater practitioners

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how to make critical choices based on close reading. Students will get on their feet to explore exactly how a play is what it is. Two lectures, one 90-minute preceptorial. R. Sandberg

ENG 208 Reading Literature: The Essay Not offered this year LA

This course introduces students to the range of the essay form as it has developed from the early modern period to our own. The class will be organized, for the most part, chronologically, beginning with the likes of Bacon and Hobbes, and ending with some contemporary examples of and reflections on the form. It will consider how writers as various as Sidney, Hume, Johnson, Emerson, Woolf, C.L.R. James, and Stephen Jay Gould have defined and revised the essay's shape and scope. Two lectures, one 90-minute preceptorial. J. Nunokawa

ENG 230 Public Speaking Fall LA

Emphasis upon the preparation and delivery of expository and persuasive speeches before audiences composed of the speaker's fellow students. Consultations with the instructor, readings in textbooks, and written analyses of speeches supplement frequent practice in speaking. One 90-minute lecture, two classes. T. Wolff

ENG 240 Origins and Nature of English Vocabulary (see CLA 208)

ENG 241 Introduction to Language and Linguistics (see LIN 201)

ENG 300 Junior Seminar in Critical Writing Fall

Students learn to write clear and persuasive criticism in a workshop setting while becoming familiar with a variety of critical practices and research methods. The course culminates in the writing of a junior paper. Each section will pursue its own topic; students are assigned according to choices made during sophomore sign-ins. Required of all English majors. One three-hour seminar. Staff

ENG 303 The Gothic Tradition (see COM 372)

ENG 305 Contemporary Literary Theory Spring LA

Fundamental questions about the nature, function, and value of literary theory. A small number of strategically selected theoretical topics, including exemplary literary works as reference points for discussion. Two 90-minutes seminars. E. Cadava

ENG 306 History of Criticism (also AAS 370) Not offered this year LA

A study of particular developments in criticism and theory, from Aristotle to Nietzsche. The course will also consider the relation of contemporary criticism to movements and issues such as deconstruction, feminism, psychoanalysis, and cultural materialism. One three-hour seminar. D. Brooks

ENG 310 The Old English Period Not offered this year LA

An intensive introduction to the English language spoken and written in the British Isles approximately 500 to 1100 C.E., leading to a critical survey of the literature. Attention is paid both to linguistic questions and to the cultural context of such poems as Beowulf and the Dream of the Rood. Two 90-minute seminars. S. Anderson

ENG 311 The Medieval Period Spring LA

A study of the Middle English texts that span the period from the Norman Conquest to the Tudor Renaissance, with attention paid to Middle English as a language. Readings will be chosen from verse romance, drama, political and religious writings, romance and/or lyric. Two lectures, one preceptorial. A. Cole

ENG 312 Chaucer Fall LA

A study of Chaucer's art with reference to the intellectual, social, and literary conventions of the Middle Ages. The course introduces the student by this means to the characteristically medieval aspects of Chaucer's poetry. Two lectures, one preceptorial. D. Smith

ENG 320 Shakespeare I Fall LA

A study of Shakespeare's plays, covering the first half of his career. Emphasis will be on each play as a work of art and on Shakespeare's development as a poet and dramatist. Two lectures, one preceptorial. L. Danson

ENG 321 Shakespeare II Spring LA

A study of Shakespeare's plays, covering the second half of his career. Emphasis will be on each play as a work of art and on Shakespeare's development as a poet and dramatist. Two lectures, one preceptorial. L. Danson

ENG 322 Spenser Not offered this year LA

A study of the development of the epic romance from Vergil to Spenser through a reading of the Aeneid and the three great Renaissance epic romances: Ariosto's Orlando Furioso, Tasso's Gerusalemme Liberata, and Spenser's The Faerie Queene. Two lectures, one preceptorial. J. Dolven

ENG 323 The 16th Century Not offered this year LA

The study of 16th-century literature, both prose and poetry, in order to define the achievement of the English Renaissance. Literary accomplishments will be placed in the more general context of Elizabethan culture and
Renaissance intellectual history. Readings in Wyatt, Surrey, Sidney, Shakespeare, Marlowe, Spenser, Donne. Two 90-minute seminars. J. Dolven

ENG 325 Milton  Spring LA
A study of Milton's poetry and prose, with particular attention to Milton's poetic style and development and his indebtedness to various classical traditions. Emphasis will also be given to Milton as thinker and to the place he holds in 17th-century thought. Two lectures, one preceptorial. N. Smith

ENG 326 The 17th Century  Not offered this year LA
A study of the interaction of literature, culture, and politics during the 17th century. The course will focus on the nature of political work done by literary texts, the representation of changing gender relations, and the evolution of literary forms. Authors include Jonson, Herbert, Donne, Marvell, Hobbes, Milton, Dryden, and the Cavalier Poets. Two 90-minute seminars. N. Smith

ENG 327 The English Drama to 1700  Not offered this year LA
A study of English drama from its medieval origins to Restoration comedy, with special attention to the astonishingly vital commercial theater of the Renaissance. The course will consider the aesthetic and cultural power of dramatic texts and the theater's characteristic production of social anxiety. Two lectures, one preceptorial. L. Danson

ENG 328 Topics in the Renaissance  Fall LA
An intensive study of various aspects of Renaissance literature. Topics may include sex and gender in the Renaissance, Shakespearean comedies, Elizabethan and Jacobean drama, Renaissance lyric poetry. Two 90-minute seminars. N. Smith, R. Leo

ENG 329 Topics in the Renaissance  Spring LA
An intensive study of various aspects of Renaissance literature. Topics may include sex and gender in the Renaissance, Shakespearean comedies, Elizabethan and Jacobean drama, Renaissance lyric poetry. Two 90-minute seminars. R. Leo

ENG 330 English Literature of the 18th Century  Fall LA
A study of major figures from the Augustan Age through the Age of Johnson: Swift, Pope, Fielding, Boswell, Johnson, Sterne, and Blake. Selections include a wide range of literary types from Gulliver's Travels and Joseph Andrews to Boswell's London Journal and Blake's Marriage of Heaven and Hell. Two lectures, one preceptorial. S. Gee

ENG 331 English Fiction before 1800  Not offered this year LA
Primarily a course in novels of the 18th century, though early narratives may also be read. Among writers read will be Defoe, Smollett, Richardson, Fielding, Sterne, the Gothic novelists, and Jane Austen. Two lectures, one preceptorial. Staff

ENG 335 American Literature before 1825  Fall LA
An examination of the literature of early America within the context of the intellectual, social, and literary traditions. The course will survey writers from Anne Bradstreet and Edward Taylor to Irving and Cooper, with emphasis on the influence of Puritanism and the Enlightenment. Two lectures, one preceptorial. Staff

ENG 338 Topics in 18th-Century Literature  Not offered this year LA
This course will at different times deal with particular currents of literature and thought in the 18th century, or with individual authors. Two lectures, one preceptorial. Staff

ENG 339 Topics in 18th-Century Literature  Not offered this year LA
This course will at different times deal with particular currents of literature and thought in the 18th century, or with individual authors. Two lectures, one preceptorial. C. Johnson

ENG 340 Romanticism and the Age of Revolution  Fall LA
A study of the Romantic movement in an age of revolutions: its literary culture, its variety of genres, its cultural milieu, and the interactions of its writers. Major figures to be studied include Wollstonecraft, Blake, Wordsworth, and Coleridge. Two 90-minute seminars. S. Wolfson

ENG 341 The Later Romantics  Spring LA
A study of the young writers who defined English literary culture, especially the Romantic movement, in Regency and late Georgian England. Course material will include poetry, prose, and fiction, with emphasis on close reading as well as cultural contexts. Among the major figures to be studied are the Shelleys, Byron, and Keats. Two 90-minute seminars. S. Wolfson

ENG 342 Experimental Fiction (see COM 325)

ENG 344 Topics in Romanticism  Not offered this year LA
An intensive study of particular aspects of British Romanticism. Two lectures, one preceptorial. E. Schor

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ENG 345 19th-Century Fiction  Fall LA
Novels of the Romantic and Victorian periods, beginning with Jane Austen, including the Brontës and the major Victorians, and ending with Hardy. Two lectures, one preceptorial. D. Nord

ENG 346 19th-Century Poetry  Fall LA
This survey of 19th-century British poetry will explore the ways that Victorian poetry and poetic form influenced and was influenced by national movements: education, empire, voting reform, gender relations, and the rise of technology. It will consider how the afterlife of 19th-century poetry haunts our interpretation of early 20th-century poetry, and re-historicize Victorian poetics amid the vibrant and complicated tapestry of the 19th century. Students will read poems by Tennyson, D.G. Rossetti, Christina Rossetti, Barrett Browning, Browning, Swinburne, Hardy, Clough, Bridges, and Hopkins. Two 90-minute seminars. S. Wolfson

ENG 347 Victorian Literature and Society  Not offered this year LA
An examination of the responses of Victorian novelists, poets, social critics, and graphic artists to poverty, industrialization, the "woman question," prostitution, slum life, and other social and political issues of the day. Special emphasis on the development of a language and imagery of social criticism. Two lectures, one preceptorial. Staff

ENG 348 Literature of the Fin de Siècle  Not offered this year LA
This course will study the literature of the Fin de Siècle, with forays into its afterlife in Edwardian England. It will be concerned especially with how these texts embody and illuminate various crises—aesthetic, linguistic, sexual, metric, ethnic, economic—that occupied the culture of the late 19th and earliest 20th centuries. Authors to be considered include Wilde, Conrad, Gilbert and Sullivan, Pater, Shaw, Hopkins, Hardy, Bridges, Patmore, Meynell, Kipling, Newbolt, Saintsbury, Rossetti, Field, Morris, and Yeats. Two lectures, one preceptorial. M. Martin

ENG 350 Literature of the American Renaissance, 1820-1860  Fall LA
A study of the major forms and traditions of American literature during the earlier 19th century, with main emphasis on such writers as Poe, Hawthorne, Melville, Emerson, Thoreau, Dickinson, and Whitman. The artistic achievement of these writers will be studied in relation to developing literary conventions and cultural patterns in pre-Civil War America. Two 90-minute seminars. E. Cadava

ENG 351 American Literature: 1865-1930  Spring LA
An investigation of issues outside the scope of traditional surveys of American literature. Topics may include: definitions of "America," literature of the South, contemporary poetry, New Historicism, America on film, the Harlem Renaissance, the Vietnam War, the sentimental novel, colonial encounters, literature of the Americas, fictions of empire, Jewish American writers. Two lectures, one preceptorial. L. Mitchell

ENG 352 African American Literature: Origins to 1910 (see AAS 353)
ENG 355 Moby-Dick Unbound (see AMS 353)
ENG 356 Topics in American Literature  Fall, Spring LA
An investigation of issues outside the scope of traditional surveys of American literature. Topics may include: definitions of "America," literature of the South, contemporary poetry, New Historicism, America on film, the Harlem Renaissance, the Vietnam War, the sentimental novel, colonial encounters, literature of the Americas, fictions of empire, Jewish American writers. Two lectures, one preceptorial. B. Widiss, S. Rivett

ENG 357 Topics in American Literature  Fall, Spring LA
An investigation of issues outside the scope of traditional surveys of American literature. Topics may include: definitions of "America," literature of the South, contemporary poetry, New Historicism, America on film, the Harlem Renaissance, the Vietnam War, the sentimental novel, colonial encounters, literature of the Americas, fictions of empire. Two lectures, one preceptorial. W. Gleason

ENG 360 Modern Fiction  Spring LA
The Modern movement in English fiction, from Conrad and Joyce to the present. Two lectures, one preceptorial. M. DiBattista

ENG 362 Modern Poetry  Not offered this year LA
British poetry from the end of the 19th century to the middle of the 20th--from the height of empire to its dissolution. Special attention to the ways in which poets respond to crises historical and personal. Poets considered include Hardy, Yeats, Eliot, Auden, Stevie Smith, and Dylan Thomas, among others. Two lectures, one preceptorial. M. Wood

ENG 364 Modern Drama  Fall LA
A study of major plays by Ibsen, Strindberg, Jarry, Chekov, Pirandello, Brecht, and Beckett. Emphasis will be given to the theatrical revolutions they initiated and to the influence they continue to exert on contemporary drama and theater. Two lectures, one preceptorial. M. Cadden

ENG 366 African American Literature: Harlem Renaissance to Present (see AAS 359)
ENG 367 American Women Writers  Fall LA

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Nineteenth- and 20th-century literature by American women, with particular emphasis on their historical, cultural, and critical contexts. This course will survey the diversity of writings by American women in relation to questions of canon formation, immigration, race and ethnicity, genre, aesthetics, modernism, and postmodernism. Two lectures, one preceptorial. *D. Fuss*

**ENG 368 American Literature: 1930-Present**   Fall LA

A study of modern American writing, from Faulkner to Diaz, that emphasize the interplay between formal experimentation and thematic diversity. Two lectures, one preceptorial. *B. Widiss*

**ENG 370 Contemporary Fiction**   Spring LA

An exploration of the connections and disconnects of our ever-smaller world, viewed through English-language novels and films of the last 25 years. At stake: translatability of language and ideas, processes of immigration, dynamics of economic development, history and memory, heroism and maturity, and notions of the future itself, in societies of rapid change. Throughout, the intersections between state policy and individual lives will be considered, such that while the course is premised on grand geopolitical questions, attention will focus on localized examples: specific texts, close reading. Two lectures, one preceptorial. *B. Widiss*

**ENG 371 Contemporary Poetry**   Not offered this year LA

With an emphasis on British, Australian, and American poetry from 1945 to the present, this course covers a range of work. It considers such groups as the Beats, the Confessionals, the Surrealists, and the New York School, but attention will mostly be devoted to major works by MacDiarmid, Bishop, Lowell, Auden, Berryman, Brooks, Jarrell, Thomas, Larkin, Leverto, Ammons, Creeley, Duncan, Ginsberg, O'Hara, Ashbery, Merwin, Tomlinson, Walcott, Hill, Plath, Murray, Tratner, Kinsella, and others. Classwork will be supplemented by attending readings on and off campus. Two lectures, one preceptorial. *S. Stewart*

**ENG 372 Contemporary Drama**   Spring LA

An examination of some of the best literature written for the stage since the Second World War. Two lectures, one preceptorial. *T. Wolff*

**ENG 373 Acting, Being, Doing, and Making: Introduction to Performance Studies (see THR 300)**

**ENG 385 Children's Literature**   Spring LA

A close examination of fairy tales and fantasies written for children but also addressed to adults. Questions to be considered will be literary, cultural, and psychological: the role of fantasy in an age of repression, didacticism versus amorality, male versus female writers, and the conventions of the Victorian fairy tale. Two lectures, one preceptorial. *W. Gleason*

**ENG 386 Literature and Environment**   Spring LA

Examines how literature defines concepts of "nature" or "environment" from agrarian to postindustrial times. The course will consider rural-urban interaction; forms of pastoral and anti-pastoral; representations of plant or animal life; images of place and region; influence of geography, ecology, and evolutionary biology on modern literary expression. Two lectures, one preceptorial. *W. Gleason*

**ENG 388 The Female Literary Tradition (also WOM 399)**   Not offered this year LA

The development of women's writing from the 18th century to the present with readings in poetry, fiction, and drama. Emphasis on relationships between gender and genre, and on historical, cultural, and theoretical issues raised by a female literary tradition. Two lectures, one preceptorial. *M. DiBattista, D. Nord*

**ENG 389 Women Writers of the African Diaspora (also AAS 389/WOM 389)**   Not offered this year LA

A reading of fiction by African, Caribbean, and African American women writers. Diverse strategies for addressing issues of race, gender, and culture in local, global, personal, and political terms are considered. Two lectures, one preceptorial. *D. Brooks*

**ENG 390 The Bible as Literature (see HUM 207)**

**ENG 391 Shades of Passing (see AAS 340)**

**ENG 392 Topics in African American Literature (see AAS 392)**

**ENG 393 African American Autobiography (see AAS 325)**

**ENG 394 Migration and the Literary Imagination (see AAS 365)**

**ENG 401 Forms of Literature**   Fall LA

Each term course will be offered in special topics of English and American literature. One three-hour seminar. *S. Anderson*

**ENG 402 Forms of Literature**   Spring LA

Each term course will be offered in special topics of English and American literature. One three-hour seminar. *T. Toibin*
ENG 403 Forms of Literature  Spring LA
Each term course will be offered in special topics of English and American literature. Two 90-minute seminars. Z. Chaudhary, A. Cheng

ENG 404 Forms of Literature  Not offered this year LA
Each term course will be offered in special topics of English and American literature. Two lectures, one preceptorial. L. Danson, M. Wood

ENG 405 Topics in Poetry  Not offered this year LA
A focused view of a problem or issue in poetry, changing from year to year. Recent topics have emphasized problems of poetic language, metrics, poetry and social life, poetic influence and canonization, and the relations between poetry and other art forms. Two lectures, one preceptorial. Staff

ENG 409 Topics in Drama  Fall, Spring LA
A detailed discussion of different bodies of theatrical literature, with emphasis and choice of materials varying from year to year. The focus will be on a group of related plays falling within a specific historical period, the developing work of one playwright, or the relationships among thematics, characterization, and structure. Two lectures, one preceptorial. M. Cadden

ENG 411 Major Author(s) (also AAS 413)  Fall LA
A close study of the works of one or two authors. May include Austen, Dickinson, Wordsworth, George Eliot, Dickens, Melville, Faulkner, James, Stevens, or Woolf, among others. Two 90-minute seminars. R. Sandberg

ENG 412 Major Author(s)  Not offered this year LA
A close study of the works of one or two authors. May include Austen, Dickinson, Wordsworth, George Eliot, Dickens, Melville, Faulkner, James, Stevens, or Woolf, among others. Two 90-minute seminars. Staff

ENG 413 Major Author(s)  Not offered this year LA
A close study of the works of one or two authors. May include Austen, Dickinson, Wordsworth, George Eliot, Dickens, Melville, Faulkner, James, Stevens, or Woolf, among others. One three-hour seminar. S. von Schlegell

ENG 414 Major Author(s)  Not offered this year LA
A close study of the works of one or two authors. May include Austen, Dickinson, Wordsworth, George Eliot, Dickens, Melville, Faulkner, James, Stevens, or Woolf, among others. One three-hour seminar. Staff

ENG 415 Topics in Literature and Ethics  Spring EM
Courses offered under this rubric will investigate ethical questions in literature. Topics will range from a critical study of the textual forms these questions take to a historical study of an issue traditionally debated by both literature and ethics (responsibility, rhetoric, justice, violence, oppression). Two lectures, one preceptorial. L. Mitchell

ENG 416 Topics in Literature and Ethics (also COM 313)  Spring EM
Courses offered under this rubric will investigate ethical questions in literature. Topics will range from a critical study of the textual forms these questions take to a historical study of an issue traditionally debated by both literature and ethics (responsibility, rhetoric, justice, violence, oppression). Two lectures, one preceptorial. S. Gikandi

ENG 417 Topics in Postcolonial Literature  Not offered this year LA
Approaches to the connections between literature and nationality, focusing either on literatures outside the Anglo-American experience or on the theoretical issues involved in articulating nationality through literature. One three-hour seminar. Staff

ENG 418 Topics in Postcolonial Literature  Not offered this year LA
Approaches to the connections between literature and nationality, focusing either on literatures outside the Anglo-American experience or on the theoretical issues involved in articulating nationality through literature. Two lectures, one preceptorial. Z. Chaudhary

ENG 420 The Lyric (see COM 309)

ENG 421 Special Topics in Performance Practice (see THR 330)
Program in Environmental Studies

Director
Lars O. Hedin

Executive Committee
Steven L. Bernasek, Chemistry
Kelly K. Caylor, Civil and Environmental Engineering
Michael A. Celia, Civil and Environmental Engineering
Lars O. Hedin, Ecology and Evolutionary Biology, Princeton

The Program in Environmental Studies is a multidisciplinary forum for the study of scientific, political, humanistic, and technological aspects of environmental problems. Through this program, students majoring in any discipline can pursue their interests in the environment and receive a certificate by designing and completing their own course of study.

The program offers three core survey courses, ENV 201, ENV 202, and ENV 204 (currently offered on a one-time-only basis) which examine a broad range of regional and global environmental problems and the human activities that contribute to them. Each of these courses can be taken with a laboratory component that incorporates a combination of inquiry-based field study and lab exercises. When taken with a lab component, ENV 201B, ENV 202B, and ENV 204B fulfill the Science and Technology (ST) distribution requirement.

Upper-level ENV courses enable students to explore specific environmental issues and topics in depth through multiple disciplines and perspectives. Seniors pursuing the ENV certificate are required to participate in a colloquium that enables them to share the research and results of their senior theses with other students from a wide range of disciplines. Senior thesis funding is available to students who elect to engage in field research as a component of their independent study. Funding for domestic and international internships with an environmental focus is also available for students following their freshman, sophomore, and junior years.

The Program in Environmental Studies is part of the Princeton Environmental Institute (PEI), the interdisciplinary center for environmental research, education, and outreach at Princeton University. PEI is committed to advancing knowledge and developing the next generation of leadership in the environmental field. The institute comprises several major interdisciplinary research centers and educational programs for undergraduate and graduate students.

In 2007, PEI launched an integrated research and teaching initiative to address global environmental challenges in energy and climate, global health and infectious disease and sustainable development in resource challenged regions of the world. Undergraduate courses, internships, and senior thesis research opportunities are aligned with Grand Challenges themes and faculty research.

Admission to the Program

The Program in Environmental Studies is open to all A.B. and B.S.E. students. Students are encouraged to plan a tentative course of study as early as possible. Although it is possible to fulfill the formal requirements of the program by choosing courses that have few prerequisites, the number of options is greatly increased by choosing courses in freshman and sophomore years that simultaneously meet the distribution requirements for the A.B. or B.S.E. degree and the prerequisites for courses recommended by the program.

Program of Study

The following environmental studies certificate program requirements are in addition to those of a student's department of concentration. By appropriate choice of courses, several of these requirements may satisfy both the program and concentration, as well as University distribution requirements. Core courses and cognate courses must be taken on a fully graded basis.

1. Students must take one core course, either ENV 201, 202, or 204. Under exceptional circumstances, substitutes may be allowed, but any substitution must be approved in advance by the program director. For students who do not have a strong science background, the laboratory options of ENV 201, 202, and 204 are recommended (although not required for the certificate). These courses satisfy the University's distribution requirement for laboratory science (ST). Interested students should take ENV 201, 202, or 204 as early as possible.

2. Students must take four ENV cross-listed and/or cognate courses. Three of these courses must be from three different divisions of the University (i.e., natural science, engineering, social science, and humanities) and they should be at the 300 level or above. The fourth course may be any ENV course (including 200-level courses) or any cognate course with a significant environment component (normally at the 300 level). The choice of cognate courses (i.e., courses that do not carry an ENV number) must be approved by the program director. Students are encouraged to discuss cognate choices with the program director early in their planning process.

3. Seniors participate in the senior thesis colloquium. The colloquium is noncredit, but regular participation is required.

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of seniors in the program. The colloquium supplements the advice that students get in their own departments by exposing a student's initial ideas and subsequent results to critique by students and faculty from other departments. Faculty lead colloquium discussions until the middle of the fall term. Students present their thesis plans and results from mid-fall through mid-spring term. For the most part, the colloquium meets weekly.

4. Independent work in the senior year will normally involve an environmental topic approved by both the director of the program and the undergraduate representative of the student's department of concentration. The environmental content of the senior thesis will be reviewed as part of the senior thesis colloquium.

Certificate of Proficiency

Students who meet the requirements of the program and of their department will receive a certificate of proficiency in environmental studies upon graduation.

Cognates

*Humanities cognates* include courses with environmental relevance from departments such as art and archaeology, English, and philosophy, as well as the School of Architecture and the environmental studies program.

*Social science cognates* include courses with environmental relevance from departments such as anthropology, economics, history, politics, and the Woodrow Wilson School, as well as the environmental studies program.

*Natural science cognates* include courses with environmental relevance from departments such as chemistry, ecology and evolutionary biology, geosciences, physics, and molecular biology.

*Engineering cognates* include courses with environmental relevance from departments such as civil and environmental engineering, chemical and biological engineering, and mechanical and aerospace engineering. Examples of cognates from each of these areas can be found on the program's website.

Courses

ENV 102A Climate: Past, Present, and Future (see GEO 102A)

ENV 102B Climate: Past, Present, and Future (see GEO 102B)

ENV 201A Fundamentals of Environmental Studies: Population, Land Use, Biodiversity, and Energy   Fall

This course explores how human activities have affected land use, agriculture, fisheries, biodiversity, and the use of energy in the USA and around the world. Students examine the fundamental principles underlying contemporary environmental issues, and use case studies to illustrate the scientific, political, economic, and social dimensions of environmental problems. Two lectures, one preceptorial. *L. Hedin, D. Wilcove*

ENV 201B Fundamentals of Environmental Studies: Population, Land Use, Biodiversity, and Energy   Fall ST

This course explores how human activities have affected land use, agriculture, fisheries, biodiversity, and the use of energy in the USA and around the world. Students examine the fundamental principles underlying contemporary environmental issues, and use case studies to illustrate the scientific, political, economic, and social dimensions of environmental problems. Two lectures, one preceptorial, one three-hour laboratory. *L. Hedin, D. Wilcove, E. Zerba*

ENV 202A Fundamentals of Environmental Studies: Climate, Air Pollution, Toxics, and Water   Spring

This course will focus on the environmental consequences of human activities and their interactions with natural systems on global scales, focusing on four main areas of current environmental concern: climate and global change; the atmosphere and air pollution; toxics in the environment; and water resources exploitation and pollution. Underlying principles will be explored for each topic, with examples and case studies used to highlight interconnections between the scientific, technological, political, economic, and social dimensions of environmental issues. Two lectures, one preceptorial. *B. Ward*

ENV 202B Fundamentals of Environmental Studies: Climate, Air Pollution, Toxics, and Water   Spring ST

This course will focus on the environmental consequences of human activities and their interactions with natural systems on global scales, focusing on four main areas of current environmental concern: climate and global change; the atmosphere and air pollution; toxics in the environment; and water resources exploitation and pollution. Underlying principles will be explored for each topic, with examples and case studies used to highlight interconnections between the scientific, technological, political, economic, and social dimensions of environmental issues. Two lectures, one preceptorial, one three-hour laboratory. *B. Ward, E. Zerba*

ENV 303 Introduction to Environmental Engineering (see CEE 303)

ENV 305 Topics in Environmental Studies   Fall, Spring

Special topics courses related to the broad field of environmental studies. *Staff*

ENV 306 Topics in Environmental Studies   Spring

http://www.princeton.edu/ua/
Special topics courses related to the broad field of environmental studies. Seminar. Staff

ENV 307 Agriculture and Food: A Foundation for Living   Fall

Agriculture and food provide all people with a foundation for living. Our land and water resources provide food, fiber, medicines, industrial commodities, fuel and more. The course investigates and analyzes specific topics in agriculture and food, and evaluate the environmental impact of our current practices. Focuses on agriculture and looks at the challenges farmers face to produce enough food for a growing world population. Looks critically at the controversies over technologies used to address these challenges, and to consider whether, and how, farming can be done in an environmentally friendly and sustainable way. One three-hour seminar. X. Morin

ENV 310 Environmental Law and Moot Court   Spring SA

Examining the relationship between law and environmental policy, this course focuses on cases that have established policy principles. The first half of the seminar will be conducted using the Socratic method. The second half will allow students to reargue either the plaintiff or defendant position in a key case, which will be decided by the classroom jury. One three-hour seminar. G. Hawkins

ENV 312 Marine Biology (see EEB 312)

ENV 316 Communicating Climate Change   Spring

Climate change has the potential to wreak great havoc over the next century, threatening ecosystems, economies, and human lives. Scientists are putting enormous effort into trying to understand the causes, effects, and possible solutions to the climate-change problem. Yet the public still has only a vague idea of what climate science actually says, and much of that is badly distorted. The course will explore how to communicate to the public about climate change through print, Web, and video, in ways that are at once clear, compelling, and scientifically rigorous. One three-hour seminar. M. Lemonick

ENV 319 Environmental Economics (see ECO 329)

ENV 322 Biogeochemical Cycles and Global Change (see GEO 322)

ENV 328 Energy for a Greenhouse-Constrained World (see MAE 328)

ENV 331 Environmental Geochemistry: Chemistry of the Natural Systems (see GEO 363)

ENV 333 Oil to Ozone: Chemistry of the Environment (see CHM 333)

ENV 334 Global Environmental Issues (see CEE 334)

ENV 339 Current and Future Climate (see GEO 366)

ENV 340 Environmental Challenges and Sustainable Solutions   Spring ST

Focuses on environmental challenges and sustainable solutions related to interrelationships between constructed and natural processes. Topic areas include resource conservation, sustainable practices, stormwater management, and habitat restoration. The format of the course is experiential learning with problem-solving research projects, lectures, and discussions. A central theme of the projects is to track the impact of land use and sustainable practices on the ecological balance of environments in and around Princeton's campus. Two 90-minute lectures. E. Zerba

ENV 361 Physics of the Ocean and Atmosphere (see GEO 361)

ENV 362 Biogeochemistry of the Ocean and Atmosphere (see GEO 362)

ENV 370 Sedimentology (see GEO 370)

ENV 399 Environmental Decision Making (see GEO 297)

ENV 401 Environmental Policy Workshop   Not offered this year

The workshop will focus on currently unresolved environmental policy questions from the perspective of the scientific evidence available to support alternative interventions and the accompanying social, economic, and political trade-offs and conflicts that require adjudication. Prerequisite: 201 or permission of instructor. B. Singer

ENV 406 Energy and Form (see ARC 406)

ENV 417A Ecosystems and Global Change (see EEB 417A)

ENV 417B Ecosystems and Global Change (see EEB 417B)

ENV 499 Environmental Change, Poverty, and Conflict (see GEO 499)
The Program in European Cultural Studies has two purposes: to deepen students' understanding of European civilization and to strengthen their command of cultural interpretation. It brings together faculty and undergraduates from several departments in a common inquiry into the way people order reality, make sense of life, and communicate meaning. In order to reduce those problems to manageable proportions, they are studied in seminars on specific themes in European history, literature, art, and philosophy.

Admission to the Program

Students from many of Princeton's established departments choose to take a certificate in European cultural studies. Those who do so normally enjoy trying interdisciplinary approaches to the interpretation of the products of European culture, from novels and paintings to cityscapes and land-use patterns. Most of them read one or more European language comfortably. To enter the program, students should take either the Humanistic Studies 216-219 sequence or ECS 209. From 2008 onward, ECS 301 and 302 will take the place of ECS 209. In the course of the spring term of the sophomore year, they should submit a formal application to join the program.

Program of Study

All students must have completed HUM 216-219 or taken ECS 209, 301, or 302. In addition, students must also take two 300-level seminars, and they are encouraged to enroll in a 400-level seminar. Most seminars are taught by professors from two different departments.

The program has two final requirements. In their junior year students will attend a colloquium and participate in a work group on a specific topic. The work group will bring the juniors together for discussion of a theme, a problem, or a work of art under the guidance of a distinguished visiting scholar. Recent topics have included: "Translating Tradition: Pope and Homer," "Reading Blake's *Marriage of Heaven and Hell,*" and "Visual Representation in the 18th Century."

In their senior year students will participate in a thesis writers' colloquium. Although they write their thesis under the direction of their home departments, they will meet together at regular intervals in the early spring to discuss common problems of research, conceptualization, organization, and writing. Each student will make a work-in-progress report and submit a chapter to the group for criticism.

Certificate of Proficiency

Students who fulfill all the requirements will receive a certificate upon graduation.

Courses

**ECS 301 Turning Points in European Culture (also EPS 301) Fall HA**

Seminar draws on expertise of guest faculty from Princeton and elsewhere to provide a broad, multidisciplinary perspective on turning points in European culture from the late middle ages to the present. Gateway course for ECS and Contemporary European Politics and Society. Topics in literature, art, music, philosophy, political theory, history of science. One three-hour seminar. B. Doherty

**ECS 302 Landmarks of European Identity (see EPS 302)**

**ECS 320 Cultural Systems Spring**

Symbolic systems and social life in specific historical eras. Topics will vary. Recent courses include, for example, magic, art, and science in Renaissance culture, political discourse and nationalism, culture and inequality, history of technology, and the rhetoric of new media. Staff

http://www.princeton.edu/ua/
ECS 321 Cultural Systems (also HUM 321)  Fall LA
Symbolic systems and social life in specific historical eras. Topics will vary. Recent courses include, for example, magic, art, and science in Renaissance culture, political discourse and nationalism, culture and inequality, history of technology, and the rhetoric of new media.  

R. Gallo

ECS 330 Communication and the Arts (also COM 321)  Spring LA
The arts and the media in different cultures. Topics will vary, for example, history of the book, art/architecture and society, opera and nationalism, literature and photography, theater and politics.  

E. Reeves

ECS 331 Communication and the Arts  Spring LA
The arts and the media in different cultures. Topics will vary, for example, history of the book, art/architecture and society, opera and nationalism, literature and photography, theater and politics.  

Staff

ECS 340 Literature and Photography (also COM 340)  Spring LA
A survey of the history of the rapport between literature and photography, looking closely at a number of literary and theoretical texts that differently address questions central to both literature and photography: questions about the nature of representation, reproduction, memory and forgetting, history, images, perception, and knowledge. One three-hour seminar.  

E. Cadava

ECS 370 Weimar Germany: Painting, Photography, Film (see GER 370)

ECS 372 Writing About Art (Rilke, Freud, Benjamin) (see GER 372)

ECS 450 Seminar. 19th-Century European Art (see ART 450)
Committee for Film Studies

Chair
Maria A. DiBattista

Executive Committee
Maria A. DiBattista, English, Comparative Literature
Steven Chung, East Asian Studies
Su Friedrich, Lewis Center for the Arts, Visual Arts
Thomas Y. Levin, German
Angel G. Loureiro, Spanish and Portuguese Languages and Cultures
Gaetana Marrone-Puglia, French and Italian
Gideon A. Rosen, Philosophy, ex officio
Jerome Silbergeld, Art and Archaeology
P. Adams Sitney, Lewis Center for the Arts, Visual Arts
Jeffrey L. Stout, Religion
Judith Weisenfeld, Religion
Michael G. Wood, English, Comparative Literature

The Committee for Film Studies, under the general direction of the Council of the Humanities, encourages the interdisciplinary study of film and video. The committee coordinates courses in the programs and departments that use film or video extensively; it also coordinates, so far as is appropriate, the acquisition of videotapes and films; and it organizes the visits of filmmakers and film scholars. Interested students are invited to consult members of the committee, who will provide additional information about film and video studies within the University.

For a list of film courses at Princeton, please check the committee's website.
Program in Finance

Director
Yacine Aït-Sahalia

Executive Committee
Dilip J. Abreu, Economics
Yacine Aït-Sahalia, Economics
Alan S. Blinder, Economics, Woodrow Wilson School
Markus K. Brunnermeier, Economics
René A. Carmona, Operations Research and Financial Engineering
Patrick Cheridito, Operations Research and Financial Engineering
Erhan Çinlar, Operations Research and Financial Engineering
Alexandre W. d’Aspremont, Operations Research and Financial Engineering
Jianqing Fan, Operations Research and Financial Engineering
Harrison G. Hong, Economics
Harold James, History, Woodrow Wilson School
Jakub W. Jurek, Economics
Paul R. Krugman, Woodrow Wilson School, Economics
Burton G. Malkiel, Economics
Stephen E. Morris, Economics
Ulrich K. Mueller, Economics
John M. Mulvey, Operations Research and Financial Engineering
Birgit Rudloff, Operations Research and Financial Engineering
José A. Scheinkman, Economics
Hyun S. Shin, Economics
Christopher A. Sims, Economics
K. Ronnie Sircar, Operations Research and Financial Engineering
David Sraer, Economics
Kenneth Steiglitz, Computer Science
Robert J. Vanderbei, Operations Research and Financial Engineering
Erik H. VanMarcke, Civil and Environmental Engineering
Mark W. Watson, Economics, Woodrow Wilson School
Wei Xiong, Economics

Under the auspices of the Bendheim Center for Finance, Princeton undergraduates concentrating in any department may earn a certificate that attests to their proficiency in the discipline of finance. The rapidly developing field of finance focuses on the pricing of financial assets, including equities, bonds, currencies, derivative securities; portfolio management and the evaluation of financial risks; banking and financial intermediation; the financing of corporations; corporate governance; financial-market and banking regulation; and many other topics. In addition to the obvious practical relevance of finance, the field contains both challenging intellectual problems and a distinctive formal framework within which those problems can be addressed. Knowledge of modern finance is also essential to the proper understanding of many other topics in economics and public policy, including the determination of exchange rates and international capital flows; the making of monetary and fiscal policy; the role of financial reform in developing and transition economies; the regulation and taxation of financial markets and financial instruments; and antitrust policy, to give but a few examples. Finally, modern finance is remarkably eclectic, drawing from many disciplines besides economics, including mathematics, operations research, engineering, computer science, psychology, politics, and history.

Admission to the Program

Students normally enter the certificate program at the beginning of their junior year. Interested students must submit a completed application form by May 31 of their sophomore year to the program representative. The application should include a brief description of the student's plan to fulfill the independent work requirement (see below) and a short essay explaining the student's interest in the finance certificate. Criteria for admission include the overall academic record of the student in the freshman and sophomore years, the plan to complete the independent work, and an essay. See the Program in Finance [http://www.princeton.edu/bcf/undergraduate/] website for more details.

As economic theory, mathematics, and probability and statistics are pervasive in modern financial analysis, completion of the certificate in finance requires mathematical ability and preparation. The following foundation courses, or their equivalent, are required for admission into the program and (except as noted) must be completed by the end of the sophomore year. ECO and ORF majors require a higher level of proficiency in the prerequisite courses to ensure that the independent work is sufficiently quantitative. Consequently, ECO and ORF majors must have an average grade of B- calculated across all prerequisites. All courses require a letter grade (pass/fail not allowed).

1. Mathematics: MAT 200 (Linear Algebra and Multivariable Calculus for Economists), or MAT 201 (Multivariable Calculus) and MAT 202 (Linear Algebra with Applications), MAT 203 (Advanced Multivariable Calculus), and MAT 204 (Advanced Linear Algebra with Applications)

2. Economics: ECO 310 (Microeconomic Theory: A Mathematical Approach)

3. Probability and Statistics: ORF 245 (Fundamentals of Engineering Statistics), or ECO 202 (Statistics and Data Analysis for Economics), or PSY 251 (Quantitative Methods), or SOC 301 (Sociological Research Methods), or POL 345 (Quantitative Analysis and Politics), or WWS 332 (Quantitative Analysis for Public Policy), or PHY 301 (Thermal Physics) and PHY 312 (Experimental Physics), or MAT 222 (Introduction to Statistics)

Program of Study

1. A total of five courses, at level 300 or higher. All students must have a minimum grade of C+ averaged over the core courses, the elective courses, and the independent work.

http://www.princeton.edu/ua/
a) The two core courses, ECO 362 (Financial Investments) and ECO 363 (Corporate Finance and Financial Institutions), typically completed during the junior year.

b) Three electives chosen from the two lists of elective courses found on the program's website. List 1: Financial Applications, and List 2: General Methodology for Finance. ECO and ORF majors must take at least two of their three elective courses from List 1. All other concentrators must take at least one of their three elective courses from List 1. The program representative can approve a coherent plan of study that involves elective courses outside the preapproved lists.

2. A senior thesis in the major department (or other form of independent work required by their concentration) with significant finance content (subject to approval of the program representative). "Significant finance content" means that a substantial component of the thesis will involve issues or methods drawn from finance. Faculty affiliated with the Bendheim Center can provide secondary thesis advising as the need arises. If there is no possibility of finance content in the senior thesis, a separate, shorter piece of independent work is required; please consult with the program representative.

Certificate of Proficiency

Students who fulfill all the requirements will receive a certificate upon graduation.

Sample Elective Selection. Elective courses may be selected either according to individual needs and preferences, or to conform to one of five suggested tracks, listed below. These tracks are intended to be illustrative of coherent courses of study that students might choose. It is not necessary for a student to designate or complete a particular track to satisfy the certificate requirements.

1. Mathematical Finance Track. Students in this track study the mathematics of financial price theory, including stochastic calculus and its applications to arbitrage and equilibrium in dynamic economies. Relevant courses include ECO 317, 414, 465, 466; MAT 305, 390, 391; ORF 309, 311, 515.

2. Corporate Finance Track. Students in this track study issues such as the choice and financing of investment projects, firms' determination of dividend policy, optimal capital structure, financial reorganization, mergers and acquisitions, and the management and regulation of banks and other financial institutions. Relevant courses include ECO 317, 322, 342, 361, 490, 464; ELE 491.

3. Derivatives Pricing and Risk Management Track. Students in this track focus on the determination of the prices of options, futures, and other derivative securities, and on the management of their risks. Relevant courses include APC 350; CEE 460; COS 323; ECO 302, 312, 463, 465, 466, 491; MAT 304, 331; ORF 309, 335, 374, 405, 435, 474, 515.

4. Investment Management Track. Students in this track study the design and functioning of asset markets around the world, the theory of optimal portfolios, the behavior and determinants of asset returns, and techniques of portfolio management. Relevant courses include COS 323; ECO 311, 342, 353, 461, 462, 463, 464, 465, 466; ELE 382; HIS 364; MAT 305; ORF 307, 311, 405, 435; WWS 312.

5. Information Technologies for Finance Track. Students in this track study the computer-based technologies that are becoming increasingly important in finance, such as the design of efficient trading systems, algorithms, interfaces and large databases, and the security of computer networks. Relevant courses include COS 318, 323, 333, 423, 425, 432, 436, 461, 492, 493, 496; MAT 305.
The Department of French and Italian offers a liberal arts major designed to give students a thorough grounding in the language, literature, and culture of one or more of the subjects it teaches, seen as independent disciplines or in combination with other languages and cognate subjects. Its courses provide practical instruction in the French and Italian languages; an introduction to the history and development of those languages, including the study of Romance philology, as well as the broader range of Romance literatures and cultures in the Middle Ages; the literatures and cultures of France and Italy in all periods, from medieval to contemporary; and literature in French written in other parts of Europe, Asia, Africa, and the Americas.

Students are encouraged to complement their courses in French and/or Italian with related and varied courses in other literatures, art history, history, political science, sociology, comparative literature, or other humanities subjects.

In addition to serving as the focus for an education in liberal arts, the French and Italian concentrations can be the basis for graduate or professional study. In mostly small classes and seminars, allowing extensive student/teacher interaction, students become equipped to take up careers in many walks of life, including journalism, business, law, government service, and international affairs. For non-majors, the department offers a rich set of language courses, from introductory to very advanced. It also offers a popular certificate program, allowing the study of French and Italian to be combined with concentration in history, architecture, English, politics, or any other subject available at Princeton.

Information and Departmental Plan of Study

The French Language Program. An Advanced Placement score of 5 or an SAT Subject Test score of 760 is required to satisfy the A.B. foreign language requirement at entrance, or for admission to a 200-level course.

Students who wish to continue a language begun in secondary school must have their proficiency measured either by a College Board score or by a placement test administered prior to course registration. Placement will depend on previous training and proficiency.

The normal program for beginners seeking a basic mastery of French is the sequence 101, 102, 107, which satisfies the University’s language requirement. Normally students electing a beginner's course in any language will receive credit only if two terms are completed.

Students showing particular gifts in 101 may be admitted to the accelerated, double-credit spring course, 102-7, which also satisfies the University’s language requirement.

Students with advanced placement in French will be placed in either 103 or 105 and will proceed to either 107 or 108 to satisfy the University language requirement. They also may be placed directly into 108. Students who have successfully completed 107 cannot take 108.

Course credit in 107 or 108 is also available through approved summer courses abroad (see Study and Work Abroad below). Funding may be available for selected and committed students. Students must pass a placement test upon their
return to satisfy the language requirement.

The Italian Language Program. An Advanced Placement score of 5 or an SAT Subject Test score of 760 is required to satisfy the A.B. foreign language requirement at entrance, or for admission to a 200-level course.

Students who wish to continue a language begun in secondary school must have their proficiency measured either by a College Board score or by a placement test administered prior to course registration. Placement will depend on previous training and proficiency.

The normal program for beginners seeking a basic mastery of Italian is the sequence 101, 102, 107, which satisfies the University's language requirement. Normally students electing a beginner's course in any language will receive credit only if two terms are completed.

Students showing particular gifts in 101 may be admitted to the accelerated, double-credit spring course, 102-7, which also satisfies the University’s language requirement.

Students with advanced placement in Italian will be placed in 107 to fulfill the University language requirement. Course credit in 107 is also available through approved summer courses abroad (see Study and Work Abroad below). Funding may be available for selected and committed students. Students must pass a placement test upon their return to satisfy the language requirement.

All questions concerning placement and summer study are dealt with by the language coordinator in the relevant program.

Advanced Placement

For information about advanced placement, see the French and Italian language programs described above.

Prerequisites

The normal requirement for admission to the department is successful completion of at least one, preferably two, 200-level courses, including one of the following: FRE 221, 222, or 224; ITA 208, 209, or 220. Students who have not satisfied this prerequisite by the end of sophomore year should consult with the departmental representative. Concentrators who plan to participate in one of the certificate programs, such as African studies, African American studies, European cultural studies, Latin American studies, or the study of women and gender, must also satisfy the prerequisites of that program.

Early Concentration

Qualified students are encouraged to begin departmental concentration in the sophomore year. This has the advantage of a longer period for independent work and preparation of the senior thesis; it also makes a semester or junior year abroad more feasible.

Program of Study

All students are expected to include one advanced language course (FRE 207, 215, 307, 407; ITA 207, 307) in their subject(s) of concentration. Any two of the following courses can count as one course credit for departmental requirement: FRE 221, 222, 224; ITA 208, 209, 221, 222.

Courses taught in the department place varying emphases on language, literary history and interpretation, aesthetics and literary theory, and cultural and intellectual history. Students are therefore able to pursue courses of study that are consistent with their own interests. To complement this individualized approach to students' plans of study, the department offers four distinct tracks within the concentration in French and/or Italian:

1. Concentration in one language, literature, and culture: Students concentrate in French or Italian. Eight upper-division courses are counted toward concentration. At least five of these must be in the language and subject of concentration. Up to three of the eight may be cognate courses approved by the departmental representative and drawn from other sections of the department or from other humanities and social science subjects.

2. Concentration in two languages, literatures, and cultures: Students intending to combine work in two languages, civilizations, and cultures normally take a minimum of eight upper-division courses: five in one of the languages, three in the other relevant language. The first language of concentration must be either French or Italian.

3. Concentration in literature and any other related field approved by the departmental representative: Students intending to combine work in French or Italian and another related field normally take a minimum of eight upper-division courses: five in the relevant language and literature and three in the other field. For example, students specializing in French or Italian and history, politics, or art and archaeology, might take appropriate courses in those departments, such as HIS 350, 351 or HIS 345, 365, POL 372, 381, or 391, or ART 319, 320, or 333.

4. Concentration in language, literature, and the creative arts: This track is designed for students wishing to combine work in French or Italian and a creative art, such as theater, music, dance, painting, film, and creative writing. Upon approval by the departmental representative, the student normally would take a minimum of eight upper-division courses: five in the relevant language and literature and three in the field related to the art of interest. In some cases, an original work of creation (e.g., paintings, prose, or poetry), or of performance (e.g., theater), may substitute for the senior thesis. In these cases, students will be required also to submit a substantial critical work of at least 6,000 but no
more than 10,000 words (25-35 pages), in which they will position and discuss their creative work in relation to the historical and cultural context of the language in question.

**Independent Work**

**Junior Papers.** At the time of entering the department, and in all cases no later than spring of the sophomore year, students should discuss their likely area of interest with the departmental representative in order to make the attribution of junior advisers as appropriate as possible. The adviser will be assigned at the beginning of the junior year. Students should get in touch with their junior adviser and plan regular meetings.

The first junior paper, written in the fall semester, should be about 4,000 words. The second junior paper, written in the spring semester, should be between 5,000 and 8,000 words. Both junior papers may be written in English, in which case a three-page summary in the relevant language must be provided. If the paper is written in the relevant language, a three-page summary in English is required.

Students following tracks 2 or 4 may write one junior paper in one of their two subjects of concentration, and one in the other.

**Senior Thesis.** As the culmination of their independent work, senior students write a thesis on an approved topic. Late in their junior year, students will discuss possible areas of interest with the departmental representative. Topics chosen in the past have ranged across the field of French and Italian studies, from linguistic problems and literary techniques to close textual analysis to thematic and ideological study. Students primarily interested in culture and civilization have written on art, on political and economic issues, on education, and on a variety of social questions. For students following tracks 2, 3, and 4, joint supervision may be arranged. The senior thesis is a major commitment of a student's time and energy, and the most important yardstick for choosing a topic is willingness to spend many hours immersed in that particular set of texts or problems.

Concentrators in French and/or Italian who are also earning certificates should consult with their advisers about selecting a suitable thesis topic. The senior thesis may be written in English, in which case a three-page summary in the relevant language must be provided. If the thesis is written in the relevant language, a three-page summary in English is required.

Resources are available to assist students with the costs of senior thesis research including, when appropriate, foreign travel.

Senior theses should not be more than 20,000 words, nor should they fall below 15,000 words.

**Senior Departmental Examination**

The examination, taken in May of the senior year, is designed to test aspects of the student's entire program of study in the department. A list of required and recommended readings is provided for each of the languages and literatures taught in the department, and guides students in preparing for the written examination. The format of the examination is as follows:

1. **Written Component** (three hours) in class, including: (a) A Sight Translation. This exercise will consist of the translation of a short prose text (500 words or less) from French or Italian into English. The resulting translation should reflect the linguistic command and stylistic sophistication expected from a reasonably proficient speaker of French or Italian. For concentrators following Track 2, and combining French and Italian, the original text will be given in the dominant language. (b) An essay written in the language of specialization. Students will choose one topic out of three culture/literature questions. Topics will be based on the reading lists and course offerings.

2. **Oral Presentation** (30 minutes). A brief (10-15 minutes) oral presentation, in the language of concentration (French or Italian), followed by a discussion. The content of the presentation will be determined and prepared by the student in concert with his/her adviser, and may reflect any aspect of the student's own general intellectual and academic experience in the department. It may therefore stem from the senior thesis, but also largely refer to the overall course of study achieved in the subject of concentration. In addition to following up on the student's presentation, the ensuing discussion may also pertain to the reading list. The examining committee will be constituted by all permanent faculty of each section.

Note: In order to better prepare for the comprehensive examination, students are strongly encouraged to include either FRE 307 or ITA 307 in their departmental course work.

**Study and Work Abroad**

The department strongly encourages its concentrators and certificate students to spend as much time as they can in any country, including those in Africà, where the language(s) they study is (are) widely spoken. There are several ways of doing this within the four-year undergraduate degree: by study abroad for one or two semesters; by summer study abroad; and by obtaining summer work or an internship abroad.

**Junior Semester/Junior Year Abroad.** Students planning to spend a semester or their whole junior year abroad should seek advice from the departmental representative and from relevant faculty in choosing a suitable program of study. Further assistance is available from the Office of International Programs. Departmental and University approval is required.

Grades awarded by foreign institutions for courses that are recognized in lieu of Princeton courses are not included in the computation of departmental honors.
Students studying abroad for one or two semesters are not exempted from independent work requirements. The responsibility for consulting with advisers, as well as for meeting all normal deadlines, lies with the student.

An approved one-semester course of study abroad normally counts for two departmental course credits. Students must complete the program abroad to the standard required by the foreign institution.

**Summer Language Study.** The department has a special relationship with the Institut International de Langue IS Aix-en-Provence, which offers intensive four-week language courses in French at various levels. The department has established a similar relationship with the University of Macerata, offering intensive language courses in Italian. The department is able to provide financial support to a small number of students in each of these courses each year.

It also maintains ties with the Bryn Mawr College summer programs held in Avignon, in French language, literature, art, and civilization (including social, political, and economic institutions). See the departmental representative if you are interested in one of these programs.

**Summer Work Abroad.** "Princeton-in-France" is a long-established summer work program that selects students who qualify linguistically to take on the responsibilities of a paying summer job or internship in France. Travel grants and salary supplements are available to students who receive financial aid. Announcements will be made early in the fall concerning a November information meeting about the program. The application deadline is early December.

Information about other placements and internships abroad may also be obtained from the director of international internships in the Office of International Programs.

**Certificate in Language and Culture**

**Admission.** The program is open to undergraduates in all departments. Students should consult the departmental representative by the beginning of the junior year. Ordinarily, students concentrating in language and literature departments, including comparative literature, will be eligible for the certificate in language and culture provided that: (a) the linguistic base for the language and culture certificate is different from the linguistic base of the concentration; and (b) the work required for the language and culture certificate does not duplicate the requirements of the major. Students pursuing area studies certificates may earn the certificate in language and culture provided that: (a) the courses they elect to satisfy the requirements of the area studies program are different from those they elect to satisfy the requirements of the language and culture certificate program; and (b) they submit a piece of independent work in addition to the independent work that satisfies the requirements of the area studies program.

Application forms are available from the departmental office located in 303 East Pyne. A separate application must be completed for each language in which a certificate will be pursued.

**Plan of Study.** The Certificate in Language and Culture is available in French and Italian and involves satisfactory completion of the following course requirements:

1. Four departmental courses in the relevant language, linguistics, literature, or culture, excluding courses that do not have a language prerequisite. At least three of these courses must be at the 300 level (or higher). At the 200 level, the course must be chosen from among the following eligible courses: FRE 211, 215, 221, 222, 224; ITA 208, 209, 220, 221, 222. Courses below these levels are not eligible. At the discretion of the departmental representative, a student may substitute one course satisfactorily completed in a departmentally approved program of study abroad, or one course taken in summer. A 200-level course is a prerequisite for taking 300-level courses in French or Italian.

2. Independent Work. This requirement can be satisfied in one of several ways: (a) by a substantial paper on a topic agreed upon with the student's appointed adviser; (b) by a substantial paper growing out of one of the courses taken to fulfill the certificate requirement (this paper is in addition to the work required in the course; the subject and scope of this paper will be agreed upon with the student's appointed adviser); (c) with the agreement of the student's home department, a student may submit a junior paper or a senior thesis that satisfies the requirements of both the home department and the Department of French and Italian. A junior paper or senior thesis of this sort must be based in substantial part on foreign language sources and display effective competence in utilizing the relevant language as an indispensable research tool.

Papers of types (a) and (b) are of approximately 4,000 to 5,000 words in length. Students are urged to write them in the appropriate foreign language. Alternatively, they may submit the independent work in English together with a 700- to 1,000-word summary in the foreign language. Students submitting a junior paper or a senior thesis in lieu of independent work [in line with option (c) above] must also submit the summary in the foreign language.

**Courses**

**FRE 101 Beginner's French I Fall**

An audio-visual approach is used to develop the skills of listening, speaking, reading, and writing French in a cultural context. The main emphasis is on acquiring competence through aural/oral practice. Classroom activities include videos, comprehension and grammar exercises, conversation, and skits. Five classes; laboratory required. No credit is given for 101 unless followed by 102. Staff

**FRE 102 Beginner's French II Spring**

A continuation of 101. The audio-visual approach promotes proficiency through listening and speaking French. Growing emphasis on reading and writing. Classroom activities include videos, discussions, small group work, and
comprehension and grammar exercises. A midterm interview with instructor, and a final oral presentation. Five classes; laboratory required. Prerequisite: 101. Students who complete 102 normally place into 107. 

FRE 103 Intensive Beginner's and Intermediate French  Fall, Spring

An intensive course that covers 101 and 102 in one semester. Designed for students who have previously studied French but whose preparation is either too remote or insufficient for direct placement in intermediate French. An audio-visual approach is used to develop concurrently the skills of listening, speaking, reading, and writing French in a cultural context. Classroom activities include videos, discussions, small group work, comprehension and grammar exercises, and conversation. Five classes; laboratory required. Normally followed by 107. M. Meere

FRE 105 Intermediate French  Fall

Designed for students who have a satisfactory foundation in French but are not yet qualified for 108. Grammar review, composition, reading of standard French texts, and practice in listening and speaking. Three classes, laboratory as deemed necessary. Prerequisites: two to five years of secondary school French and a satisfactory score on the placement test. Normally followed by 108. C. Sagnier

FRE 107 Intermediate/Advanced French  Fall, Spring

A continuation of 102. Develops an active command of spoken and written French through class discussion and compositions. Continued presentation and review of grammar. Acquisition of reading skills through short readings. Five classes. Normally open only to students who have successfully completed 102 or 103. Staff

FRE 108 Advanced French  Fall, Spring

An intensive course aimed at developing an active command of the language. Syllabus includes the reading of literary texts, and class exercises emphasize comprehension and oral proficiency. Three classes. Prerequisite: 105 or satisfactory score on placement test. M. Perrier

FRE 207 Studies in French Language and Style  Fall, Spring

Intensive practical training in oral and written French through a study of French culture and society. Strong emphasis on discussion. Film series. Recommended as preparation for advanced courses in French literature and civilization. Three classes. Prerequisite: 107 or 108. Staff

FRE 207F Accelerated Summer Study in France

A four-week summer intensive language course, equivalent to 207, taught in France, at the IS Aix-en-Provence, with additional instruction from resident Princeton faculty. Emphasis on French-language writing and speaking skills, with supplemental work in literature. Admission by application and interview. Prerequisite: 107, 102-7, or 108, or equivalent. Five four-hour classes, two preceptorials. C. Sagnier

FRE 215 France Today: Culture, Politics, and Society  Spring

Intensive language practice and readings from French textbooks for students of economics and politics, focusing on the concepts and vocabulary of the modern international economy. Prerequisite: a 200-level course in French, or instructor's permission. Two 90-minute classes. C. Sagnier

FRE 221 The Rise of France: French Literature, Culture, and Society from the Beginnings to 1789  Fall LA

A study of the evolution of French literature, culture, and society from the beginnings to the Revolution: the Middle Ages, the Renaissance, Neo-Classicism, and the Enlightenment. The distinguishing cultural and social ideals of these four periods will be defined and analyzed, and representative cultural productions (the cathedrals, the châteaux of the Loiré, Versailles, etc.) will be discussed in context. A few major literary texts will constitute primary readings. Prerequisites: 107, 108, or equivalent. 207 recommended as a corequisite. Two 90-minute classes. S. Kay

FRE 222 The Making of Modern France: French Literature, Culture, and Society from 1789 to the Present Spring LA

A historical survey of the main features of French society, literature, and culture from the period of the French Revolution (1789-99) to the present. Weekly lectures cover political, intellectual, and cultural history, while precepts and readings focus on representative literary texts (drama, lyric poetry, and fiction) as well as examples of French art and film. Prerequisites: 107, 108, or equivalent. 207 recommended as a corequisite. Two 90-minute classes. M. Huet

FRE 224 French Literature: Approaches to the Language of Literary Texts  Fall, Spring LA

The application of various critical methods to the interpretation of texts (short fiction, drama, and poetry) from all periods. Topics will include themes, narrative and rhetorical strategies, authorial voice, implicit reader, and genre theory. Two 90-minute classes. Prerequisite: 107, 108 or equivalent. 207 recommended as a corequisite. A. Benhaïm

FRE 307 Advanced French Language and Style  Fall, Spring LA

Intensive practice of written and spoken French through close analysis of grammatical and syntactic structures, literary translation, and the stylistic study of representative literary works from the Middle Ages to the present. Prerequisite: a 200-level French course or instructor's permission. Two 90-minute classes. Staff

FRE 313 Contemporary French Civilization  Fall LA

The evolution of 20th-century French institutions and their relationship to intellectual and social movements since
World War I. New directions taken by French thought will be stressed through the study of individuals, selected from representative fields, whose influence led to the restructuring of contemporary French civilization. Two 90-minute classes. Prerequisite: a 200-level course in French or instructor's permission. Staff

FRE 317 Visions of Paris   Spring LA
A study of Paris as urban space, object of representation, and part of French cultural identity. Topics include Paris in the Ancien Régime; Revolutionary and Napoleonic Paris; the transformation of Paris in the 19th century; Paris as a site of European art and literature; modern and multicultural Paris in the 1900s; and challenges in the new millennium. Prerequisite: a 200-level course in French or instructor's permission. One 90-minute lecture, one 90-minute preceptorial. A. Benhaïm

FRE 321 The Invention of Literature and Culture in France (also WOM 330)   Fall, Spring LA
The birth of literature in the Middle Ages in France is accompanied by remarkable inventiveness. From the glamour of troubadour love songs to the somber passion of heroic poetry, from the refinements of chivalric romance to the bawdy of fabliaux, from intricate lyric forms to complex prose romances, medieval writers not only practiced but constantly re-created the emergent concept of "literature," elaborating, as they did so, such legendary tales as those of Roland, Tristan, Lancelot, and the grail. Prerequisite: a 200-level course in French or instructor's permission. One 90-minute lecture, one 90-minute preceptorial. S. Kay

FRE 327 Tales of Hospitality: France, North Africa, and the Mediterranean (also COM 357)   Fall EM
An exploration of the concept of hospitality, individual and collective, in French, Mediterranean, and Maghrebi (i.e., North African: Arab, Berber, and Jewish) cultures. Draws on materials from literature and the arts, politics and law, philosophy and religion. Issues studied include immigration, citizenship, alienation, and, more generally, the meaning of welcoming a stranger. Prerequisite: a 200-level course in French or instructor's permission. One 90-minute lecture, one 90-minute preceptorial. A. Benhaïm

FRE 330 Landmarks of French Culture and History   Spring LA
An interdisciplinary study of places, periods, persons, or questions that helped define French cultural identity, from its origins to the present. Areas of study could include the Hundred Years' War; Versailles and the culmination of the French monarchy; the French Revolution; Napoleon and the New Empire; the Belle Époque; the Figure of the Intellectual from Zola to B.-H. Lévy; the sociocultural revolution of May 1968; colonization, its discontents, and its aftermaths; France in the age of globalization; Franco-American relations; etc. Prerequisite: a 200-level course in French or instructor's permission. Two 90-minute classes. A. Benhaïm

FRE 331 French Renaissance Literature and Culture   Fall LA
Readings from the works of Rabelais, the Pléiade poets, Marguerite de Navarre, Montaigne, and d'Auنبigné in the light of contemporary artistic, political, and cultural preoccupations. Themes will include the rhetoric of love, education, humanism, recurrent mythologies, and utopias. Two 90-minute classes. Prerequisite: a 200-level course in French or instructor's permission. F. Rigolot

FRE 332 Topics in the French Middle Ages and Renaissance   Spring LA
The continuities of French culture and its preeminence over much of Europe from its 11th-century beginnings through the 16th century. Emphasis on medieval and Renaissance literary works (in modernized versions) in their relationship to topics such as "love" (fin'amor), saintliness, national identity, humanism, and so on. Prerequisite: a 200-level course in French or instructor's permission. Two 90-minute classes. Prerequisite: a 200-level course in French or instructor's permission. One 90-minute lecture, one 90-minute preceptorial. S. Kay

FRE 341 The Classical Age   Fall LA
An introduction to the literature and culture of the 17th century, known in France as le grand siècle. Readings range from the dramatic masterpieces of Corneille, Molière, and Racine to La Fontaine's Fables and Perrault's Contes, to be studied in relationship to their historical context. Formal and thematic analysis with an emphasis on moral, social, and political tensions and conflicts. Two 90-minute classes. Prerequisite: a 200-level French course or instructor's permission. V. Schröder

FRE 347 Jewish Identities in France since 1945 (also JDS 367)   LA
France has the largest Jewish community in Europe as well as a strong tradition of cultural assimilation. This course explores literary and film works that represent or refract the experience of Jews in France in the last 60 years. Problems that arise include the diversity in the cultural backgrounds of the French Jewish community, the conflict between "Jewish literature" and French republican ideology, and the role of Holocaust narratives in literary and cultural production. Prerequisite: a 200-level French course or instructor's permission. One 90-minute lecture, one 90-minute preceptorial. D. Bellos

FRE 351 The Enlightenment in France (also CHV 351)   Spring LA
Examines the challenge to the political and cultural authority of the ancien régime from new ideas, values, and rhetorics. The emphasis may fall on the work of an individual writer or group of writers, a genre or subgenre (the epistolary novel, the popular scientific essay), or the role of literary institutions (journalism, salons, censorship). Two 90-minute classes. Prerequisite: a 200-level French course or instructor's permission. N. Lee

FRE 352 Topics in 17th- and 18th-Century French Literature (also WOM 352)   Spring LA
Topics will range from single authors and major texts (for example, the Encyclopédie) to literary genres and questions of culture (preciosite, comedy and/or tragedy, historiography, epistolary writing, etc.). Prerequisite: a 200-level course

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in French or instructor's permission. Two 90-minute classes. M. Huet

FRE 353 The Ancient Regime: Society and Culture in France, 1624-1789 Fall, Spring LA

The age of French political and cultural hegemony is characterized by the construction of the modern state, the imposition of strict social discipline, and the rationalization of large areas of human behavior. These processes will be studied in political and philosophical writings, plays, novels, poems, and memoirs. Prerequisite: a 200-level course in French or instructor's permission. Two 90-minute classes. N. Lee

FRE 355 Representations of History HA

This course examines three crucial moments in French history and culture: the rise to power of Louis XIV, the French Revolution, and the Vichy regime under German occupation. The class will discuss the representation of these forms of government through archival documents, historical accounts, memoirs, films, and fiction. Prerequisite: 200-level French course, or permission of instructor. One 90-minute lecture, one preceptorial. M. Huet

FRE 357 Literature, Culture, and Politics Fall, Spring LA

Literary texts represent and often question relations of power and cultural norms, but as a form of knowledge, literature is itself implicated in power relations. Topics range from the work of a writer or group of writers who composed both fiction and political theory or commentary to the function of censorship and of literary trials. Prerequisite: a 200-level course in French or instructor's permission. One 90-minute lecture, one 90-minute preceptorial. G. Blix

FRE 361 French Romanticism LA

A thematic, artistic, and cultural study of the vision and sensibility shaped by the French Revolution and the new bourgeois-industrial society. The course in alternate years will stress poetry and theater or prose fiction, as well as the history of ideas. Close analysis of texts is combined with a broader perspective. Two 90-minute classes. Prerequisite: a 200-level French course or instructor's permission. E. Rentzou

FRE 362 The 19th-Century French Novel Spring LA

Major literary and cultural themes in the tradition of the French novel. Special attention to fictional techniques and innovations in the works of Stendhal, Balzac, Flaubert, and Zola. Emphasis on literary form in relation to intellectual, artistic, and historical background. One 90-minute lecture, one 90-minute preceptorial. Prerequisite: a 200-level French course or instructor's permission. Alternates with 363. G. Blix

FRE 363 The 20th-Century French Novel Fall LA

A study of major themes, forms, and techniques in modern fiction. Close analysis of works by Proust, Gide, Mauriac, Malraux, Céline, Sartre, and Camus. The nouveau roman and experiments in contemporary fiction will be examined as well as the cultural, moral, and political problems of our times. One 90-minute lecture, one 90-minute preceptorial. Prerequisite: a 200-level French course or instructor's permission. Alternates with 363. D. Bellos

FRE 364 Modern French Poetry Fall, Spring LA

Postromantic poetry, including works by Baudelaire, the symbolists (Verlaine, Rimbaud, Mallarmé), such modernists as Valéry, Apollinaire, and the surrealists. Special emphasis is placed on close textual analysis, as well as on symbolist, surrealist, and contemporary poetics. Two 90-minute seminars. Prerequisite: a 200-level French course or instructor's permission. Staff

FRE 365 French Theater Fall LA

Plays by Molière, Corneille, Racine, Beaumarchais, Marivaux, Hugo, Feydeau, Jarry, Claudel, Giraudoux, Anouilh, Sartre, Genet, Ionesco, and Beckett, along with consideration of mise en scène, techniques of acting, theories of Artaud, and evolution of such traditions as théâtre de moeurs, boulevard comedy, and theater of the absurd. Two 90-minute classes. Prerequisite: a 200-level French course or instructor's permission. V. Schröder

FRE 366 Modern French Fiction Spring LA

Innovations in the theory and practice of French narrative from the 1850s to the present, considered in cultural, historical, and intellectual context. Works by Flaubert, Proust, Gide, Céline, Camus, Sarraute, Yourcenar, and others will be read in English translation. Prerequisite: a 200-level literature course or instructor's permission. T. Trezise

FRE 367 Topics in 19th- and 20th-Century French Literature and Culture Spring LA

Topics will range from the oeuvre and context of a single author (for example, Balzac, Baudelaire, or Beckett) to specific cultural and literary problems (modernism and the avant-garde, history as literature, women's writing). Prerequisite: a 200-level French course or instructor's permission. Two 90-minute classes. M. Benjamin

FRE 371 World Literatures in French Fall, Spring LA

An introduction to francophone societies and cultures in Europe, Africa, and America. Each year special attention will be paid to one of these (for example, the Caribbean, the Maghreb). Readings will include both literary works and works of historical and social analysis. Prerequisite: a 200-level course in French or instructor's permission. Two 90-minute seminars. A. Benhaim

FRE 391 Topics in French Cinema (also VIS 347) Spring LA

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Major movements and directors in French and French-language cinema. Topics may include: early history of the cinematographe; the Golden Age of French film; Renoir, Bresson, Tati; the "New-Wave"; French women directors of the 1980s; adaptation of literary works. T. Trezise

**FRE 401 Topics in French Literature and Culture**  Fall, Spring LA

Issues pertaining to French literature and/or culture that transcend chronological boundaries. The specific content of the course will change each time it is offered. Possible topics include: French Autobiographical Writings, The Idea of Nationhood in France, The French Intellectual, Satire and Humor in France. Prerequisite: a 200-level course in French or instructor's permission. One three-hour seminar. **Staff**

**FRE 407 Prose Translation**  Fall, Spring LA

History, theory, and practice of literary translation. One three-hour seminar. Prerequisite: a 200-level course in French or instructor's permission. **D. Bellas**

**FRE 410 Introduction to French Literary Theory**  LA

Combines a general introduction to literary theory with the in-depth study of a small number of representative original texts. The first element will be taught via a survey of the field and the second via the focused study of works on a central theme, such as "melancholy and spectrality" or "others and alterity," using authors such as Levinas, Derrida, and Kristeva. Prerequisite: 200-level French course or permission of instructor. Two 90-minute seminars. **S. Kay**

**FRE 1027 Intensive Intermediate and Advanced French**  Spring

An intensive double-credit course designed to help students develop an active command of the language. Focus will be on reading and listening comprehension, oral proficiency, grammatical accuracy, and the development of reading and writing skills. A solid grammatical basis and awareness of the idiomatic usage of the language will be emphasized. Students will be introduced to various Francophone cultures through readings, videos, and films. Prerequisite: 101 and permission of instructor. Five 90-minute classes. **Staff**

**ITA 101 Beginner's Italian I**  Fall

An oral-aural method is used to develop concurrently the skills of speaking, understanding, reading, and writing Italian. The main emphasis is on basic grammatical principles and vocabulary. A substantial portion of the basic grammar is covered. Five classes, laboratory. **F. Weinapple**

**ITA 102 Beginner's Italian II**  Spring

A continuation of 101. The remainder of the basic grammar is covered. A number of texts from a reader will be studied. Growing emphasis on reading and writing, but much attention will continue to be given to oral Italian. Five classes, laboratory. Prepares for 107. **F. Weinapple**

**ITA 107 Advanced Italian**  Fall

Further development of general proficiency and extensive reading of standard texts. Five classes. Prerequisite: 102 or instructor's permission. **S. Marchesi**

**ITA 207 Studies in Italian Language and Style**  Fall

Intensive practice in spoken and written Italian with emphasis on vocabulary acquisition and advanced syntactical structures. Close readings and translations of contemporary Italian prose. Discussions are based on newspaper and magazine articles, television, and films. Emphasis on an audio-video approach to Italian language and culture. Prerequisite: 107 or instructor's permission. Three classes. **G. Marrone-Puglia**

**ITA 207I Accelerated Summer Study in Italy**

A four-week summer intensive language course, equivalent to 207, taught at the University of Macerata, Italy, with additional instruction from resident Princeton faculty. Emphasis on Italian-language writing and speaking skills, with supplemental work in literature. Admission by application and interview. Prerequisite: 107 or 102-7, or equivalent. Five four-hour classes, plus activities and trips. **P. Frassica, F. Weinapple**

**ITA 208 Introduction to Italy Today**  Spring

Designed to develop students' ability to communicate effectively in present-day Italy. Exploration of key moments in contemporary Italy, focusing on concepts and the vocabulary of modern politics and the economy. Emphasizes Italian social, political, and economic institutions, through the analysis of cultural and social differences between Italians and Americans in such everyday concerns as money, work, and leisure. Two 90-minute classes. Prerequisite: 107 or instructor's permission. **Staff**

**ITA 221 Introduction to Italian Literature, Language, and Society: From the Beginnings to 1700**  Not offered this year LA

The evolution of Italian literature and culture from their beginnings up to the period of Illuminismo. The distinguishing cultural and social ideals of the Middle Ages, the Renaissance, mannerism, and the baroque. One 90-minute lecture, one 90-minute preceptorial. Prerequisite: 107 or instructor's permission. **S. Marchesi**

**ITA 222 Introduction to Italian Literature, Language, and Society: From 1700 to the Present**  Not offered this year LA
Novels, plays, and poems in the context of ideological and cultural currents. Topics considered include Illuminismo, romanticism and Risorgimento, and literature under Fascism and afterward. One 90-minute lecture, one 90-minute preceptorial. Prerequisite: 107 or instructor's permission. P. Frassica

ITA 302 Topics in Medieval Italian Literature and Culture  Spring LA

Topics will range from the work of a single author (such as Boccaccio) and certain major texts to specific cultural, literary, and poetic problems (such as the medieval comune). Major figures include Giacomo da Lentini, Guido Guinizelli, Guido Cavalcanti, Petrarch, and Boccaccio. Two 90-minute seminars. Alternates with 306. Prerequisite: a 200-level Italian course or instructor's permission. S. Marchesi

ITA 303 Dante's Inferno (also MED 303)  Fall, Spring LA

Intensive study of the Inferno, with major attention paid to poetic elements such as structure, allegory, narrative technique, and relation to earlier literature, principally the Latin classics. Students who know Italian are expected, insofar as possible, to make use of the original text. Two 90-minute classes, one preceptorial. S. Marchesi

ITA 304 Dante's "Purgatorio" and "Paradiso" (also MED 304)  Spring LA

This course is a continuation of 303 and provides an occasion for close collaborative study of the final "cantiche" of the Commedia. Half the semester will be devoted to the Purgatorio, half to the Paradiso. S. Marchesi

ITA 306 The Italian Renaissance: Literature and Society  Spring LA

Readings from the works of Ariosto, Machiavelli, Guicciardini, Tasso, Della Casa, Michelangelo, and Bembo, interpreted in light of artistic and cultural preoccupations of the time. Topics include: Tasso and the Counter-Reformation sensibility, the Renaissance epic, history and the writing of history. One three-hour seminar. Alternates with 302. Prerequisite: a 200-level Italian course or instructor's permission. P. Frassica

ITA 307 Advanced Language and Style  Fall LA

Intensive practice of written and spoken Italian through close analysis of grammatical and syntactic structures, literary translation, and the stylistic study of representative literary works from the Middle Ages to the present. Focus on rhetorical structures and on Italian linguistic change. Prerequisite: a 200-level course in Italian or instructor's permission. P. Frassica

ITA 308 Topics in 20th-Century Italian Literature  Fall LA

Topics will range from the study of a single author (such as Pirandello, Montale, Pavese, D'Annunzio) to the investigation of specific literary and poetic problems. One three-hour seminar. Prerequisite: a 200-level Italian course or instructor's permission. P. Frassica

ITA 309 Topics in Contemporary Italian Civilization  Fall LA

The evolution of Italian contemporary civilization through the study of historical, sociopolitical, and cultural topics. The approach will be interdisciplinary; each year a different topic will be selected and studied as portrayed in representative samples of slides, films, and pertinent reading material. One three-hour seminar. Prerequisite: a 200-level Italian course or instructor's permission. Offered in alternate years. P. Frassica

ITA 310 Topics in Modern Italian Cinema (also VIS 443)  Spring LA

An introduction to Italian cinema from 1945 to the present. Through an interdisciplinary approach, the course will focus on sociopolitical and cultural issues as well as on basic concepts of film style and technique. Specific topics will change from year to year, and prerequisites will vary. One three-hour seminar, one film showing. G. Marrone-Puglia

ITA 311 Topics in 19th-Century Italian Literature  Fall LA

Topics will range from the study of a single author (such as Leopardi, Manzoni, Verga) to the thematic, artistic, and cultural analysis of either a genre or a literary movement (such as Romanticism, Verismo). One three-hour seminar. Prerequisite: a 200-level Italian course or instructor's permission. G. Marrone-Puglia

ITA 312 Fascism in Italian Cinema (also VIS 445)  Spring LA

A study of fascist ideology through selected films from World War II to the present. Topics include: the concept of fascist normality; racial laws; the role of women; and the Resistance and the intellectual left. Films include: Bertolucci's The Conformist, Fellini's Amarcord, Rossellini's Open City, and Benigni's Life is Beautiful. The approach is interdisciplinary and combines the analysis of sociohistorical themes with a cinematic reading of the films. One lecture, one two-hour preceptorial, one film screening. G. Marrone-Puglia

ITA 313 Marxism in Italian Cinema (also VIS 446)  Spring LA

A study of the influence of Marxist ideology on major Italian directors from the Cold War to the present. Representative films include: Bertolucci's The Last Emperor, Visconti's The Leopard, Pasolini's Teorema, Wertmuller's Seven Beauties, Pontecorvo's The Battle of Algiers. The approach will be interdisciplinary and will combine the analysis of historical and political themes with a cinematic reading of the films. One lecture, one two-hour preceptorial, one film screening. G. Marrone-Puglia

ITA 314 Risorgimento, Opera, Film  HA

Explores the way in which national identity was imagined and implemented within Italian history, culture, and cinema

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before, during, and after the period of Italian Unification in the 19th century. Examples are drawn from a wide range of historical, literary, artistic, and cultural media. Prerequisite: 200-level Italian course or instructor's permission. One three-hour seminar. *G. Marrone-Puglia*

**ITA 319 The Literature of Gastronomy   LA**

A study of Italian novels and poems in English translation, works of visual art, and films which thematize food as reality and metaphor, examining how eating functions within ideological and mythological structures of modern society. Topics include "Futurist" cuisine as an aesthetic experience and a prophetic vision, the theme of the "Last Supper," and the "interrupted dinner." Precepts in English and Italian. Prerequisite: instructor's permission to enroll in Italian precept. *P. Frassica*

**ITA 401 Seminar in Italian Literature and Culture   Fall LA**

Investigation of a major theme or author, with special attention to formal structures and intellectual context. Topics may range from the medieval chivalric tradition in such Renaissance masterpieces as Ariosto's *Orlando Furioso* to a reading of the writings of Primo Levi as these examine the issue of the annihilation of the personality. Prerequisite: a 300-level course in Italian or instructor's permission. One three-hour seminar. *Staff*

**ITA 1027 Intensive Intermediate and Advanced Italian   Spring**

An intensive, double-credit course designed to help students develop an active command of the language. Reading comprehension and oral proficiency as well as reading skills and grammatical accuracy will be developed through various activities. A solid grammatical basis and awareness of the idiomatic usage of the language will be emphasized. Students will be introduced to various cultural aspects of Italy through readings, cultural videos, and films. Prerequisite: 101 and permission of instructor. Five 90-minute classes. *F. Weinapple*
Program of Freshman Seminars in the Residential Colleges

**Director**
Peter H. Quimby

**Executive Committee**
Bonnie Bassler, Molecular Biology

Caryl G. Emerson, Slavic Languages and Literatures, Comparative Literature
Sharad Malik, Electrical Engineering
Robert J. Wuthnow, Sociology

The Program of Freshman Seminars in the Residential College will offer approximately 75 seminars in 2010-11. These courses are designed to introduce students to the excitement and challenge of working in a small setting with a faculty member and fellow students on a topic of special interest. While freshman seminars are not required, they count as regular courses, with many fulfilling distribution requirements.

Freshman seminars present a unique opportunity for students to test ideas, learn from others, and get to know faculty members in both formal and informal settings. Emphasis is on class discussions based on readings, papers, and in-class presentations focused on the subject matter of the specific seminar.

Each freshman seminar is affiliated with a residential college and is limited to 15 students.

A brochure describing the freshman seminars offered in a given year is mailed to all entering students and is available online in early July. The application process is described in the brochure and on the program website.
Program in Geological Engineering

Director
James A. Smith

Executive Committee
Michael A. Celia, Civil and Environmental Engineering
Satish C. B. Myneni, Geosciences
Jean-Hervé Prévost, Civil and Environmental Engineering
Ignacio Rodriguez-Iturbe, Civil and Environmental Engineering
James A. Smith, Civil and Environmental Engineering

The Program in Geological Engineering combines studies in engineering and the earth sciences and is designed for the student interested in the varied engineering applications of geology, geochemistry, and geophysics. The well-trained Earth scientist-engineer is increasingly important as humankind steps up its use of the land surface and oceans. In this respect the geological engineer is involved with exploration and exploitation of Earth's water, energy, and mineral resources, as well as in the acquisition and utilization of the database necessary to shape environmental policy and practice.

Depending upon the selection of electives, the program provides professional training for graduate study or practice in geology, geochemistry, geophysics, oceanography, water resources, engineering and environmental geology, and civil and environmental engineering. The program is a cooperative effort of the Department of Civil and Environmental Engineering and the Department of Geosciences, and the program committee is drawn from those departments. The student may be a candidate for either the B.S.E. or the A.B. degree.

Students with interests in this interdepartmental approach are encouraged to consult the program director. Further information may be found under the listings of the two departments.

Program of Study

Participants in the program will satisfy the degree requirements for their department as well as the course and independent work requirements for the program. A coherent course of study will be developed in conjunction with the program adviser and the departmental representative and will include geosciences and engineering courses outside the student's department. Specific program requirements are listed below.

Program Requirements

All program students must take:

1. B.S.E. mathematics, physics, and chemistry requirements.

2. Four program-approved courses at or above the 300 level that constitute a coherent sequence (for additional details, see the geosciences and civil and environmental engineering department descriptions). At least two of these courses must be from a department different from that in which the student is concentrating.

3. A two-semester senior thesis on a geological engineering topic approved by the program committee.

To remain a member of the program in good standing, students must maintain at least a B- average in their technical subjects. To be awarded the program certificate upon graduation, students must achieve a minimum grade average of B- in program courses. Program courses may not be taken on a pass/D/fail basis.

Certificate of Proficiency

Students who have met the program requirements will receive a certificate of proficiency upon graduation.
Department of Geosciences

Chair
Bess B. Ward

Associate Chair
Thomas S. Duffy

Departmental Representative
Satish C. B. Myneni

Director of Graduate Studies
Michael L. Bender

Professor
Michael L. Bender*
Thomas S. Duffy
Lincoln S. Hollister
Gerta Keller
François Morel
Tullis C. Onstott
Michael Oppenheimer, also Woodrow Wilson School*
S. George H. Philander*
Allan M. Rubin
Jorge L. Sarmiento*
Daniel M. Sigman
Jeroen Tromp, also Applied and Computational Mathematics
Bess B. Ward

Associate Professor
Satish C. B. Myneni

Assistant Professor
Stephan A. Fuglistalter*
Adam C. Maloof
Nadine McQuarrie
David M. Medvigy*
Blair Schoene
Frederik J. Simons

Visiting Lecturer
Gregory E. van der Vink

Associated Faculty
Michael A. Celia, Civil and Environmental Engineering
Peter R. Jaffé, Civil and Environmental Engineering
Denise L. Mauzerall, Woodrow Wilson School
Catherine A. Peters, Civil and Environmental Engineering
Ignacio Rodriguez-Iturbe, Civil and Environmental Engineering
James A. Smith, Civil and Environmental Engineering
Eric F. Wood, Civil and Environmental Engineering

Program in Atmospheric and Oceanic Sciences

Director
Jorge L. Sarmiento

Lecturer with Rank of Professor
Isaac M. Held
Ngar-Cheung Lau
Venkatachalam Ramaswamy
Geoffrey K. Vallis

Lecturer
Leo Donner
Stephen T. Garner

Anand Gnanadesikan
Robert W. Hallberg
Larry W. Horowitz
Sonya A. Legg

Associated Faculty
Denise L. Mauzerall, Woodrow Wilson School, Civil and Environmental Engineering*
Stephen W. Pacaia, Ecology and Evolutionary Biology*
James A. Smith, Civil and Environmental Engineering
Mark Zondlo, Civil and Environmental Engineering

*Member of Program in Atmospheric and Oceanic Sciences

Information and Departmental Plan of Study

The intellectual excitement of modern geosciences is fueled by our exploration of the dynamic forces and delicate balances that mold our planet and have rendered it conducive to life for much of its history. Our landscape is continually reshaped by the movement of cold continents atop the hot, viscous mantle, and our lives are shattered by the earthquakes and volcanic eruptions that attend their collision. Rocks that cover the Earth's surface sink to great depths and fundamentally transform under enormous temperatures and pressures, perhaps some day to be uplifted as mountains and exposed to future generations by the inexorable forces of erosion. The ocean and atmosphere engage in a continuous and complex dialogue that controls the Earth's climate. Chemical reactions operating within microorganisms and on a variety of mineral and other natural surfaces are integrated into large geochemical fluxes, which distribute the resources needed for life, and life in turn alters these fluxes. This process operates within the framework of biological evolution, in which diverse organisms appear, evolve, and vanish, sometimes leaving a transfigured world in their wake. All of these processes influence our daily lives in surprising and compelling ways.

Many of the great challenges to humanity, today and in the future, involve processes that are studied by Earth scientists, leading to a rapidly increasing role for the field in issues of environmental regulation and public policy. A background in the Earth sciences is an essential component of contemporary education. Practicing geoscientists study
nature both in the field and in the lab; and, to an ever-increasing degree, they must quantify observations with the aim not only of describing the past but of predicting the future of our planet, often with the aid of rigorous laboratory and field experiments, and intensive computation and modeling. The diversity of processes that characterize the Earth as a whole requires geosciences to be an extraordinarily interdisciplinary field with direct connections to mathematics, physics, chemistry, and biology. As a result of these connections, the geosciences frequently draw students from many backgrounds; many of our most successful graduates begin their undergraduate careers in subjects ranging from physics to English. The Department of Geosciences welcomes this intellectual variety, and our undergraduate program allows flexibility while stressing the importance of an understanding of the natural sciences.

**Prerequisites**

Majors are normally required to have taken at least one 200-level geosciences course (202, 203) or a geosciences freshman seminar by spring of their sophomore year. Introductory geosciences courses, GEO102 and GEO103, are intended primarily for non-science majors and are not ideal for students anticipating in majoring in geosciences.

**General Requirements**

The following courses (or their AP equivalents) are required for graduation.

Mathematics: MAT 104 or higher. MAT 201, 202, and 303 are recommended but not required.

Biology, Chemistry, and Physics: Two introductory or one advanced course from two of the three natural science departments. These introductory courses include PHY 103 and 104; CHM 201 and 202 (or 207); EEB 210 and 211, 214 and 215, or 308 and 309. Examples of advanced courses include PHY 203, 205, 207; CHM 215. Students are encouraged to take as many of these courses as possible.

Students interested in going to graduate school are encouraged to take more than these minimum basic science requirements.

**Departmental Requirements**

Majors are required to take eight upper-level geosciences courses (300-level or higher) with a breadth requirement of one course from at least two tracks.

Two upper-level courses (300 level or higher) in CEE, CHE, CHM, COS, EEB, MAE, MAT, MOL, PHY, or WWS may be substituted for two of the eight required geosciences courses.

If the student takes more than one 200-level GEO course and a freshman seminar in geosciences and would like to count one of these courses toward their 300-level requirements, the student should consult with the departmental representative. Students are urged to consult with the departmental representative or their junior or senior adviser before choosing departmental courses outside geosciences. In general, the department is flexible with course selections and requirements; however, we like to ensure a degree of coherency in the curriculum of each student.

**Junior Colloquium.** This is a weekly luncheon meeting, convened during the fall term, to acquaint juniors with research and career opportunities. This is mandatory for all geosciences majors (including those in the geological engineering program).

**Program of Study**

A set of informal programs (tracks) of study is designed to help students interested in different areas of geosciences, and to provide basic course plans that allow students to develop a strong foundation in those areas. These areas of focus include:

**Geology and Geophysics (GPG).** Focuses on the structure and evolution of the Earth as a physical system, by theory, experiment, field work, and numerical simulation. The emphasis is on geological processes of global relevance. The quantitative concepts and techniques covered in class are also relevant to applied sciences and industry.

**Ocean, Atmosphere, and Climate (OAC).** This track specializes in the study of the coupled ocean and atmosphere system as it interacts with life to set the physical and chemical conditions of the Earth's surface.

**Environmental Biogeochemistry (EBG).** This track focuses on the understanding of chemical and biological processes modifying the Earth's surface (atmosphere, soils, sediments, oceans), and how their interactions alter the behavior of elements or molecules responsible for different environmental processes, such as global climate change, and transport and bioaccumulation of anthropogenic contaminants.

**Certificate Programs.** The department offers a certificate program in geological engineering in collaboration with the Department of Civil and Environmental Engineering, which is described in the entry for the Program in Geological Engineering. There is also a geosciences concentration certificate program in the Woodrow Wilson School of Public and International Affairs. The admission process for the certificate students is the same as for other potential Woodrow Wilson School concentrators. The department also cooperates in the certificate programs in environmental studies, materials science and engineering, and teacher preparation. Several geosciences courses fulfill the requirements of these certificate programs.

All students considering a major in the department should see the departmental representative. They are encouraged to consult as soon as possible, even as first-year students, to aid in the design of a course of study. The department offers an open house in both the fall and spring terms to introduce prospective students to departmental courses, faculty,
students, and research interests.

For full details, see the department's website.

**Independent Work**

*Junior Independent Work.* Students conduct independent research, and write and orally present their results in both the fall and spring semesters. In the fall semester, the independent work often takes the form of a synthesis of library research on a topic that is chosen by the student in consultation with one of the faculty members, whereas in the spring students are expected to collect and/or conduct data analysis. Examples of research topics in different areas of geosciences can be accessed on the department Web pages, and can also be obtained from the department office. Many opportunities for collecting data are available, either through the student's own efforts (including geological field work, experiments conducted in any of the several laboratories in the department, and computer simulations), or by accessing databases made available by and for the scientific community at large. The department and the faculty adviser can provide the necessary funding to conduct this independent research. The oral presentations of independent work take place during the reading period. The final grade for both fall and spring independent research is decided based on the quality of the research, written report, and the oral presentation of the student.

*Senior Independent Work.* All students write a thesis and give an oral presentation on a subject chosen by the student with the advice of the department. Many students select their projects in consultation with a faculty adviser, and begin the research during the summer preceding the senior year. The department and the faculty adviser usually provide the necessary funds to conduct the independent research. The grade for the thesis is decided based on the quality of the research, written report, and the oral presentation.

**Senior Departmental Examination**

The comprehensive examination in the department consists of an oral examination based on the senior thesis and related topics.

**Preparation for Graduate Study**

Specialization in any one of the Earth sciences today requires graduate study. Students interested in pursuing graduate studies in any of the tracks are encouraged to take advanced chemistry, physics, mathematics, and biology courses. More specific information on graduate education can be obtained from the departmental representative or other faculty members.

**Field Programs.** Since experience in field geology is an important aspect of professional training, students are encouraged to take a course in field methods in geology and oceanography.

**Geological Field Camp.** Many of our students take the YBRA (Yellowstone-Bighorn Research Association) field course in Red Lodge, Montana, after their sophomore or junior year. Other students choose to work with a faculty member (e.g., Maloof, McQuarrie, Onstott, and Hollister) or a graduate student in the field, and may conduct independent research for junior or senior independent research as part of this opportunity. Geosciences facilitates student enrollment in these field opportunities by providing financial aid.

**Experience at Sea.** Students interested in ocean studies can participate in ongoing studies at sea or at the Bermuda Biological Station. The department tries to make available opportunities to interested undergraduates, particularly to those electing the OAC and EBG tracks, to participate in an oceanographic cruise at some time during their undergraduate years.

Information on other opportunities for field experience is made available annually. The student should consult the departmental representative if they are interested in participating in field programs.

**Financial Assistance.** Grants for field work in geology are available through the Tony Conway '36 Memorial Scholarship Fund. Grants for field and museum studies and research in natural history during the summer are available to students of high scholastic standing from the John Boyd '43 Memorial Fund and the Glenn L. Jepsen '27 Fund. Grants are available from the Erling Dorf '33 Fund for field work and the field course. In 1977 the Howard T. Vaum Jr. '78 Fund was established as a memorial to this student in geological engineering; proceeds are used to support students of high academic standing in a field study program. Students wishing assistance from any of these funds should present a proposal (two pages of research description) by February 15 to the departmental representative.

Funds are available from time to time for qualified undergraduates to serve as research assistants to faculty members during the regular academic session as well as during the summer months.

In some instances summer employment for qualified students can be arranged with governmental, commercial, or academic field parties.

**Courses**

**GEO 102A Climate: Past, Present, and Future (also ENV 102A)  Fall**
An introduction to the processes and conditions that control Earth's climate; an overview of past climate evolution

http://www.princeton.edu/ua/
from the time of Earth's origin to the period of human history; and an investigation of ongoing climate changes and those predicted for the future, including the capacity of human activities to alter climate and the impacts of climate change on environment and society. Intended primarily for students not concentrating in science or engineering. Three lectures. M. Bender, D. Sigman, G. Vallis

**GEO 102B Climate: Past, Present, and Future (also ENV 102B)  Fall ST**

An introduction to the processes and conditions that control Earth's climate; an overview of past climate evolution from the time of Earth's origin to the period of human history; and an investigation of ongoing climate changes and those predicted for the future, including the capacity of human activities to alter climate and the impacts of climate change on environment and society. Intended primarily for students not concentrating in science or engineering. Three lectures, one three-hour laboratory. M. Bender, D. Sigman, G. Vallis

**GEO 103 Natural Disasters  Spring ST**

Natural hazards and the importance of public understanding of the issues related to them. Emphasis on the processes which underlie these hazards with some discussion of the policy issues involved. Principal topics: earthquakes, volcanoes, hurricanes, landslides, impacts, limits to growth of population and its use of natural resources. Three lectures, one three-hour laboratory. A. Rubin

**GEO 202 Ocean, Atmosphere, and Climate  Spring ST**

An introduction to the ocean, atmosphere, and climate from the perspective of oceanography. Covers coastal processes including waves, beaches, tides, and ecosystems; open ocean processes including atmospheric circulation and its impact on the surface ocean, the wind-driven circulation, and surface ocean ecosystems; and the abyssal ocean including circulation, the cycling of chemicals, and ocean sediments and what they tell us about the climate history of the Earth. The final part of the course will cover humans and the Earth system, including a discussion of ocean resources and climate change. Three lectures, one three-hour laboratory. N. McQuarrie

**GEO 203 Geology (also CEE 235)  Fall ST**

An introduction to geology and geological processes. Topics include the physical processes occurring within the Earth, including plate tectonics, formation of minerals and rocks, Earth structure, earthquakes, faults, and mountain building, as well as the physical processes that transform the Earth's surface, including weathering and erosion, flooding, landslides and the development of landscape. Recommended for students considering geosciences as a concentration. Two 90-minute lectures, one three-hour laboratory. N. McQuarrie

**GEO 207 A Guided Tour of the Solar System (also AST 207)  Fall QR**

Examines the major bodies of our solar system, emphasizing their surface features, internal structures, and atmospheres. Topics include the origin of the solar system, habitability of planets, and the role of impacts in planetary evolution. Terrestrial and giant planets will be studied as well as satellites, comets, and asteroids. Recent discoveries from planetary missions are emphasized. This course is aimed primarily at non-science majors. Three lectures, one preceptorial. T. Duffy

**GEO 208 Human Evolution (see ANT 206)**

**GEO 255 Life in the Universe (also AST 255/EEB 255/CHM 255)  Fall QR**

Introduces students to a new field, astrobiology, where scientists trained in biology, chemistry, astronomy, and geology combine their skills to discover life's origins and seek extraterrestrial life. Topics include: discoveries of microbes in extreme environments on Earth that raise the prospect of life on Mars and Europa, a moon of Jupiter; and extra-solar planets that offer targets for NASA telescopes searching for life. Prerequisites: at least one course in astrophysics, biology, chemistry, physics, or geology. For freshmen, an AP score of 4 or 5 in chemistry, biology, or physics is required. Two 90-minute lectures. T. Onstott, E. Turner, L. Landweber

**GEO 297 Environmental Decision Making (also ENV 399)  Fall QR**

Use of scientific data and arguments in formulating environmental policies, international development, poverty reduction, economic growth, conflict, and risk assessment. Class format consists of case studies for which students analyze the scientific arguments, evaluate the data upon which they are based, and determine the scientific credibility, political feasibility, and economic consequences of the various decisions. One three-hour seminar. G. van der Vink

**GEO 300 Summer Course in Geologic Field Methods**

Introduction to modern geologic field methods. Local and regional problems studied from base camp at Red Lodge, Montana. Five weeks during summer usually following sophomore year. Prerequisite: one year of college geology and 312, 314, or 316. L. Goodell

**GEO 308 Sedimentology and Stratigraphy  Fall ST**

Examination of the nature and origin of sedimentary rocks and fossils that provide the basis for the interpretation of sedimentary environments. Focus on processes and environments involved in the origin, dispersal, deposition, and burial of sediments, and the use of fossils to determine age and stratigraphic correlation of sediments. A field work short course during break introduces the students to practical applications of geological principles and provides hands-on experience. Prerequisite: 300-level geosciences course, or instructor's permission. Offered alternately with 305. G. Keller

**GEO 312 Introduction to Mineralogy and Petrology  Spring ST**
An examination of the materials that compose the Earth and the processes that govern their growth and transformation. Emphasis on the crystal chemistry of the rock-forming minerals. Laboratory devoted to hand samples and modern methods of mineral analysis. Three classes, one three-hour laboratory. Prerequisite: CHM 201 or 203, or instructor's permission. T. Onstott

GEO 314 Igneous and Metamorphic Geology Fall ST

Interpretation of Earth history based on the rock record. Two 90-minute lectures, one three-hour laboratory. Several one-day field trips and an eight-day trip during fall break. Prerequisite: one course in geosciences (or geosciences freshman seminar). L. Hollister

GEO 322 Biogeochemical Cycles and Global Change (also ENV 322) Not offered this year

An examination of the natural cycles of carbon, nitrogen, and other biologically active elements. Major themes include the physical processes and biological requirements that underlie biogeochemical cycles on Earth; the biogeochemistry of land-based, freshwater, and marine environments; and their integration into global cycles; changes in these cycles over Earth history and their recent alteration by human activities. Prerequisite: CHM 201 and 202 or MAT 101 and 102, or instructor's permission. Three one-hour classes. D. Sigman

GEO 361 Physics of the Ocean and Atmosphere (also ENV 361/CEE 360) Fall

The habitability of our planet depends critically on the motion of the oceans and atmosphere, which determines our weather and climate. Associated phenomena include hurricanes, tornadoes, the Jet Streams, the Gulf Stream, El Nino, La Nina, and the recurrent Ice Ages of the past million years. The course includes the use of an idealized computer model to study how these phenomena depend on the Earth's rotation and sphericity, and to explore the predictability of weather and of long-term changes in climate, including future global warming. Prerequisites: MAT 201, PHY 104 or equivalent. Three lectures. S. Philander

GEO 362 Biogeochemistry of the Ocean and Atmosphere (also ENV 362) Not offered this year ST

The chemical cycles of ocean and atmosphere and their interaction with Earth's biota. Topics include: the origin of the ocean's salt; the major and biologically active gases in the atmosphere and ocean; nutrients and ocean fertility; the global carbon cycle; the reactive chemistry of the atmosphere. Prerequisites: CHM 201/202 or higher; GEO 202 and/or GEO 361; or permission of the instructor. Three lectures, one laboratory. D. Sigman

GEO 363 Environmental Geochemistry: Chemistry of the Natural Systems (also CHM 331/ENV 331) Fall

Covers topics including origin of elements; formation of the Earth; evolution of the atmosphere and oceans; atomic theory and chemical bonding; crystal chemistry and ionic substitution in crystals; reaction equilibria and kinetics in aqueous and biological systems; chemistry of high-temperature melts and crystalization process; and chemistry of the atmosphere, soil, marine, and riverine environments. The biogeochemistry of contaminants and their influence on the environment will also be discussed. Two 90-minute lectures. Prerequisite: one term of college chemistry or instructor's permission. S. Myneni

GEO 364 Earth Chemistry: The Major Realms of the Planet (also CHM 364) Spring

The chemical composition of the major realms of the planet: core, mantle, continents, ocean, atmosphere, and biosphere. Topics include the synthesis of the chemical elements in stars, the origin of the solar system and Earth, and the chemical differentiation of Earth's core, mantle, crust, ocean, atmosphere, and biosphere. Also explores the global cycles of carbon, nitrogen, and other biologically important elements, their interactions with the geosphere, and their evolution through time. Prerequisites: CHM 201, or equivalent; MAT 103, or equivalent. Three lectures. M. Bender, D. Sigman

GEO 365 Evolution and Catastrophes Fall

Evolution of life and its fossil record with special emphasis on catastrophes resulting in mass extinctions. Evaluation of current theories on mass extinctions. Two 90-minute lectures. Prerequisite: 202; or EEB 211; or instructor's permission. Offered alternately with 308. G. Keller

GEO 366 Current and Future Climate (also ENV 339/WWS 335) Not offered this year

An exploration of the causes and potential consequences of human-induced climate change, and their implications for policy responses. By studying the climate system and how it is influenced by human perturbation, the class will develop themes that should constrain public policy, including time-scales of change, irreversibility, lags, limits, uncertainty, and surprise. Prerequisites: MAT 101-102 and either CHM 201-202 or PHY 101-102; or permission of instructor. Two 90-minute lectures, one preceptorial. Offered alternate years. M. Oppenheimer

GEO 370 Sedimentology (also ENV 370/CEE 370) Spring ST

A treatment of the physical and chemical processes that shape Earth's surface, such as solar radiation, i.e., deformation of the solid Earth, and the flow of water (vapor, liquid, and solid) under the influence of gravity. In particular, the generation, transport, and preservation of sediment in response to these processes are studied in order to better read stories of Earth history in the geologic record and to better understand processes involved in modern and ancient environmental change. Prerequisites: MAT 104, PHY 103, CHM 201, or equivalents. Two lectures, two laboratories. A. Maloof

GEO 371 Global Geophysics (also PHY 371) Fall

An introduction to the fundamental principles of global geophysics. Taught in four parts, the material builds up to form a final coherent picture of (how we know) the structure and evolution of the solid Earth--gravity, magnetism,
GEO 372 Earth Materials  Fall ST
This course serves as an introduction to the processes that govern the distribution of different rocks and minerals in the Earth. Students learn to make observations from the microscopic to continental scale and relate these to theoretical and empirical thermodynamics. The goal is to understand the chemical, structural, and thermal influences on rock and mineral formation and how this in turn influences the plate tectonic evolution of our planet. Prerequisite: GEO 203 or FRS 145. Two lectures, one laboratory. B. Schoene

GEO 373 Structural Geology  ST
The nature and origin of the deformed rocks composing the crust of Earth considered at scales ranging from atomic to continental. Tectonics and regional geology of North America. Three lectures, one three-hour laboratory, and two one-day and one three-day field trips in the Appalachians. Prerequisite: 235 or instructor's permission. N. McQuarrie

GEO 374 Planetary Systems: Their Diversity and Evolution (also AST 374)  Not offered this year
Examines the diversity of recently discovered planetary systems in terms of fundamental physical and chemical processes and what this diversity implies about the origin and evolution of our own planetary system. Topics include: the formation and dynamics of planets and satellites, planetary migration, the evolution of planetary interiors, surfaces and atmospheres, the occurrence of water and organics, and the habitability of planets and planetary systems. Recent discoveries from planetary missions and extrasolar planet observations are emphasized. Prerequisites: GEO 207, 255, or instructor's permission. Two 90-minute lectures. T. Onstott

GEO 375 Environmental Fluid Mechanics (see CEE 305)  Fall

GEO 416 Evolution of the Continents  Spring
Geology and geophysics as they relate to the origin and evolution of the continental crust. Prerequisite: one year of geology. One three-hour seminar; one seven-day field trip during spring break. Offered alternately with 308. L. Hollister

GEO 417 Environmental Microbiology (also CEE 417/EEB 419)  Spring
The study of microbial biogeochemistry and microbial ecology. Beginning with the physical/chemical characteristics and constraints of microbial metabolism, we will investigate the role of bacteria in elemental cycles, in soil, sediment, and marine and freshwater communities, in bioremediation and chemical transformations. Prerequisites: One 300-level course in chemistry or biology, or instructor's permission. Two 90-minute classes. B. Ward

GEO 418 Environmental Aqueous Geochemistry (also CHM 418)  Fall
Application of quantitative chemical principles to the study of natural waters. Includes equilibrium computations, weathering and diagenetic processes, precipitation of chemical sediments, and pollution of natural waters. Two lectures. Prerequisite: one year of college chemistry. Previous or concurrent enrollment in CHM 306 recommended. Offered alternate years. F. Morel

GEO 419 The Earth as a Physical System (also PHY 419)  Spring
The Earth is a physical system whose past and present state can be studied within the framework of physics and chemistry. Topics include current concepts of geophysics and the physics and chemistry of Earth materials; origin and evolution of the Earth; and nature of dynamic processes in its interior. One emphasis is to relate geologic processes on a macroscopic scale to the fundamental materials properties of minerals and rocks. Three lectures. Prerequisites: one year of college-level chemistry or physics (preferably both) and calculus. Offered alternately with 424. T. Duffy

GEO 420 Topics in Earth Science  Fall
These courses cover one or more advanced topics in modern Earth science. They are offered only when there is an opportunity to present material not included in the established curriculum; the subjects vary from year to year. Three classes or a three-hour seminar. S. Philander

GEO 421 Topics in Earth Science
These courses cover one or more advanced topics in modern Earth science. They are offered only when there is an opportunity to present material not included in the established curriculum; the subjects vary from year to year. Three classes or a three-hour seminar. L. Hollister

GEO 424 Introductory Seismology and Oil Exploration (also CEE 424)  Fall
Fundamentals of seismology and seismic wave propagation. Introduction to acoustic and elastic wave propagation concepts, observational methods, and inferences that can be drawn from seismic data about the deep planetary structure of the Earth, as well as about the occurrence of oil and gas deposits in the crust. Offered every other year. Prerequisites: PHY 104 and MAE 305 (can be taken concurrently), or permission of the instructor. Two 90-minute classes. Staff

GEO 425 Introduction to Physical Oceanography (also MAE 425)  Fall
The study of the oceans as a major influence on the atmosphere and the world environment. Ocean circulation and the
oceans' properties. The Coriolis-dominated equations of motion, the thermocline, wind-driven and thermohaline-driven circulation, and oceanic tracers. Three lectures. Prerequisite: MAT 201 or equivalent. A. Gnanadesikan

GEO 428 Biological Oceanography Spring

Fundamentals of biological oceanography, with an emphasis on the ecosystem level. The course will examine organisms in the context of their chemical and physical environment; properties of seawater and atmosphere that affect life in the ocean; primary production and marine food webs; and global cycles of carbon and other elements. Students will read the current and classic literature of oceanography. Prerequisites: college-level chemistry, biology, and physics. Two 90-minute classes. B. Ward

GEO 440 Advanced Mineralogy (also MSE 440) Spring

An advanced survey of the structure and crystal chemistry of major rock-forming minerals. Topics include: crystallography, physical properties of minerals, mineral thermodynamics, lattice dynamics, phase transformations, defects, and kinetics. Prerequisites: GEO 372 or MSE 301, or instructor's permission. Two 90-minute classes. T. Duffy

GEO 441 Computational Geophysics (also APC 441) Spring

An introduction to weak numerical methods used in computational geophysics. Finite- and spectral-elements, representation of fields, quadrature, assembly, local versus global meshes, domain decomposition, time marching and stability, parallel implementation and message-passing, and load-balancing. Parameter estimation and "imaging" using data assimilation techniques and related "adjoint" methods. Labs provide experience in meshing complicated surfaces and volumes as well as solving partial differential equations relevant to geophysics. Prerequisites: MAT 201; partial differential equations and basic programming skills. Two 90-minute lectures. J. Tromp

GEO 442 Geodynamics (also PHY 442) Not offered this year

An advanced introduction to setting up and solving boundary value problems relevant to the solid Earth sciences. Topics include heat flow, fluid flow, elasticity and plate flexure, and rock rheology, with applications to mantle convection, magma transport, lithospheric deformation, structural geology, and fault mechanics. Prerequisites: MAT 201 or 202. Two 90-minute lectures. A. Rubin

GEO 464 Radiogenic Isotopes Spring

Theory and methodology of radiogenic isotope geochemistry, as applied to topics in the geosciences, including the formation and differentiation of the Earth and solar system, thermal and temporal evolution of orogenic belts, and the rates and timing of important geochemical, biotic, and climatic events in earth history. Two 90-minute lectures. B. Schoene

GEO 470 Environmental Chemistry of Soils (also CHM 470) Spring

Focuses on the inorganic and organic constituents of aqueous, solid, and gaseous phases of soils, and fundamental chemical principles and processes governing the reactions between different constituents. The role of soil chemical processes in the major and trace element cycles, and the biogeochemical transformation of different soil contaminants will be discussed in the later parts of the course. Prerequisites: 331, or any other basic chemistry course. Two 90-minute lectures. S. Myneni

GEO 471 Introduction to Water Pollution Technology (see CEE 471)

GEO 499 Environmental Change, Poverty, and Conflict (also ENV 499) Fall

Evaluates our vulnerability to natural hazards and the future humanitarian, economic, and political impact of such events given changes in sea level, climate variations, and demographic trends. Students work in teams to assess risk and to develop economically realistic and scientifically sound policy recommendations. The results will be published and/or presented to policymakers. One three-hour seminar. G. van der Vink
Department of German

Chair
Michael W. Jennings

Acting Chair
Nikolaus Wegmann (fall)

Departmental Representative
Thomas Y. Levin

Director of Graduate Studies
Sara S. Poor

Professor
Michael W. Jennings
Nikolaus Wegmann

Visiting Professor
Joseph W. Vogl
Sigrid Weigel

Associate Professor
Brigid Doherty, also Art and Archaeology
Thomas Y. Levin
Sara S. Poor

Assistant Professor
Devin A. Fore
Christiane Frey
Sarah M. Pourciau

Senior Lecturer
James W. Rankin

Lecturer
Brian E. Hanrahan

Associated Faculty
Scott G. Burnham, Music
Hal Foster, Art and Archaeology
Daniel Heller-Roazen, Comparative Literature
Alexander Nehamas, Philosophy, Comparative Literature, Council of the Humanities
Anson G. Rabinbach, History
Peter Schäfer, Religion

Information and Departmental Plan of Study

Advanced Placement

A student with a minimum SAT Subject Test score in German of 760 or an Advanced Placement Examination score of 5 will be considered to have satisfied the A.B. foreign language requirement and be eligible for placement in 200- or 300-level courses, as well as participation in the Summer Work Program and the Berlin Consortium. Students with some knowledge of German but without SAT Subject or AP test scores must have their proficiency measured by a placement test during orientation week. Sophomores and upperclass students may take the test as well, but should notify the departmental office well in advance.

Prerequisites

The requirement for admission to the German department is a satisfactory working knowledge of German demonstrated by the completion of 107, an SAT Subject Test score of 760, or a 5 on the Advanced Placement test.

Early Concentration

Qualified students may begin departmental work in the sophomore year under the following plan:

1. Recommended introductory courses: 207, 208, 209, 210, or 211;
2. Independent work beginning in the second sophomore term;
3. Meetings with the departmental adviser for individual discussion of the student's independent work.

This plan permits students to devote themselves to their major interest before their junior year. They can advance when ready and as swiftly as possible. An early start gives students a wider choice of courses and seminars in their senior year and enables them to start work on the senior thesis before their final year at Princeton.

Program of Study

The department offers six areas of concentration:

1. German Literature. This program focuses on the major periods and forms of German literature with emphasis on literary and historical analysis. Students will satisfy the general University requirement of eight departmental courses by taking a minimum of five courses in the department (usually no more than one course at the 200 level) and a...
maximum of three cognate courses in related humanities departments and other disciplines such as philosophy and religion.

2. **German Philosophy and Intellectual History.** This program concentrates on philosophy, political and cultural theory, particular intellectual movements, and epochs in German-speaking contexts. Students in this track are required to take a minimum of five courses in the German department (at least three of which should be 300 level courses) and three relevant cognate courses in history, European cultural studies, or philosophy.

3. **Media and Aesthetics.** This program is designed for students who wish to focus on art, film, music, sound technology, and/or media theory broadly conceived. Students take a minimum of five courses in the German department, at least three of which should be 300 level courses, and three relevant cognate courses in art and archaeology, music, philosophy, European cultural studies, and the Program in Visual Arts.

4. **Germanic Linguistics.** This program concentrates on the history and structure of the German language. Majors who select this program are required to take the following courses: LIN 213 Introduction to Language and Linguistics, LIN 214 Historical Linguistics, or another course in linguistics, and two graduate seminars GER 505 History of the German Language and GER 506 Second Language Acquisition and Pedagogy. In addition, such students will take at least three courses in German literature and culture as well as one cognate course.

5. **The Study of Two Literatures.** This plan of study normally consists of five upper-level courses in the German department and three upper-level courses in a second literature. Students who have not completed the language preparation for the second literature may engage in the program provided that they satisfy that language requirement during the junior year.

6. **Joint Program in German Culture and Politics.** In cooperation with the Department of Politics, students may combine a concentration in German literature and culture with German/European politics and political theory. In this program, four courses will be taken in the German department and four cognate courses will be taken in the Department of Politics (at least two of them on the 300 level). One semester of junior independent work will be done in each department. Recommended departmental courses are GER 207, 208, 211, 306, 307, 309, and 324. Recommended cognates in politics include POL 210, 230, 231, 240, 306, 372, 373, and 385. The senior thesis will be supervised in the German department, but it may deal with any political topic acceptable to both departmental representatives. Upon completion of this program, the two departments will issue a letter certifying completion of a program in German cultural studies with a concentration in politics.

**Language Requirements**

For areas 1 to 5, at least three, and for area 6, at least two of the departmentals should be courses taught in German. For areas 2 and 3, one of these three may be a course taught in English for which there is an appropriate German-language component. This option is available for all courses taught in the German department, but also for some courses in other departments. Students should consult with the course instructor regarding the German-language component at the beginning of the semester and submit the agreed-upon plan to the German departmental representative for approval.

**Independent Work**

Independent reading, the junior year essays, and the senior thesis constitute the student's total independent work, which is spread over the four upperclass terms. These elements can be profitably linked with departmental courses. Students will consult with the departmental representative under whose guidance they will develop their own program. During the first term of the junior year, students are required to write an essay of approximately 4,000 words on a subject in German philosophy, art, media, linguistics, literature, or politics. During the second term of the junior year, students will present a longer essay (of approximately 8,000 words). These essays, as well as the senior thesis, may be written in German or English. Early in May students should discuss plans for their senior theses with their departmental representative.

During senior year students will write a thesis on a subject approved by the adviser. By the end of the fourth week of the first senior term students will submit to their advisers a tentative outline of the proposed thesis. Further progress reports (as announced by the department) are required. Five weeks before the departmental examination students must deliver to the departmental office two spiral-bound readers' copies (signed). After the departmental exam and upon approval of the thesis, students must submit one bound copy for the department archive and one unbound copy for the library. Readers' copies will be returned to the student with comments in advance of the departmental exam. The title page must show the student's name and class numerals, the department in which the student is enrolled, the name of the adviser, and the month and year of presentation.

**Senior Departmental Examination**

The departmental examination will be oral, based on the thesis and the student's course of study. More specific information, such as time and arrangement, will be announced by the department each year.

**Study and Work Abroad**

It is strongly recommended that students spend some time in a German-speaking country. This could be done through the Berlin Consortium for German Studies (see below) or the department's Summer Work Program. The following opportunities are available to students who wish to spend time in Germany in order to gain fluency and accuracy in the German language, to pursue further study, and to participate in German life.

**Berlin Study Abroad Program.** Through the Berlin Consortium for German Studies, of which Princeton University is a
1. Undergraduate Announcement

http://www.princeton.edu/ua/

1. The department offers courses in:

Areas of Study.

Note: Normally students electing a beginner's course in any language will receive credit only if two terms are representative.

2. As independent work, a substantial paper (20 pages) growing out of one of the four courses taken to fulfill the requirements for work done in the Department of German are:

1. Four courses at the 200 level or higher. Two of these four must be at the 300 level or above, and three of these four must be courses that are taught in the German language.

2. As independent work, a substantial paper (20 pages) growing out of one of the four courses taken to fulfill the certificate requirement. This paper will be in addition to the work required in the course. The paper may be written in either German or English. If written in English, it must be accompanied by a two-page German abstract.

Program Requirements. The program is open to undergraduates in all departments. Students should consult the departmental representative by the middle of the sophomore year to plan a program of study. Ordinarily, students concentrating in language and literature departments, including comparative literature, will be eligible for the certificate in language and culture provided that: (a) the linguistic base for the language and culture certificate is different from the linguistic base of the concentration; and (b) the work required for the language and culture certificate does not duplicate the requirements of the major. Students pursuing area studies certificates may earn the certificate in language and culture provided that: (a) the courses they elect to satisfy the requirements of the area studies program are different from those they elect to satisfy the requirements of the language and culture certificate program; and (b) they submit a piece of independent work in addition to the independent work that satisfies the requirements of the area studies program and the home department.

In addition to meeting the departmental requirements below, students' work should involve aspects of German culture in one or more disciplines outside the Department of German, for example, relevant courses or independent work in history, politics, culture, literature, music, media, and so on that deal in part with German-speaking countries. The requirements for work done in the Department of German are:

1. Four courses at the 200 level or higher. Two of these four must be at the 300 level or above, and three of these four must be courses that are taught in the German language.

2. As independent work, a substantial paper (20 pages) growing out of one of the four courses taken to fulfill the certificate requirement. This paper will be in addition to the work required in the course. The paper may be written in either German or English. If written in English, it must be accompanied by a two-page German abstract.

Preparation for Graduate Study

Departmental students who intend to pursue graduate studies in German are reminded that most graduate schools require a reading knowledge of a second modern foreign language, and possibly Latin. Students are therefore advised to prepare themselves as undergraduates to meet these requirements.

The Language Program. The normal program for beginners consists of 101, 102, 105, and 107. Students with a grade of A in 101 may combine 102 and 105 in a special second-term course, 102-5.

It is possible to start the study of German at Princeton and fulfill the language requirement in one year through the Munich study abroad program (see above): 101 (fall term), 102-5 (spring term), 107G (summer study immediately following 102-5). German 105G is also offered through the Munich program.

Successful completion of 107, 107G, or immediate assignment to a higher course satisfies the degree requirement and qualifies the student for all advanced courses, for departmental concentration, and for participation in the Berlin Consortium and the Summer Work Program. All questions concerning placement, course changes, failures, summer study, or other matters related to any of the department's undergraduate courses should be referred to the departmental representative.

Note: Normally students electing a beginner's course in any language will receive credit only if two terms are completed.

Areas of Study. The department offers courses in:


Munich Study Abroad Program. Students enrolled in 102, 102-5, or 105 have the opportunity to receive credit for 105 or 107 with a special month-long summer course at the Goethe-Institut in Munich (105G and 107G), which is partially subsidized by the University and the German department. Successful completion of 107G in Munich satisfies the University's language requirement and qualifies students for upper-level courses in German, the Summer Work Program, and the Berlin Consortium. Interested students should consult with Professor James Rankin at jrankin@princeton.edu.

The Summer Work Abroad Program. The department places students in paid internships in Germany and Switzerland in fields such as banking, newspaper and book publishing, radio, healthcare, and computing. Salaries generally cover living expenses, and scholarship funds are available to help with transportation to and from the job where needed.

Applications for this program are due in early November. Prerequisite for acceptance is a satisfactory speaking knowledge of German; that is, at least a C+ grade in German 107 or its equivalent. Further information may be obtained from the program office.

Certificate in Language and Culture

The Department of German offers students an opportunity to do sustained work in German language, philosophy, art, and media while concentrating in another department, leading to a certificate in German language and culture.

Program Requirements. The program is open to undergraduates in all departments. Students should consult the departmental representative by the middle of the sophomore year to plan a program of study. Ordinarily, students concentrating in language and literature departments, including comparative literature, will be eligible for the certificate in language and culture provided that: (a) the linguistic base for the language and culture certificate is different from the linguistic base of the concentration; and (b) the work required for the language and culture certificate does not duplicate the requirements of the major. Students pursuing area studies certificates may earn the certificate in language and culture provided that: (a) the courses they elect to satisfy the requirements of the area studies program are different from those they elect to satisfy the requirements of the language and culture certificate program; and (b) they submit a piece of independent work in addition to the independent work that satisfies the requirements of the area studies program and the home department.

In addition to meeting the departmental requirements below, students' work should involve aspects of German culture in one or more disciplines outside the Department of German, for example, relevant courses or independent work in history, politics, culture, literature, music, media, and so on that deal in part with German-speaking countries. The requirements for work done in the Department of German are:

1. Four courses at the 200 level or higher. Two of these four must be at the 300 level or above, and three of these four must be courses that are taught in the German language.

2. As independent work, a substantial paper (20 pages) growing out of one of the four courses taken to fulfill the certificate requirement. This paper will be in addition to the work required in the course. The paper may be written in either German or English. If written in English, it must be accompanied by a two-page German abstract.

Preparation for Graduate Study

Departmental students who intend to pursue graduate studies in German are reminded that most graduate schools require a reading knowledge of a second modern foreign language, and possibly Latin. Students are therefore advised to prepare themselves as undergraduates to meet these requirements.

The Language Program. The normal program for beginners consists of 101, 102, 105, and 107. Students with a grade of A in 101 may combine 102 and 105 in a special second-term course, 102-5.

It is possible to start the study of German at Princeton and fulfill the language requirement in one year through the Munich study abroad program (see above): 101 (fall term), 102-5 (spring term), 107G (summer study immediately following 102-5). German 105G is also offered through the Munich program.

Successful completion of 107, 107G, or immediate assignment to a higher course satisfies the degree requirement and qualifies the student for all advanced courses, for departmental concentration, and for participation in the Berlin Consortium and the Summer Work Program. All questions concerning placement, course changes, failures, summer study, or other matters related to any of the department's undergraduate courses should be referred to the departmental representative.

Note: Normally students electing a beginner's course in any language will receive credit only if two terms are completed.

Areas of Study. The department offers courses in:

Courses

GER 101 Beginner's German I  Fall
Lays the foundation for functional acquisition of German, with a goal of proficiency in oral and written interaction. Class time is devoted to language tasks that will foster communicative competence, stressing listening and reading strategies, vocabulary acquisition, authentic input, and oral production. Five hours per week. J. Rankin

GER 102 Beginner's German II  Spring
Continuation of 101, with added emphasis on reading ability, communicative writing strategies, and listening comprehension. Five hours per week. J. Rankin

GER 103 Beginner's German in Review  Fall
The course provides students who have some background in German a brief review of material covered in 101, and then works on speaking, listening, reading, and writing skills at the level of 102. Five hours. Prerequisite: scores from placement/proficiency test administered during fall orientation and consultation with instructor. Staff

GER 105 Intermediate German  Fall, Spring
Aims toward further proficiency in functional communication, with more emphasis on reading and writing. Class time is devoted to a task-based approach to vocabulary building, grammar acquisition, production strategies, and discussion of texts. Prerequisite: SAT Subject Test score of 570 and demonstrated oral competence, or successful completion of 102. To be followed by 107 to satisfy the A.B. language requirement. Four hours per week. Staff

GER 105G Intermediate German in Munich
A special offering of third-semester German taught during the summer in Munich, Germany. Students take part in a four-week intensive language course at the Goethe-Institut, as well as a precept with a Princeton faculty member that covers the literary component of 105. Students are chosen by application from 102 in the spring. Five three-hour classes, two preceptorials. M. Jennings

GER 107 Advanced German  Fall, Spring
Further acquisition of proficiency in speaking, listening, reading, and writing using newspapers, mass media, and literary texts as a basis for class discussion. Prerequisite: SAT Subject Test score of 650 and demonstrated oral competence, or successful completion of 105. Satisfies the A.B. language requirement. Three hours per week. C. Frey

GER 107G Advanced German in Munich
A special offering of fourth-semester German taught during the summer in Munich, Germany. Students take part in a four-week intensive language course at the Goethe-Institut, as well as a precept with a Princeton faculty member that covers the literary component of 107. Students are chosen by application from 102-5 and 105 in the spring. Five three-hour classes, two preceptorials. M. Jennings

GER 207 Studies in German Language and Style: Society, Politics, and Culture in Germany, 1890-1945  Fall
Discussions of exemplary texts from modern German society and culture, including essays, speeches, autobiographies, works of literature, art, and film. The course offers an introduction to important issues in modern Germany: the Kaiserreich to the end of monarchy, Berlin as a modern metropolis, World War I, the democratic experiment of the Weimar Republic, and the rise and structures of National Socialism. Intensive practice in spoken and written German with emphasis on vocabulary acquisition and complex syntactical forms. Two 90-minute seminars. Prerequisite:107 or instructor's permission. A. Wedemeyer

GER 208 Studies in German Language and Style: Contemporary Society, Politics, and Culture  Spring
Continuation of 207 (which is not, however, a prerequisite). Discussions of social, political, and cultural aspects of contemporary Germany. Basis of discussions are essays, literary texts, and films. Individual assignments to develop oral and written expression. Particularly recommended to students contemplating study or work in Germany. Two 90-minute seminars. Prerequisite:107 or instructor's permission. A. Wedemeyer

GER 209 Introduction to German Literature after 1700  Fall LA
The main periods of German literature from Lessing to the present studied through texts chosen to help the student acquire fluency in reading German and in the principles of literary interpretation. Two classes. D. Fore

GER 210 Introduction to German Philosophy  Spring EC

http://www.princeton.edu/ua/
Covers German intellectual history from the Enlightenment to the present by focusing on the theoretical texts of its major authors (Kant, Hegel, Marx, Nietzsche, Weber, Heidegger, Arendt, Habermas). In addition to addressing the core discipline of philosophy, this course focuses on aesthetics, social, and political thought as well. All readings in English. Two lectures, one preceptorial. S. Pourciau

GER 211 Introduction to Media Theory Spring EC

Traces the development of critical reflection on media through careful readings of a wide range of media theoretical texts from the late 19th to the early 21st century. Topics range from the birth of single-point perspective to photography, from gramophones to radio, from pre-cinematic optical devices to film and television, and from telephony and typewriters to cyberspace. Covers the relationship between representation and technology, the historicity of perception, the interplay of aesthetics, techniques, and politics, and transformations of reigning notions of imagination, literacy, communication, reality, and truth. Two 90-minute seminars. T. Levin

GER 301 Topics in German Drama and Theater Fall LA

Exploration of specific problems in the history of German theater, drama, and dramatic theory. Topics may range from the baroque drama to the importance of Brechtian theater for modernism, and from the dramatic representation of political conflicts to contemporary theater and performance studies. Prerequisite: 107. J. Vogl

GER 302 Wagner (see MUS 337)

GER 303 Topics in Prose Fiction Spring LA

Critical investigations of particular problems in the development of German literary prose. Topics may include love as a mode of literary self-expression, the role of utopia in the rise of the modern novel, the history of the German novella, detective fiction, and the modern short story and experimental prose. Prerequisite: 107. A. Wedemeyer

GER 305 Topics in German Poetry Fall LA

Studies of a particular question related to the development of German-language poetry and poetics. Topics may range from readings of major German poets (Goethe, Hölderlin, George, Rilke, Benn, Celan) to the paradigmatic status of the genre for 20th-century conceptions of the avant-garde. Prerequisite: 107. A. Wedemeyer

GER 306 German Intellectual History Fall, Spring LA

A study of major German philosophers and religious and social thinkers from the Reformation to the present. Selected works of Hegel, Marx, Nietzsche, Freud, Heidegger, or German-Jewish thinkers will be read together with contemporary interpretations. Two 90-minute seminars. Staff

GER 307 Topics in German Culture and Society Fall LA

Exploration of key moments in German culture in light of its history and institutions. Topics may range from Marxist aesthetics to theories of fascism to German women writers. Readings and discussion in German. A. Wedemeyer

GER 308 Topics in German Film History and Theory Spring LA

An interdisciplinary examination of key issues in German cinema, focusing on the cultural and ideological dimensions of film production and reception, as well a variety of theoretical issues raised by the close analysis of the mass cultural and avant-garde moving image. Topics will include film-historical periods (early German cinema, Weimar cinema, Nazi cinema, "new" German cinema), German film theory and aesthetics, studies in specific genres (expressionist cinema, the "street film," "Heimatfilm"), and explorations of avant-garde cinema. T. Levin

GER 309 Literature, Philosophy, and Politics in the Weimar Republic Spring LA

An interdisciplinary examination of continuity and change in the culture and the cultural politics of Germany between 1919 and 1933. Topics include expressionism in the visual arts and literature; Berlin Dada; the conservative Revolution; abstract versus representational art (Thomas Mann, Neue Sachlichkeit); the Bauhaus and mass housing; montage in film and literature (Sergei Eisenstein, Walter Benjamin); the political theater (Bertolt Brecht, Erwin Piscator), and the optics of the modern metropolis (Walter Ruttmann, Alfred Döblin). Two 90-minute seminars. D. Fore

GER 320 Masterworks of European Literature: The Romantic Quest (also COM 320) Not offered this year LA

Works central to the tradition of modern European literature, including Goethe's Faust, Byron's Don Juan, Flaubert's Sentimental Education, Nietzsche's Beyond Good and Evil, and Mann's Doctor Faustus. Each work treats the quest for greatness; each will be examined as to its form and place in the history of ideas. Two 90-minute seminars. S. Corngold

GER 321 Topics in German Medieval Literature (also WOM 321) Spring LA

Exploration of German medieval literature. Topics may include medieval German Arthurian literature and the relationship between gender and power in the medieval epics. S. Poor

GER 323 Fairy Tales: The Brothers Grimm and Beyond Spring LA

What do fairy tales do? More than children's entertainment, they instruct, amuse, warn, initiate, and enlighten. Throughout history, they have functioned to humanize and conquer the bestial and barbaric forces that terrorize us. They have also disguised social anxieties about gender and sex. The history and social function of fairy tales will be explored in the context of Germany in the 18th-20th centuries. Texts include selections from the Grimms' Häusmarchen, as well as from the literature of the Romantic, Weimar, and postwar periods. Prerequisite: 107. Two 90-
minute seminars. S. Poor

GER 324 Topics in Germanic Literatures (also COM 317)  Spring LA
Critical investigation of German language literature from 800 to the present. Topics may include medieval German Arthurian literature, the Austrian literary avant-garde, love stories, as well as focused studies of selected authors. Two 90-minute seminars. C. Frey

GER 325 Nietzsche and Modern European Literature  Not offered this year  LA
The philosophy of Friedrich Nietzsche as an important progenitor of the European modernist culture that arose in the period of urban capitalist modernity, roughly 1870-1930. Particular emphasis will be placed on a series of textual encounters between Nietzsche and such authors as Gide, Mann, Lawrence, Rilke, Yeats, Musil, and Malraux; their readings and rewritings of Nietzsche lent decisive impulses to the formal and thematic concerns of modernism. Two 90-minute seminars. M. Jennings

GER 332 The Cultural Theory of the Frankfurt School  Spring EC
An examination of the work of the Frankfurt School of critical social theory on questions of modern culture. The course will focus on the textual debates among Theodor Adorno, Walter Benjamin, Max Horkheimer, and Siegfried Kracauer on the complex relationship of aesthetics and politics. These often polemical socio-philosophical texts attempt to map a contemporary cultural landscape reconfigured by the "culture industry," transformations in perception, the emergence of the mass, and new technologies of reproduction such as radio, cinema, and television. One three-hour seminar. M. Jennings

GER 337 Court, Cloister, and City: Art and Architecture in Central and Eastern Europe (see ART 337)

GER 340 German Literature in the Age of Revolution  Not offered this year  LA
The major works of the classical period in German literature. Texts by Goethe, Schiller, Hölderlin, and Kleist in relation to European historical, social, and philosophical change. Two 90-minute seminars. N. Wegmann

GER 362 Contemporary German Literature  Spring LA
An introduction to the poetry, drama, and prose of postwar Germany in the East and West. Emphasis on the political and social context of the major literary works from the '50s to the present. Two 90-minute seminars. A. Wedemeyer

GER 370 Weimar Germany: Painting, Photography, Film (also ART 331/ECS 370)  Not offered this year  LA
The visual arts in Germany during the Weimar Republic (1918-1933). Works of art, cinema, and literature in historical context. Topics include: modernism and modernity; Expressionism, Dada, New Objectivity in painting, photography, cinema, and literature; historical conditions of bodily experience and visual perception; emergence of new artistic and technological media; expansion of mass culture; place of politics in art; experience and representation of metropolitan life; changes in the conceptualization and representation of individuality, collectivity, embodiment, race, class, gender, sexuality. Two 90-minute seminars, one film screening. B. Doherty

GER 371 Art in Germany Since 1960 (also ART 391)  Spring LA
The production and reception of art in the Federal Republic of Germany from c. 1960 to now, situating episodes in the history of painting, sculpture, and photography in relation to developments in literature and cinema. Topics include the problem of coming to terms with the past (Vergangenheitsbewältigung); the West German economic miracle (Wirtschaftswunder) and the functions and meanings of art in consumer society; violence, politics, and representation; abstraction and figuration in painting, sculpture, and photography; history, memory, and artistic tradition; art as a vehicle of socio-political critique. Two 90-minute classes. B. Doherty

GER 373 Modernist Colloquies: Photography and Literature (also ART 390)  Not offered this year  LA
Exemplary encounters between photography and literature in the 20th century. After providing students with a basis in the theory of photography, the course focuses on intersections between literary and photographic forms, producers, and movements. Topics will include modernism in New York (Williams, Strand, and Sheeler) and Mexico City (Lawrence, Bravo, Weston, Modotti), the New Photography and the photo essay in Germany (Benjamin, Moholy-Nagy, Renger-Patzsch, Sander), social criticism (Evans and Agee), surrealism (Breton), and the American road (Kerouac and Frank). Two 90-minute seminars. M. Jennings

GER 1025 Intensive Intermediate German  Spring
Intensive training in German, building on 101 and covering the acquisitional goals of 102 and 105: communicative proficiency, mastery of discourse skills and reading strategies to interpret and discuss contemporary German short stories and drama. Limited to students with a grade of A in 101. Nine hours per week. J. Rankin

http://www.princeton.edu/ua/
The interdepartmental Program in Global Health and Health Policy enables undergraduates to study the determinants, consequences, and patterns of disease across societies; the role of medical technologies and interventions in health improvements; and the economic, political, and social factors that shape domestic and global public health.

**Admission to the Program**

The program is open to undergraduates of all disciplines. Students apply to the program in the second semester of their sophomore year and are accepted if they have met the following prerequisites: submission of an essay describing the rationale for completing the certificate and plans for the junior and senior year; completion of an approved basic science course (EEB 210, EEB 211, MOL 101, MOL 214, MOL 215 or ISC 231-234) by the end of sophomore year; completion of an approved statistics course (ECO 202, *EEB 355, ORF 245, POL 345, PSY 251, or SOC 301) by the end of sophomore year; a minimum grade of B in each of the prerequisite courses and a minimum GPA requirement of 3.3 overall; and a demonstrated commitment to the field of global health through completion of a health-related internship, volunteer work, campus activities, intellectual commitment, and/or community service.

Students who have placed out of departmental requirements and/or introductory-level courses with Advance Placement (AP) credit have the option of taking higher-level courses in lieu of the standard science and statistics prerequisites, with program permission.

Advanced science course options: EEB 309, EEB 314, EEB 328

Advanced statistics course options: ECO 302, ECO 312, ORF 405, SOC 404

Students who have not met the prerequisites can apply to the program; however, waivers of the prerequisites are granted only in extraordinary circumstances. Applicants should explain in their essay why they have not met the prerequisites and how they plan to address the issue in their future studies.

**Program Requirements**

To obtain the certificate, students must complete the following requirements:

Completion of GHP 350 and GHP 351 by the end of junior year.

Four additional health-related electives approved by the global health and health policy program, at least one of which is in an area outside of the student's department of concentration.

An approved research-focused internship or independent research project during the summer between the junior and senior year.

A senior thesis written in the student's department of concentration that addresses or relates to global health and health policy in an interdisciplinary manner.

http://www.princeton.edu/ua/
Certificate of Proficiency

Students who fulfill the requirements of the program receive a certificate of proficiency in global health and health policy upon graduation.

Related Courses in Global Health and Health Policy. Courses that may be used to satisfy program requirements may be found on the program's website. If other courses on global health and/or health policy are offered, these may be added to the list of approved courses with program permission.

Courses

GHP 350 Critical Perspectives on Global Health and Health Policy (also WWS 491/ANT 491)  Fall SA

Introduces disease and healthcare problems worldwide and examines efforts to address them. Via an interdisciplinary approach, identifies the main actors, institutions, knowledge, and values at play in the "global health system", and explores the environmental, social, political, and economic factors that shape patterns and variations in disease and health across societies. Topics include: development and governance of disease; technological change and public health; human rights and social justice; measuring health outcomes; and the shifting role of states, civil society, and public-private partnerships in healthcare delivery. Two lectures. J. Biehl

GHP 351 Epidemiology  Spring

Focuses on the distribution and determinants of disease. Diverse methodological approaches for measuring health status, disease occurrence, and the association between risk factors and health outcomes will be presented via classic and contemporary studies of chronic and infectious illness and disease outbreaks. Emphasis on: causal inference, study design and sampling, bias and confounding, the generalizability of research, health policy and research ethics. Prerequisite: an approved basic statistics course. Two 90-minute lectures, one preceptorial. Staff

http://www.princeton.edu/ua/
Program in Hellenic Studies

The Program in Hellenic Studies, under the general direction of the Council of the Humanities and with the support of the Stanley J. Seeger Hellenic Fund, is designed for students interested in the interdisciplinary study of the Greek world, ancient Byzantine or modern, as well as the classical tradition. The program offers language courses in modern Greek and postclassical Greek (Hellenistic koine to Byzantine Greek), freshman seminars in Hellenic studies, introductory courses in Byzantine and modern Greek studies, upperclass seminars in classical, Byzantine, and modern Greek studies, and a senior thesis colloquium for concentrators in the program. These are complemented by cognate courses offered in several cooperating University departments.

Additional information about the program can be found at the program's website.

Admission to the Program

The program is open to undergraduates majoring in any department. Students should apply for admission during the sophomore or junior year. Students will be accepted into the program on the basis of interest and a coherent academic plan.

The formal requirements for admission are:

1. Satisfactory completion of the requirements for admission to any department with whose plan of study this interdepartmental program may be combined.

2. Satisfactory completion of HLS 107, 204, 206, 235, 240, 261, 346, 348, or 358, or a freshman seminar on a Hellenic studies topic approved by the program executive director.

Program of Study

Program concentrators may elect to follow one of three plans of study:

Plan A allows a specialization in the language and literature of modern Greece. Concentrators in this plan must satisfy a language requirement (HLS 107 or its equivalent).

Plan B provides for a broad-based interdisciplinary study of modern Greek culture, including literature in translation, history, politics, and anthropology.

Plan C offers a diachronic survey of the Hellenic tradition, including the classical, Byzantine, and modern Greek periods.

Each student works out an individual program of study in consultation with the program executive director. Students in

http://www.princeton.edu/ua/
all three plans of study must complete the following requirements:

1. Completion of at least one of the following: HLS 204, 206, 235, 240, 261, 263, 346, 348, or 358, normally during the sophomore year. Plan A concentrators must also complete HLS 107 or its equivalent.

2. Two upper-level HLS seminars or one upper-level HLS seminar and one upper-level cognate course.

3. A senior thesis with an appropriate Hellenic studies focus approved by the program executive director. For science and engineering majors, a substantial research paper on a Hellenic topic, approved by the program executive director.


The program also sponsors a biweekly modern Greek seminar, a lecture series, and occasional colloquiums that provide a forum for discussion of research in progress on all aspects of Greek civilization by faculty members, students, members of the Institute for Advanced Study, and visiting scholars.

**Languages**

Concentrators choosing Plan B or C are encouraged to take at least two years of ancient or modern Greek.

**Study Abroad**

Program concentrators are encouraged to pursue further study and research in Greece during the summer months and, on occasion, during the academic year. Interested students may apply for Stanley J. Seeger study/travel fellowships through the program.

Under the auspices of the Study Abroad Program, students may complement their academic work in Hellenic studies by enrolling for one or two terms at selected institutions in Greece or England. The Princeton-Oxford Exchange Program provides additional opportunities for students in Hellenic studies.

The program also offers scholarships to qualified Greek nationals who have been admitted to Princeton for study at the undergraduate level.

**Certificate of Proficiency**

A student who completes the requirements of the program with satisfactory standing receives a certificate of proficiency in Hellenic studies.

**Senior Thesis Colloquium.** This noncredit colloquium is designed to help program concentrators formulate and carry out their senior thesis research and writing. In any given year the colloquium will be run by faculty in Hellenic studies and others who advise program concentrators. Discussion will focus on research methods and resources in Hellenic studies. Students will present periodic reports on the progress of their work.

**Cognate Courses.** A list of complete cognate courses may be found on the program's website. Any of these courses may provide an appropriate supplement to the program's core courses. Other courses may be added to this list with the approval of the appropriate department and the director of the program.

**Courses**

**HLS 101 Elementary Modern Greek I (also MOG 101) Fall**

Designed to serve as an introduction to the language of modern Greece. Practice in speaking, grammatical analysis, composition, and graded reading. Four classes. *Staff*

**HLS 102 Elementary Modern Greek II (also MOG 102) Spring**

A continuation of 101, aiming to develop the skills of listening, speaking, reading, and writing modern Greek in a cultural context. Classroom activities include videos, comprehension and grammar exercises, and discussions. Four classes. *Staff*

**HLS 105 Intermediate Modern Greek (also MOG 105) Fall**

Advanced grammatical analysis, composition, and graded reading, with further practice in speaking. An introduction to themes in the Hellenic tradition through readings in modern Greek literature. Four classes. Prerequisite: 102 or instructor's permission. *Staff*

**HLS 107 Advanced Modern Greek (also MOG 107) Spring**

Advanced composition and oral practice aimed at developing idiomatic written and spoken style. Discussions entirely in Greek. Introduces students to contemporary Greek culture and literature through the study of works by Cavafy, Sikelianos, Seferis, Elytis, Ritsos, and Anagnostakis, among others. Readings from articles on current Greek topics. Four classes. Prerequisite: 105 or instructor's permission. *Staff*
HLS 205 Medieval Art in Europe (see ART 205)
HLS 206 Byzantine Art and Architecture (see ART 206)
HLS 240 Introduction to Postclassical Greek from the Late Antique to the Byzantine Era (see CLG 240)
HLS 324 The Classical Tradition (see COM 324)
HLS 326 Tragedy (see COM 326)
HLS 327 Topics in Ancient History (see CLA 327)
HLS 334 Modern Transformations of Classical Themes (see CLA 334)
HLS 335 Studies in the Classical Tradition (see CLA 335)
HLS 337 The Ottoman Empire, 1300-1800 (see NES 437)
HLS 346 Introduction to Byzantine Civilization (also HIS 346) Not offered this year HA
The development of Byzantine civilization from the foundation of Constantinople in A.D. 330 to the city's fall to the Ottoman Turks in 1435. Within a chronological framework, the course analyzes the growth of a specifically medieval, Greek, Christian culture, which developed from the pagan, Greco-Roman background of late antiquity, and moves through medieval, Slavic, Islamic, and Western influences to the Renaissance. Two lectures, one preceptorial. Staff

HLS 358 Greeks, Turks, and Slavs: Nationalism in the Balkans (also HIS 358) Not offered this year HA
Examines the rise of nationalism in the Balkans, beginning with an examination of Balkan society under the Ottomans and continuing up through the establishment of nation-states in the 19th and 20th centuries. Case studies will include Greece, Yugoslavia, Bulgaria, Romania, and Albania. Themes covered: social organization, prenational politics, imperialism, cultural and economic elites, the Ottoman heritage. One lecture, two preceptorials. M. Greene

HLS 361 Special Topics in Modern Greek Civilization (also COM 369) Not offered this year LA
An aspect or period of modern Greek civilization since the War of Independence (1821) as it is illuminated by literary, historical, and other relevant sources. Emphasis will be given to the cross-cultural context of the topic, including the relation of modern Greece to Western, Eastern, or Balkan cultures, or the Hellenic diaspora in America and elsewhere. Staff

HLS 362 Special Topics in Byzantine Civilization Not offered this year
An aspect of the civilization of the Eastern Roman (Byzantine) Empire, from 312 to 1453, as illuminated by literary, historical, and other relevant sources. Emphasis will be given to the cross-cultural context of the topic, including relations of the Byzantine Empire with Sassanid Persia, the Arabs, the Slavs, and Western Europe. Two lectures, one preceptorial. Staff

HLS 363 Special Topics in Hellenic Studies Not offered this year
The diachronic development of a theme, genre, or institution, with emphasis on the continuities and discontinuities between successive periods of Hellenic culture--ancient, Byzantine, and modern. The approach will be interdisciplinary and cross-cultural. Staff

HLS 410 Seminar. Greek Art (see ART 410)
HLS 430 Seminar. Medieval Art (see ART 430)
HLS 441 Seminar. Renaissance Art (see ART 440)
HLS 461 Great Cities of the Greek World (also ART 461) Not offered this year LA
An intensive interdisciplinary study of the evolution of a city, such as Athens, Constantinople, Thessaloniki, Alexandria, or Antioch, where Greek civilization flourished through successive periods, from antiquity to the present. A study of the form and the image of the city as seen in its monuments and urban fabric, as well as in the works of artists, writers, and travelers. Prerequisite: instructor's permission. Two 90-minute classes. Staff
Department of History

Chair
William C. Jordan

Associate Chair
Molly Greene

Departmental Representative
James A. Dun

Director of Graduate Studies
John F. Haldon (History)
Michael D. Gordin (History of Science)

Professor
Jeremy I. Adelman
David A. Bell
Peter R. Brown
D. Graham Burnett
Martin C. Collicutt, also East Asian Studies
Linda J. Colley
Angela N. H. Creager
Benjamin A. Elman, also East Asian Studies
Sheldon M. Garon, also East Asian Studies
Michael D. Gordin
Anthony T. Grafton
Molly Greene, also Hellenic Studies
Jan T. Gross
John F. Haldon, also Hellenic Studies
Hendrik A. Hartog
Tera W. Hunter, also African American Studies
Harold James, also Woodrow Wilson School
William C. Jordan
Stephen M. Kotkin, also Woodrow Wilson School
Michael F. LaFlam
Nancy Weiss Malkiel
Susan Naquin, also East Asian Studies
Philip G. Nord
Willard J. Peterson, also East Asian Studies
Gyan Prakash
Anson G. Rabinbach
Daniel T. Rodgers
Martha A. Sandweiss
Emily A. Thompson
Keith A. Wailoo, also Woodrow Wilson School
R. Sean Wilentz
Julian E. Zelizer, also Woodrow Wilson School

Associate Professor
Emmanuel H. Kreike
Kevin M. Kruse

Visiting Associate Professor
Katherine L. Jansen

Assistant Professor
Adam G. Beaver
Margot Canaday
Vera S. Candelier
Mariana P. Candido
Janet Y. Chen, also East Asian Studies
Katja Guenther
Joshua B. Guild, also African American Studies
Eleanor K. Hubbard
Robert A. Karl
Jonathan I. Levy
Yair Mintzker
Ekaterina Pravilova
Bhavani Raman
Helmut Reimitz
Rebecca A. Rix
Bradley R. Simpson, also Woodrow Wilson School
Wendy Warren
Max D. Weiss, also Near Eastern Studies

Lecturer with Rank of Professor
Barbara B. Oberg

Lecturer
Matthew W. Backes
On Barak, also Council of the Humanities
Eduardo F. Canedo, also Council of the Humanities
David N. Cannadine, also Council of the Humanities
James A. Dun
Yaacob Dweck, also Council of the Humanities
Simon Grote, also Council of the Humanities
Eran Kaplan, also Judaic Studies
Paul L. Miles
Neil J. Young

Associated Faculty
Wallace D. Best, Religion, African American Studies
Michael A. Cook, Near Eastern Studies
M. Şükrü Hanioğlu, Near Eastern Studies
Bernard A. Haykel, Near Eastern Studies
Joy S. Kim, East Asian Studies
Heath W. Lowry, Near Eastern Studies
Eileen A. Reeves, Comparative Literature
Peter Schäfer, Religion
Maurizio Viroli, Politics

Information and Departmental Plan of Study

The plan of departmental study encourages the student to gain further knowledge of the major developments in, and problems of, history; to do independent historical research and writing; and to develop an authoritative knowledge of one particular field of history. A leaflet, "Information for Majors," available in the history department undergraduate office in Dickinson Hall and on the department's website, describes the program and requirements in detail.

The department encourages students to master at least one language in addition to English. Knowledge of another language is invaluable for senior thesis research especially that on topics in the history of continental Europe or the non-Western world.

http://www.princeton.edu/ua/
**Prerequisites**

Students are required to take and pass at least two departmental courses before they enter the department. Students who wish to enter the department but who have not taken two departmental courses before their junior year must consult with the departmental representative. At least one of these two prerequisite courses must be selected from the following: HIS 201, 207, 208, 211, 212, 280, 281, 282, 290, 291, 292, or 293. Students who have not fulfilled the 200-level prerequisite must take one of the appropriate courses in the fall of their junior year. (HUM 216-17 or 218-19 may be used as a 200-level prerequisite but cannot be counted as one of the departmental requirements.)

**Program of Study**

On joining the history department, each student elects to concentrate in one of the following fields: Africa; Ancient Greece and Rome; East Asia since 1600; Europe since 1700; Latin America; Middle Ages; Near East; Russia; United Kingdom; United States; History of Science and Technology; Women and Gender; Intellectual and Cultural History; Modern Imperialism and Colonialism; and War, Revolution, and the State. The senior thesis will ordinarily be written in the field of concentration, and the senior departmental examination will always be written in the field of concentration. Students should select courses so as to create a coherent program in their field.

**Course Advising.** Before preregistration each term, each history student must consult with one of the department's designated undergraduate advisers.

**Departmental Distribution Requirements.** University regulations stipulate that undergraduates may not take more than 12 departmental courses. Departmental regulations stipulate that undergraduates must pass at least 10 courses, including HIS 400, in order to receive the A.B. degree. History courses taken in the freshman and sophomore years are numbered among the 10 to 12 required for graduation. Of the departmental courses, one must be a course in European history (including Russia); one a course in United States history; one a course in non-Western history; and one a course in premodern history. No one course may satisfy more than one of these distribution requirements. In addition, concentrators in the history of the U.S. are required to take at least two courses in pre-20th-century U.S. history. Courses fulfilling the non-Western, premodern, and pre-20th-century U.S. history requirements are listed on the department's website under "Distribution Requirements."

**Cognates.** The history department encourages students to take courses in other departments when they add depth and variety to their selected program of concentration. For example, a student concentrating in Russian history might identify an appropriate course in politics to take as a cognate; a student concentrating in intellectual history might take an appropriate course in philosophy as a cognate. Two such courses may be taken during the junior and senior years and counted as departmental courses provided they contribute significantly to the student's plan of study. Cognates cannot be used to fulfill departmental distribution requirements. Cognates can only be approved by the departmental representative during the course enrollment period and prior to attending the class. Courses may not be designated as cognates retroactively. Cross-listed courses (for example, CLA 217, also listed as HIS 217) are automatically considered departmental courses, not cognates.

**History of Science.** History majors wishing to concentrate in the history of science need not meet the departmental prerequisites or distribution requirements. But they must take 10 courses that satisfy the following pattern of requirements (note: an asterisk indicates a one-time-only topic or course):

1. Two courses in science, engineering, or mathematics in addition to those used to fill the University's science distribution requirement.

2. Four of the following courses:

- *277 Technology and Society (see EGR 277)
- 290 The Scientific Worldview of Antiquity and the Middle Ages
- 291 The Scientific Revolution and European Order, 1500-1750
- 292 Science in the Modern World
- 293 Science in a Global Context: 15th to 20th Century
- *395 History of Medicine and the Body
- 396 History of Biology
- *397 Translation in the History of Science
- 398 Technologies and Their Societies: Historical Perspectives
- *399 In the Groove: Technology and Music in American History, from Edison to the iPod
- *401 Latin American Studies Seminar: Health and Society in Latin America during the 20th Century (see LAS 405)
- 490 Perspectives on the Nature and Development of Science
- 491 Problems in the Development of the Physical Sciences
- 492 Problems in the Development of the Life Sciences
- *493 Science and Religion: Historical Approaches
- *494 Broken Brains, Shattered Minds: Disease and Experience in the History of Neuroscience
- *495 The Soviet Science System
- *496 Africa, Medical Pluralism, and the History of Health and Disease

With the permission of the departmental representative, one of these courses may be replaced by a cognate course from another department, for example, in philosophy or sociology of science.

3. Four other history courses.

4. The independent work and comprehensive examination requirements are the same as for all other departmental majors.

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Independent Work

Junior Year. In the fall term of the junior year students are required to enroll in HIS 400 Junior Seminars. Work in the junior seminars involves exercises in defining a topic for historical research and in identifying and evaluating a body of historical literature. Each student may expect to gain experience in the use of the library and bibliographical sources, to learn the correct technical form for presenting evidence clearly, and to develop a historical presentation convincingly. Students in HIS 400 will have the opportunity to choose from a number of seminars devoted to historical events or themes of wide importance, such as "Origins of World War I," "Comparative Revolutions," "The United States and Latin America," and "Marxist Social Analysis and Historical Interpretation."

In the spring term of the junior year, in consultation with his or her adviser, the student selects a topic and writes a research paper on an independent basis. Written work equivalent to that submitted in the first term is required. The two semesters of junior independent work must be focused in two different geographical fields. Students should consult their advisers about this requirement.

Senior Year. The independent work consists of writing a thesis on an approved subject of the student's choice. The thesis usually relies on research in original source materials, but it may also involve reinterpretation of familiar materials.

Senior Departmental Examination

The senior comprehensive examination is given during the University examination period (after submission of the senior thesis). The exam is a set of take-home essays in the field of concentration designated by the student.

Study Abroad

Students in the department are encouraged to participate in those programs for foreign study recognized by the University (for further information, consult the Office of International Programs, 36 University Place, Suite 350). The department has the following policies:

1. Juniors majoring in the department may receive credit for up to four courses in history taken while abroad for either a full year or semester. These courses will require the prior approval of the departmental representative, and to secure that approval, students will be expected to produce some evidence of the work load and the material covered by the courses.

2. Sophomores intending to major in history may count one history course taken abroad toward the requirement to enter the department. The course cannot be used to substitute for the 200-level prerequisite (see above).

3. Recognizing the difficulties of doing research without Princeton's many resources, the department will try to be flexible regarding the deadlines for submission of independent work conducted abroad. Students will have to make arrangements for extensions with the department representative before leaving.

4. The department's junior seminars will be open to sophomores intending to go abroad in their junior year, thus enabling them to do their first junior paper in the fall of their sophomore year and preparing them to write the second while abroad or in the resident semester of their junior year (if they elect to spend only one semester abroad). Students who meet the requirements of junior independent work while at Princeton will still be expected to undertake a full course load while abroad. Moreover, to take full advantage of the international experience, study abroad should include some research work, and we urge students to take seminars that include a research component.

5. As opportunity arises, the history department will seek to identify former students and colleagues abroad willing to act as junior advisers for Princeton students studying in their region.

Interdepartmental Programs. Interdepartmental programs of particular interest to history department students are the Programs in African Studies, American Studies, Classics, East Asian Studies, European Cultural Studies, Hellenic Studies, Judaic Studies, Latin American Studies, Medieval Studies, Near Eastern Studies, and the Study of Women and Gender, as well as the Center for African American Studies. Students should consult the departmental representative and the director of the relevant program.

Courses

HIS 201 A History of the World since 1300  Spring HA

An overview of world history. Begins with Genghis Khan's Mongol Empire, which collided peoples, goods, and ideas across the Eurasian landmass, and traces the global transformations that connected or disconnected societies through time. The dynamism of Asia; environmental specificities of Africa and the Americas; slavery and other links across the Atlantic; the surprise onset of European predominance; colonialism, anti-colonialism, globalization. What is the past and future of Islam? How is China's staggering wealth up to 1750 and its recent ascent explained? Where did the U.S. come from and where is it going? Two lectures, one preceptorial. J. Adelman, S. Kotkin

HIS 207 History of East Asia to 1800 (also EAS 207)  Fall HA

General introduction to major themes in the cultural, intellectual, and institutional history of China and Japan, with some attention to Korea and Southeast Asia. Two lectures, one preceptorial. M. Colcutt, W. Peterson

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HIS 208 East Asia since 1800 (also EAS 208)  Spring HA

The civilizations of East Asia at the beginning of the modern era; the impact of the West; the contrasting responses of China, Japan, and Korea to the confrontation; the development of the present societies. Assignments will be drawn from contemporary sources as well as from secondary accounts. Two lectures, one preceptorial. J. Chen, S. Garon

HIS 211 Europe from Antiquity to 1700  Fall HA

The course deals with four main topics: the Greek city-state, the Roman Empire and the rise of Christianity, the formation of medieval European society, and the Renaissance and Reformation. Emphasis will be laid on those social, political, intellectual, and religious developments that contributed most directly to forming modern European civilization. Two lectures, one preceptorial. A. Grafton

HIS 212 Europe in the World: Monarchies, Nations, and Empires from 1776 to the Present Day  Not offered this year HA

The emergence of modern societies from the Europe of the Old Regimes. Emphasis on problems and themes, including the French and Industrial Revolutions, nationalism, science and its discontents, popular culture, the mass movements of revolution and war. Intended as an introduction to Europe for students with little background in history. Two lectures, one preceptorial. D. Cannadine

HIS 216 Archaic and Classical Greece (see CLA 216)

HIS 217 The Greek World in the Hellenistic Age (see CLA 217)

HIS 218 The Roman Republic (see CLA 218)

HIS 219 The Roman Empire, 31 B.C. to A.D. 337 (see CLA 219)

HIS 220 Jews, Muslims, and Christians in the Middle Ages (see NES 220)

HIS 223 Introduction to the Middle East (see NES 201)

HIS 240 The Perception of China and Asia in the West (see EAS 240)

HIS 245 The Islamic World from its Emergence to the Beginnings of Westernization (see NES 245)

HIS 277 Technology and Society (see EGR 277)

HIS 280 Approaches to American History  Spring HA

An intensive introduction to concepts, methods, and issues in American history, especially recommended for prospective concentrators. The problems investigated in the course (the Revolution, class and cultural relations, literature and society, and others) will vary. Emphasis will be on the framing of historical questions and immersion in the actual sources of history. One lecture, two classes. J. Dun, N. Young

HIS 281 Approaches to European History  Not offered this year HA

An intensive introduction to the methods and practice of history through the close reading of sources on three different topics in European history. The class introduces students to the basic vocabulary of European historiography, focusing on the interpretation and analysis of documents, the framing of historical questions, and the construction of effective arguments. Two 90-minute classes. Staff

HIS 282 A Documents-based Approach to Asian History (also EAS 282)  Not offered this year HA

An intensive, documents-based introduction to methods and issues in Asian history, focusing on topics that embed Asia in the wider context of world history. Especially recommended for prospective concentrators. The problems investigated (Marco Polo in Asia, Jesuits in China, Russo-Japanese War, Japan's Greater East Asia Co-Prosperity Sphere, etc.) will vary. Emphasis will be on interpreting primary sources, framing historical questions, and constructing historical explanations. Two 90-minute classes. Staff

HIS 290 The Scientific Worldview of Antiquity and the Middle Ages  Not offered this year HA

The emergence and development of natural philosophy in ancient Greece, with consideration of its Egyptian and Babylonian background and its subsequent articulation and modification in the medieval worlds of Islam and Western Europe. Emphasis is placed on the interplay of science and culture. Two lectures, one preceptorial. Staff

HIS 291 The Scientific Revolution and European Order, 1500-1750  Not offered this year HA

Beliefs about the nature of the universe, the Earth, and even the human body changed drastically during the early modern period. This course examines this transformation of natural knowledge as a process of both social and intellectual reorganization. Explores how Europeans developed a new mechanistic science for astronomy, physics, and medicine with a dynamic culture of new institutions and technologies. Two lectures, one preceptorial. Staff

HIS 292 Science in the Modern World  Not offered this year HA

The evolution of science since Newton. Emphasis is placed on the major developments of scientific theory and practice since the chemical revolution of the late 18th century. Topics considered will also include: the development of science as a discipline; the connections between science and mathematics, philosophy, and technology; and the emergence of science as an integral part of modern societies. Two lectures, one preceptorial. M. Gordin

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HIS 293 Science in a Global Context: 15th to 20th Century  Not offered this year HA

Science and technology have literally changed the world. This course examines how, with an emphasis on understanding the place of scientific knowledge in the history of European exploration and expanding global power. How did the sciences go out into the world? How did certain disciplines and practices take shape in global interactions since 1400? How does knowledge become universal? What instruments, institutions, and activities made this possible? Two 90-minute classes. D. Burnett

HIS 303 Colonial Latin America to 1810 (also LAS 305)  Fall HA

The principal themes of Iberian imperialism and colonial society from preconquest to the eve of independence. The main issues to be covered will be: Amerindian civilization, the conquest of the Americas, social and cultural change, and evolving economic relations. Two lectures, one preceptorial. V. Candiani

HIS 304 Modern Latin America since 1810 (also LAS 304)  Spring HA

A survey of Latin America from the wars of independence to recent struggles for democracy. The focus will be on state formation in the 19th century, relations with the world economy, and changing patterns of social and political life in the 20th century. Two lectures, one preceptorial. R. Karl

HIS 305 History of the Modern Caribbean (also LAS 306)  Not offered this year HA

This course treats major themes in Caribbean social and political history cutting across the various empires, nations, and cultures that have shaped the region. It focuses on slavery and freedom during the 19th century and imperialism, authoritarianism, revolution, migration, and transnationalism in the 20th century. Race, ethnicity, and nation are explored throughout the course. Two lectures, one preceptorial. Staff

HIS 314 Precolonial Africa  Spring HA

A survey course that begins with an overview of the continent at the end of the third century A.D. and ends with the death of Moshoeshoe in the 19th century. Focuses on several great themes of African history: long-distance trade, state formation, migration, religious conversion to either Islam or Christianity, forms of domestic slavery, and the impact of the slave trade. Two lectures, one preceptorial. M. Candido

HIS 315 Colonial and Postcolonial Africa  Not offered this year HA

The impact of European colonial rule on the traditional societies of Africa in the 19th and 20th centuries. One of the dominant themes will be the emergence of the intelligentsia in colonial areas as proponents of nationalism. Two lectures, one preceptorial. Staff

HIS 316 South African History, 1497 to the Present  Spring HA

Beginning with a brief precolonial regional overview, the course examines European occupation following 1652; explores slavery, the frontier, intergroup relations, the growth of nationalism, the Boer War and unification, African resistance movements, the structure of politics, constitutional developments, and debates over race and class; and ends with the 1980s constitutional crisis. Two lectures, one preceptorial. É. Kreike

HIS 317 The Making of Modern India  Not offered this year HA

An exploration of three major themes in the history of India's emergence as a nation-state: colonial socio-economic and cultural transformations, the growth of modern collective identities and conflicts, and nationalism. Topics covered include: trade, empire, and capitalism; class, gender, and religion; Gandhi, national independence, and partition; and postcolonial state and society. Two lectures, one preceptorial. G. Prakash

HIS 318 Early Chinese History to 221 (see EAS 335)

HIS 319 The Making and Transformation of Medieval China: 300-1200 (see EAS 336)

HIS 320 Early Japanese History (see EAS 320)

HIS 321 Early Modern Japan (see EAS 321)

HIS 322 20th-Century Japan (also EAS 324)  Fall HA

An analysis of change and continuity in modern Japanese society, with emphasis on industrialization, social discontent, parliamentary democracy, war, defeat, the "economic miracle," and Japanese preoccupation with national identity in a Western-dominated world. Divided between the prewar and postwar periods. Two lectures, one preceptorial. S. Garon

HIS 324 Early Modern China (also EAS 354)  Fall HA

China between the 1570s and the 1860s, from its early involvement in the new world economy to the crises of the Opium War era. Emphasis on the history and culture of the Qing empire, its success and challenges, with attention to family and society, religion, art, and literature. Two lectures, one preceptorial. S. Naquin

HIS 325 China, 1850 to the Present (also EAS 355)  Not offered this year HA

China's transformations and continuities from the civil wars of the mid-19th century to the economic reforms of the 1980s. Topics include the opium crisis, the impact of natural disasters, the fall of the imperial dynasty, China's struggle with Western and Japanese imperialism, and experiments in government and society on mainland China and Taiwan since 1949. Two lectures, one preceptorial. J. Chen

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HIS 326 Topics in Ancient History (see CLA 326)
HIS 327 Topics in Ancient History (see CLA 327)
HIS 328 Classical Historians and Their Philosophies of History (see CLA 324)
HIS 329 Roman Law (see CLA 325)
HIS 334 The Middle East in the 20th Century (see NES 337)
HIS 336 Modern Worlds of Islam  Spring HA
An introduction to Islam in modern world history. What, and where, is "the Islamic world?" What have been the major developments in Muslims' historical experiences since the 18th century? How have Muslims themselves made, experienced, and understood modern history? How have Muslims and others shaped the world in which we live, and how are relationships between "Islamic" and other worlds to be characterized? What is the relationship between Islam and modernity? How can we better understand the place of Islam in history today? Two lectures, one preceptorial. M. Weiss
HIS 337 The Ottoman Empire, 1300-1800 (see NES 437)
HIS 340 Culture and Society in Late Imperial China: 1000-1900 (see EAS 340)
HIS 341 Between Resistance and Collaboration: The Second World War in Europe  Spring HA
In the broader context of conflict between fascism, communism, and liberal democracy, the course examines various patterns and methods of occupation, collaboration, and resistance during World War II in Western and Eastern Europe. Topics to be discussed include the Holocaust of European Jewry and the technology of terror; the impact of war and occupation on elites and other social strata. Students will read historical studies as well as personal narratives by eyewitnesses and participants. Two lectures, one preceptorial. J. Gross
HIS 342 The Civilization of the Early Middle Ages (also CLA 343)  Not offered this year HA
A study of the emergence of a distinctive Western European civilization out of Christian, Greco-Roman, and Germanic institutions and ideas from the decline of the Roman Empire to about A.D. 1050. Two lectures, one preceptorial. H. Reimitz
HIS 344 The Civilization of the High Middle Ages (also CLA 344)  Spring HA
An analysis of typical institutions, social and economic structures, and forms of thought and expression from about 1050 to about 1350. Emphasis is placed on the elements of medieval civilization that have influenced the subsequent history of European peoples. Two lectures, one preceptorial. Staff
HIS 345 Europe at the Dawn of Modernity  Not offered this year HA
A study of economic, political, intellectual, and religious developments in continental Europe from about 1300 to 1600, emphasizing the tension between old institutions and new forces, and the relation between intellectual and social change, during the transition from medieval to modern times. Two lectures, one preceptorial. Staff
HIS 346 Introduction to Byzantine Civilization (see HLS 346)
HIS 350 History of France, 1685-1800  Not offered this year HA
Beginning with the last 30 years of Louis XIV's reign, this course will trace the fate of the ancien régime through its destruction in the Revolution. The emphasis will be on social and cultural history. Two lectures, one preceptorial. Staff
HIS 351 France, 1815 to the Present  Spring HA
The political and social history of France from Napoleon to the Fifth Republic. The impact of revolution, industrialization, and war on French society in the 19th and 20th centuries. Particular attention will be paid to movements of popular revolt and the efforts of elites--rural, bourgeois, and technocratic--to maintain control in the face of social ferment. Two lectures, one preceptorial. P. Nord
HIS 353 Intellectual History of Europe, 1760-1880  Not offered this year HA
An introduction to European thought during the age of revolution, industrialization, and national consolidation. Reflections on the relationship between the natural and social worlds will receive particular attention; lectures will treat both individual thinkers and larger cultural developments. Two lectures, one preceptorial. Staff
HIS 354 Intellectual History of Europe since 1880  Not offered this year HA
Major themes and figures in European thought and culture in the transition from the 19th to the 20th century. Focuses on the intellectual response to new forms of personal and social experience in the age of organized capitalism and imperialism, and the attempt to come to terms with the waning of romantic and revolutionary expectations inherited from the period before 1850. Two lectures, one preceptorial. A. Rabinbach
HIS 356 Between Swords and Stones: Jerusalem, a History (see JDS 355)
HIS 358 Greeks, Turks, and Slavs: Nationalism in the Balkans (see HLS 358)
This course surveys the breadth of Jewish experience from the era of the Enlightenment to the contemporary period. Tracing the development of Jewish cultures and communities in Europe and the United States against the background of general history, the course focuses on themes such as the transformation of Jewish identity, the creation of modern Jewish politics, the impact of anti-Semitism, and the founding of the State of Israel. Two 90-minute classes. Y. Dweck

HIS 360 The Russian Empire: From Peter the Great to Nicholas II Not offered this year HA

Eighteenth-century enlightened absolutism: reforms of Peter and Catherine the Great, shaping of national identity and a modern state. Nineteenth-century tensions between reform from above and revolution from below, with a focus on the political role of social groups and special attention to the origins of revolutionary conflict in 1905 and 1917. Two lectures, one preceptorial. E. Pravilova

HIS 362 The Soviet Empire Not offered this year HA

An examination of the transformation of the Russian Empire into the Soviet Empire. Topics include: the unfolding of single-party revolutionary politics, the development of Stalin's personal despotism, the violent attempt to create a noncapitalist society, the monumental war with Nazi Germany, and the nature of everyday life. Two lectures, one preceptorial. S. Kotkin

HIS 365 Europe in the 20th Century Fall HA

The history of Western and Central Europe since World War I viewed from the perspective of Europe's rapidly changing role in world history. Europe's political, social, and economic adjustment to the Russian Revolution, to the emergence of America and Russia as superpowers, and to the loss of overseas imperial possessions. Two lectures, one preceptorial. A. Rabinbach

HIS 366 Germany since 1806 Spring HA

Sets German history after the Napoleonic invasion in a context of international politics, and shows how the development of a peculiarly German idea of the nation was a response to pressures exerted by European political changes and by the European state system. Examination of how, after national unification in 1871, German domestic policy in turn affected the whole world: in German foreign policy before the First World War, in the aftermath of 1918, and during the Nazi dictatorship. Treatment of the separate courses of the two Germanies since 1945 and of their position in world politics. Two lectures, one preceptorial. H. James

HIS 367 English Constitutional History Not offered this year HA

A study of the development of the English Constitution to 1600, with special emphasis on the institutions and ideas that form the background for American constitutional history. Two lectures, one preceptorial. W. Jordan

HIS 368 England from the Mid-15th to the Mid-17th Century Fall HA

In the middle of the 15th century, England suffered a series of dynastic struggles for the crown. In the middle of the 17th another, rather different, civil war broke out. The course will trace the political, social, and cultural developments that rendered these apparently similar reactions to royal misrule so different from one another. In so doing, it will seek to describe and explain the origins and causes of the English Revolution. Two lectures, one preceptorial. E. Hubbard

HIS 369 Britain 1688-1815: From Revolution to Global Pre-eminence Not offered this year HA

Explores British society, politics, and culture between the English Revolution and the Industrial Revolution. Major themes include the emergence of Britain as an imperial power (equal attention will be given to Ireland, Scotland, and overseas expansion); aristocratic culture and commerce; the Enlightenment and religion; art and leisure; and changes in gender relations. Two lectures, one preceptorial. L. Colley

HIS 370 Britain 1815-1945: Dominance, Democracy, and Decline Not offered this year HA

Thematic survey of the social, cultural, and political transformations in the lives of women and men in Britain from the Industrial Revolution to the present. Topics include Britain's rise and fall as the first "modern" society and imperial power; national identities and civil society, gender, and class; democracy and imperialism; Irish nationalism and contemporary culture. Two lectures, one preceptorial. L. Colley

HIS 371 Colonial North America Spring HA

An overview of European colonization in North America, covering New France, New Spain, New England, the Middle Colonies, the Chesapeake area, South Carolina, and the sugar islands. Special emphasis upon social structures, labor systems, race, gender, religion, political cultures, and the problem of imperial control from Jamestown through the Great Awakening of the 1740s. Particular attention will be paid to the various and changing encounters of Africans, Native American, and Europeans, and to the importance of slavery in the colonization process. Two lectures, one preceptorial. W. Warren

HIS 372 Revolutionary America Not offered this year HA

The Old British Empire reaches its zenith, 1740-63. Crisis and disintegration, 1763-76. America's republican experiment and its difficulties, 1776-90. Two lectures, one preceptorial. Staff

HIS 373 The New Nation Not offered this year HA

A survey of society, culture, and politics in the United States from the ratification of the Constitution to the
Compromise of 1850. Topics include the rise of cotton slavery, Northern capitalism and class formation, the politics of cultural change, Jeffersonianism, Jacksonian democracy, and the political economy of sectionalism. Two lectures, two preceptorials. R. Wilentz

HIS 374 History of the American West Not offered this year HA

The westward expansion of British America and of the United States, examining the de-peopling and re-peopling of successive American Wests from the 17th century to the 20th. Primary focus on the interplay of environment and culture among the different peoples vying for occupancy and opportunity in old and new Wests. Two lectures, one preceptorial. Staff

HIS 376 The American Civil War and Reconstruction Not offered this year HA

Surveys the causes, issues, and consequences of the nation's bloodiest conflict. Topics include slavery and antislavery, Manifest Destiny, the growing sectional conflict, the clash of arms, the transforming impact of the Civil War, the transition from slave to free labor in the South, and postslavery race relations. Two lectures, one preceptorial. Staff

HIS 377 Gilded Age and Progressive-Era United States, 1877-1920 Spring HA

The rise of the modern corporate state in America. Primary focus on the development of big business in the years following the Civil War, accompanying social processes such as immigration and urbanization, and the political responses to these phenomena, particularly populism and progressivism. Other topics include labor, blacks and racism, women in progressive America, and the intellectual response to modernity. Concludes with the United States' entry into World War I. Two lectures, one preceptorial. R. Rix

HIS 378 American Economic History (see ECO 370)

HIS 380 The United States and World Affairs Fall HA

The relations between the United States and other nations from the 1890s to the present, treating political, economic, and cultural aspects of American foreign policy as well as the more important diplomatic and strategic problems. Two lectures, one preceptorial. B. Simpson

HIS 381 The United States South, 1865 to the Present Not offered this year HA

A survey of the American South from the Confederate defeat and emancipation to the present. Topics will include cultural conflict and exchange, segregation and racism, class conflict within a racist society, southern women, race and class in a political setting, southern music, the civil rights movement, and the South today. Two lectures, one preceptorial. Staff

HIS 383 The United States since 1920 Not offered this year HA

The history of modern America, with particular focus on domestic political and social changes. Topics include the Great Depression and New Deal, the homefront of World War II and the Cold War, the civil rights movement; the Vietnam War; the sexual revolutions; suburban development; modern conservatism and the "cultural wars." Two lectures, one preceptorial. K. Kruse

HIS 384 Gender and Sexuality in Modern America (also WOM 384) Not offered this year HA

An examination of changing patterns of manhood and womanhood, with an emphasis on women's experience. Topics include housekeeping, child rearing, birth control, sexuality, work, feminism, and the role of gender in religious and political movements and economic development. Two lectures, one preceptorial. M. Canaday

HIS 385 The Role of Law in American Society Fall HA

An analysis of selected problems in the development of public and private law in America. Lectures and class discussion, based on primary source materials, will emphasize law as a product of socioeconomic change rather than as a system of reasoning. Two lectures, one preceptorial. H. Hartog

HIS 386 African American History to 1863 (also AAS 366) Not offered this year HA

An examination of the history of African Americans from 1619 to 1863. Issues to be discussed include the African origins of African Americans, the slave trade, slavery, the construction of black culture and institutions, free blacks, resistance, the abolitionist movement, and emancipation. Two lectures, one preceptorial. Staff

HIS 387 African American History from Reconstruction to the Present (also AAS 367) Fall HA

An analysis of the social, political, legal, and cultural dimensions of the African American experience in the United States throughout critical historical moments such as Reconstruction, suffrage, the Great Migration, war, the Great Depression, the New Deal, the Civil Rights era, the black power movement, and contemporary racial politics. Two lectures, one preceptorial. J. Guild

HIS 389 American Cultural History since 1876 Not offered this year HA

Ideas, popular values, and cultural expression in the last century. The quest for certainty, freedom, and social harmony, as seen through the writings of contemporary Americans. Two lectures, one preceptorial. D. Rodgers

HIS 394 The Rise of Modern Biomedicine: Global Trends in Health and Healing, 1500-2000 Not offered this year HA

http://www.princeton.edu/ua/
This course explores the global roots of biomedicine beginning in the period of European expansion (16th century) and ending with the 20th-century consolidation of the World Health Organization (WHO). Particular emphasis is paid to migrations and circulations of all kinds: peoples, diseases, ideas, and practices. Two lectures, one preceptorial. 

K. Guenther

**HIS 396 History of Biology**  Not offered this year HA

An examination of the emergence of biology as a scientific discipline since 1750, focusing on the cultural context and social impact of changes in biological knowledge. Particular attention will be paid to changing conceptions of life, the institutionalization and financial support of biological research, and how interactions with the physical sciences have shaped life sciences. Two lectures, one preceptorial. 

A. Creager

**HIS 398 Technologies and Their Societies: Historical Perspectives**  Not offered this year HA

A historical inquiry into technological systems as the nexus between technical processes and human beings employing them. Exploring topics such as medieval cathedral construction and mills, steam-powered factories of the Industrial Revolution, the assembly line, and software technology, the course moves from the technical structure, limits, and possibilities of the system to the interplay between the social needs it fills and the social demands it makes. Two lectures, one preceptorial. 

E. Thompson

**HIS 400 Junior Seminars**  Fall, Spring HA

The junior seminars serve to introduce departmental majors, in the fall of their junior year, to the tools, methods, and interpretations employed in historical research and writing. Students may choose from a range of topics; assignments to specific seminars are made on the basis of these choices at the beginning of the fall term. Seminar topics tend to be cross-national and comparative. All juniors must be enrolled in one of the seminars. One three-hour seminar.

Staff

**HIS 402 Latin American Studies Seminar (see LAS 402)**

**HIS 408 Selected Topics in 20th-Century Latin America (also LAS 408)**  Not offered this year HA

Research and reading on topics related to economic development and political change with attention to specific national contexts, such as authoritarian state and society in Argentina and Brazil; revolution and social change in Mexico, Cuba, and Chile; problems in Latin American foreign relations. One three-hour seminar.

R. Karl

**HIS 409 Topics in Hispanic Culture (Europe and America) (see SPA 401)**

**HIS 411 War and Society in the Modern World**  Spring HA

The interrelationship of war and society from the 18th century to the nuclear age. Emphasis on the causes, conduct, and consequences of war. Particular attention is given to the American Revolution, the French Revolutionary and Napoleonic Wars, the American Civil War, and World Wars I and II. One three-hour seminar.

P. Miles

**HIS 415 Intellectual History of China to the Fifth Century (see EAS 415)**

**HIS 416 Intellectual History of China from the Ninth to the 19th Century (see EAS 416)**

**HIS 417 Gandhi: The Making of the Mahatma**  Spring HA

This seminar examines Gandhi’s political life extending from his campaign for the rights of Indians in South Africa to his role in the struggle for Indian independence from British rule. Focus on those historical processes that turned M. K. Gandhi into a major 20th-century figure--the Mahatma. Issues relating to imperialism and nationalism form the context in which the seminar looks at Gandhi's life and seeks to understand Gandhian ideology and its different--often conflicting--historical appropriations. One three-hour seminar.

G. Prakash

**HIS 433 Imperialism and Reform in the Middle East and the Balkans (see NES 433)**

**HIS 434 Nation, State, and Empire: The Ottoman, Romanov, and Hapsburg Experiences (see NES 416)**

**HIS 448 History: An Introduction to the Discipline**  Fall HA

An introduction to the discipline of history aimed at, but not limited to, history majors. Through case studies, students will learn how historians of the last few generations have framed problems, found and interpreted evidence, and built arguments. Participants will both study the major recent movements in the discipline of history and reflect on and improve their own historical techniques. The course will culminate with an examination of history and memory in the early 21st century. Prerequisites: successful completion of the department's junior requirements or comparable work in another department. One three-hour seminar.

A. Grafton

**HIS 458 Zionism: From Ideology to Practice (see JDS 458)**

**HIS 460 Topics in American Legal History**  Not offered this year HA

An in-depth exploration of a topic in American legal history. In some years the course will investigate an event, such as a famous or infamous trial or case. In other years the course will explore historical dimensions of a particular legal concept, such as "rights," "coercion," "dependency," the "family," or "property." One three-hour seminar.

Staff

**HIS 466 The History of Financial Crises (see WWS 340)**

**HIS 477 The Civil Rights Movement (see AAS 477)**

http://www.princeton.edu/ua/
HIS 478 The United States and the Vietnam Wars  Fall HA
The American experience in Vietnam. The chronological scope extends from the outbreak of the Second World War to the collapse of the South Vietnamese government in 1975. Topics include the U.S. involvement in the French Indochina War, the commitment of military forces in defense of South Vietnam, the character of the anti-war movement, the consequences of the Tet Offensive, and the impact of war upon American society. Although the American experience receives primary emphasis, we also consider the background and role of Vietnamese nationalist and revolutionary movements. One three-hour seminar. P. Miles

HIS 481 African American Intellectual History (see AAS 390)

HIS 482 Race and Sport (see AAS 422)

HIS 483 Black Protest in 20th-Century America (see AAS 352)

HIS 490 Perspectives on the Nature and Development of Science (also PHI 490)  Not offered this year HA
An overview of science studies, including approaches drawn from history, philosophy, sociology, anthropology, and political science, with these analytic frameworks applied to specific historical and contemporary case studies. Normally taken junior year. Open to other students with instructor's permission. One three-hour seminar. R. DiSalle

HIS 491 Problems in the Development of the Physical Sciences  Not offered this year HA
A seminar emphasizing close reading of primary sources. Topics vary from year to year and may include the development of mechanics from Galileo to Newton, electrical theory from Franklin to Maxwell, the chemical revolution and its atomic aftermath, conservation and degradation of energy, and the origins of quantum theory. Open to upperclass students with instructor's permission. Seminar. Staff

HIS 492 Problems in the Development of the Life Sciences  Not offered this year HA
A seminar emphasizing close reading of primary sources. Topics vary from year to year and may include: reductionism in physiology, evolution theory, the foundation of genetics, the history of bacteriology, and topics in disease and culture. One three-hour seminar. Staff
University Center for Human Values

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Nannerl O. Keohane, Laurance S. Rockefeller Distinguished Visiting Professor of Public Affairs and the University Center for Human Values
John Seery, Laurance S. Rockefeller Visiting Professor for Distinguished Teaching

**Lecturer with Rank of Professor**
Peter Brooks, also Comparative Literature

**Lecturer**
Erika Kiss
Victoria McGeer, also Philosophy

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Leora F. Batnitzky, Religion
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John M. Darley, Psychology, Woodrow Wilson School
Angus S. Deaton, Woodrow Wilson School, Economics
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Susan T. Fiske, Psychology
Daniel Garber, Philosophy
Sophie G. Gee, English
Robert P. George, Politics
Eddie S. Glaude Jr., Religion, African American Studies
Eric S. Gregory, Religion
Gilbert H. Harman, Philosophy
Hendrik A. Hartog, History
Mark Johnston, Philosophy
Thomas P. Kelly, Philosophy
Robert O. Keohane, Woodrow Wilson School
David R. Leheny, East Asian Studies
Thomas C. Leonard, Economics
Douglas S. Massey, Woodrow Wilson School, Sociology
Sarah E. McGrath, Philosophy
Alexander Nehamas, Philosophy, Comparative Literature
Guy J. Nordenson, Architecture
Jeff E. Nunokawa, English
Joyce Carol Oates, Lewis Center for the Arts, Creative Writing
Serguei Oushakine, Slavic Languages and Literatures
Devah Pager, Sociology
Deborah A. Prentice, Psychology
Albert J. Raboteau, Religion
Daniel T. Rodgers, History
Gideon A. Rosen, Philosophy
Rahal Sagar, Politics
Harold T. Shapiro, Woodrow Wilson School, Economics
Anne-Marie Slaughter, Woodrow Wilson School, Politics
Anna B. Stilz, Politics
Jeffrey L. Stout, Religion
Maurizio Viroli, Politics
Cornel R. West, African American Studies
Michael G. Wood, English, Comparative Literature
Robert J. Wuthnow, Sociology

The University Center for Human Values fosters interdisciplinary study of ethical and evaluative issues in private and public life. One of its activities within the undergraduate curriculum is to cosponsor courses with departments and programs. The center encourages students to supplement their disciplinary concentrations with a set of these courses, which address fundamental questions about the meaning and value of human life and the ethical relationships of individuals and societies.

The University Center for Human Values assists faculty members in developing new courses and revising existing courses, supplements the offerings of the freshman seminars program, and sponsors occasional lectures and colloquia on human values to which students, along with faculty and other members of the Princeton University community, are invited. The center awards senior thesis prizes to seniors who have written outstanding theses in the area of ethics and human values. Departments are invited to nominate their best thesis in this area.

The University Center for Human Values is also the home for the undergraduate certificate Program in Values and Public Life, which focuses on modes of inquiry into important ethical issues in public life.

The center was created in 1990 with an endowment by Laurance S. Rockefeller '32.

http://www.princeton.edu/ua/
The undergraduate courses listed below are cosponsored by the center.

**Freshman Seminars in the Residential Colleges.** Each year the University Center for Human Values sponsors several freshman seminars in the residential colleges. For a list of the current seminars, please check the freshman seminars website.

For information about courses relevant to the study of human values, visit the center’s website.

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**Courses**

CHV 202 Introduction to Moral Philosophy (see PHI 202)

CHV 212 The Psychology of Moral Behavior (see PSY 212)

CHV 214 The Other Side of Rome (see CLA 214)

CHV 261 Christian Ethics and Modern Society (see REL 261)

CHV 301 Ethics and Public Policy (see WWS 301)

CHV 306 Democratic Theory (see POL 306)

CHV 309 Political Philosophy (see PHI 309)

CHV 310 Practical Ethics (also PHI 385)  Not offered this year EM

Should we be sharing our wealth with people who will otherwise die from poverty-related causes? Is abortion wrong? Does a human embryo have a greater claim to protection than a chimpanzee? Are we justified in eating animals? Can the traditional doctrine of the sanctity of human life be defended? When should a nation go to war? And why should we act ethically, anyway? Students will be encouraged to question their own ethical beliefs on these and other issues, and in the process to explore the extent to which reason and argument can play a role in everyday ethical decision-making. Two lectures, one preceptorial. *P. Singer*

CHV 311 Systematic Ethics (see PHI 307)

CHV 315 Philosophy of Mind (see PHI 315)

CHV 319 Normative Ethics (see PHI 319)

CHV 330 Greek Law and Legal Practice (see CLA 330)

CHV 335 Greek Ethical Theory (see PHI 335)

CHV 345 Ethics and Economics (see ECO 385)

CHV 351 The Enlightenment in France (see FRE 351)

CHV 364 Sociology of Medicine (see SOC 364)

CHV 396 The Idea of America (also AMS 396/POL 310)  Fall EM

Explores, from various angles, periods, and points of view the idea of America as: an experiment in republicanism on a scale never before attempted; the New World; a promised land; a frontier space; a slave nation; or a dream (albeit often dashed). Examines critically the shifting images, ideologies, and mythologies surrounding the idea of America as portrayed through fiction, film, music, sports, art, poetry, and political theory. *Staff*
The Program in Humanistic Studies, under the auspices of the Council of the Humanities, sponsors two kinds of courses. General courses (subject area HUM) introduce students to interrelated events, ideas, texts, and artifacts of Asian and Western cultures.

Ferris, McGraw, and Robbins seminars in journalism, taught by distinguished writers and journalists, examine a wide spectrum of topics related to writing and the media, from creative non-fiction to relations among different media and society.

Princeton’s journalism courses (subject area JRN) are administered by an interdisciplinary committee consisting of the chairs of the English and politics departments, the dean of the Woodrow Wilson School of Public and International Affairs, the director of the creative writing program, and the chair of the Council of the Humanities. They were inaugurated in 1957 by the bequest of former New York Herald journalist, Edwin F. Ferris, of the Class of 1899. In 1984 publisher Harold W. McGraw Jr. ’40 created the McGraw Professorship in Writing and Publishing, in recognition of the importance of writing in all disciplines. Other seminars have been sponsored by a gift from the E. Franklin Robbins Trust, in honor of the late William G. Michaelson ’59 and his daughter Robin L. Michaelson ’89.

In addition to sponsoring courses, the Ferris committee provides grants to Princeton undergraduates who undertake summer internships in the media. For more information, visit the Council of the Humanities website.

Courses

HUM 205 The Classical Roots of Western Literature (see COM 205)
HUM 206 Masterworks of European Literature (see COM 206)
HUM 207 The Bible as Literature (also COM 207/ENG 390) Not offered this year LA

The Bible will be read closely in its own right and as an enduring resource for literature and commentary. The course will cover its forms and genres, including historical narrative, uncanny tales, prophecy, lyric, lament, commandment, sacred biography, and apocalypse; its pageant of weird and extraordinary characters; and its brooding intertextuality. Students will become familiar with a wide variety of biblical interpretations, from the Rabbis to Augustine to Kafka and Kierkegaard. Cinematic commentary will be included--Bible films, from the campy to the sublime. One 90-minute lecture, one 90-minute preceptorial. E. Schor

HUM 212 Classical Mythology (see CLA 212)
HUM 216 Interdisciplinary Approaches to Western Culture I: Literature and the Arts Fall LA

This course, taken simultaneously with 217, forms the first part of an intensive, four-course (216-219) interdisciplinary introduction to Western culture from antiquity to the Middle Ages. These courses bring together students and several faculty members to discuss key texts, events, and artifacts of European civilization. Readings and discussions are complemented by films, concerts, museum visits, guest lectures, and other special events. Students enroll in both 216 and 217. Three lectures, two discussion sessions. H. Schadee, S. Anderson, P. Sitney

HUM 217 Interdisciplinary Approaches to Western Culture I: History, Philosophy, and Religion Fall HA

In combination with 216, this is the first part of a year-long interdisciplinary sequence, exploring Western culture from Antiquity to the Middle Ages. Students enroll in both 216 and 217. All meetings are listed under 216. D. Feeney, D. Heller-Roazen

HUM 218 Interdisciplinary Approaches to Western Culture II: Literature and the Arts Spring LA

This course, taken simultaneously with 219, forms the second part of an intensive, four-course (216-219) interdisciplinary introduction to Western culture from the Renaissance to the modern period. These courses bring together students and several faculty members to discuss key texts, events, and artifacts of European civilization. Readings and discussions are complemented by films, concerts, museum visits, and other special events. Students enroll in both 218 and 219. Prerequisites: 216-217 or instructor's permission. Three lectures, two discussion sessions.

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H. Schadee, F. Rigolot, N. Panou

HUM 219 Interdisciplinary Approaches to Western Culture II: History, Philosophy, and Religion  Spring EC

In combination with 218, this is the second half of a year-long interdisciplinary sequence exploring Western culture from the 15th to the 20th centuries. Prerequisite: 216-217 or instructor's permission. All meetings are listed under 218.

M. Wachtel, A. Ryan

HUM 222 Religion in Modern Thought and Film (see REL 222)
HUM 227 The World of the Middle Ages (see MED 227)
HUM 229 Great Books in Buddhism (see REL 229)

HUM 231 The Chinese Classics: A Comparative Approach (see EAS 231)

HUM 233 East Asian Humanities I: The Classical Foundations (also EAS 233/COM 233)  Fall EM

An introduction to the literature, art, religion, and philosophy of China, Japan, and Korea from antiquity to ca. 1400. Readings are focused on primary texts in translation and complemented by museum visits, films, and other materials from the visual arts. The lecturers include faculty members from East Asian studies, comparative literature, art and archaeology, and religion. Students are encouraged to enroll in 234 in the spring, which continues the course from ca. 1400 into the 20th century. Two lectures, one preceptorial. R. Okada, K. Yasar

HUM 234 East Asian Humanities II: Tradition and Transformation (also EAS 234/COM 234)  Spring EM

An introduction to the literary, philosophical, religious, and artistic traditions of East Asia. Readings are focused on primary texts in translation. Lectures and discussions are accompanied by films, concerts, and museum visits. Lecturers include faculty from East Asian studies, comparative literature, art and archaeology, and religion. Two lectures, one preceptorial. A. Ueda, K. Yasar

HUM 318 Medieval Manuscript Illumination (see ART 318)
HUM 321 Cultural Systems (see ECS 321)
HUM 326 Philosophy of Art (see PHI 326)

HUM 365 Freud on the Psychological Foundations of the Mind (also PSY 365)  Fall EC

Freud is approached as a systematic thinker dedicated to discovering the basic principles of human mental life. For Freud, these basic principles concern what impels human thought and behavior. What moves us to think and act? What is it to think and act? Emphasis is placed on the close study and critical analysis of texts, with particular attention to the underlying structure of the arguments. Two 90-minute classes. S. Sugarman

JRN 240 Creative Non-Fiction (also CWR 240)  Spring LA

This is a course in factual writing and what has become known as literary nonfiction, emphasizing writing assignments and including several reading assignments from the work of John McPhee and others. Enrollment is limited to 16 second-year students, by application only. One three-hour seminar. J. McPhee

JRN 349 Science Journalism (see STC 349)

JRN 440 The Literature of Fact  Fall LA

This seminar offers a chance to think about and practice different kinds of writing. Students will strive to identify and emulate the best--the smartest, the most vivid, the most humane--in a variety of journalistic genres, from news analysis to arts criticism to foreign correspondence. E. Thomas

JRN 441 The McGraw Seminar in Writing  Spring LA

Each year a different kind of writing is featured, depending on the specialty of the Harold W. McGraw Professor of Writing and Publishing. One three-hour seminar. A. Hull

JRN 444 Sportswriting as Cultural Commentary  Fall SA

In this writing-intensive seminar, students will examine the work of prominent writers--from A.J. Liebling to Michael Lewis--paying special attention to the way they use sports as a means of expounding on larger and more complex cultural topics. Students will complete a variety of writing assignments, including a final long-form work suitable for publication. A passion for sports is not a prerequisite. A passion for writing is, however, essential. J. Wertheim

JRN 445 Investigative Journalism  Fall SA

This course looks at investigative reporting both as a practice, with its own methods of research, and as a force in society. Specific content and approach vary from year to year, depending on the expertise of the Ferris Professor of Journalism. One three-hour seminar. J. Steele

JRN 447 Politics and the Media  Not offered this year SA

Examination of political journalism and the role of the press in American society. The content and approach vary from year to year, depending on the interests of the Ferris Professor of Journalism. One three-hour seminar. Staff
JRN 448 The Media and Social Issues   Fall SA

An examination of the ways in which the media both cover and influence social issues. Specific content and approach vary from year to year, depending on the expertise of the Ferris Professor of Journalism. One three-hour seminar. L. Belkin

JRN 449 International News   Fall, Spring SA

This seminar explores the particular challenges of writing about other cultures, as well as the powers and limits of foreign reporting in shaping American public opinion. Specific content and approach vary from year to year, depending on the expertise of the Ferris Professor of Journalism. One three-hour seminar. E. Sciolino, R. Bernstein

JRN 452 Journalism on the Screen   Not offered this year SA

Readers increasingly follow the news on television and the Internet. This seminar explores the potential as well as the limitations and dangers of on-screen journalism. Specific content and approach vary from year to year, depending on the expertise of the Ferris Professor of Journalism. One three-hour seminar. Staff
One would be hard pressed to find any aspect of society today that is not influenced by evolving technology in a significant way. Similarly, technology does not develop in a vacuum; by virtue of its applied nature, it is shaped by the needs and desires of individuals and the societies in which they live. Society and technology co-evolve, so that you cannot fully understand one without knowing something about the other. This is especially true in the area of information technology (IT) that broadly covers the computation and communication technologies that permeate virtually all aspects of corporate and social activity. The products and services enabled by it have had a major impact on the world economy and on social interactions. As we look to the future, emerging technologies in IT continue to be driven by critical societal needs in a variety of areas as diverse as business productivity, healthcare, security, and entertainment. At the same time, these technologies need to address the societal concerns, such as privacy and security, raised in course of their deployment.

This intersection of IT and society is becoming increasingly important to consider in our educational mission—to understand how IT affects society, and how society affects IT. The Program in Information Technology and Society, established in partnership between the Keller Center for Innovation in Engineering Education and the Center for Information Technology Policy (CITP), provides access for Princeton undergraduates to the intellectual efforts at the intersection of IT and society through a coherent program of courses and research. Certificate recipients will have a greater understanding of the shaping, development and deployment of IT solutions for the benefit of society. They are thus likely to be stronger contributors to this enterprise in areas as diverse as technology development, policymaking, investing in technology and technology based for profit and nonprofit entrepreneurship.

Admission to the Program

Students are admitted to the program once they have chosen their field of concentration and consulted with the program director, who will assign them an adviser. Normally, they will have completed the program's core course prior to seeking admission.

Program of Study

The program provides students a focus on technology (IT) and society and places it in the broader context of technology and society. An introductory gateway course provides exposure to a broad set of issues at the intersection of technology and society. This helps them see the commonalities and differences on these issues between IT and other technology areas such as energy and biotechnology. Following the introductory course, students study both the technological and societal aspects of IT, which is critical to acquiring a good understanding of the disciplinary aspects of both sides of the issues that come up at this intersection. On the technology side, there is a rich set of courses in IT that have been designed to be accessible to all students on campus and that place the technical material in a broader application context. These are in the disciplines of computer science, electrical engineering, and operations research and financial engineering. Similarly on the societal side, IT issues are part of important courses in several departments such as sociology and the Woodrow Wilson School. In addition to depth in IT and society, the program emphasizes breadth through a course in an area of technology different from IT that addresses the intersection of technology and society, e.g. energy or biotechnology. Finally, students need to conduct research on a specific issue through a one semester project with a subsequent written component (junior paper/thesis component) as well as a presentation at a program symposium.

Program Requirements

The following requirements need to be satisfied to earn the program certificate (note: an asterisk indicates a one-time-only course or topic):

Core Course. EGR/HIS/SOC 277 Technology and Society. This course provides students with the intellectual tools needed to approach the rest of the program—a "set of lenses" that will help them view the issues being addressed in their work.

IT and Society Courses (4 courses). This course requirement is intended to provide an understanding of the technology and societal aspects through a discipline based study of both sides.

Technology Courses. Each student is required to take two technology courses from a list that includes the courses below. These courses are mostly drawn from a set that includes courses specifically designed for a wider campus

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audience (no prerequisites). An advanced/one-time-only course may be used to replace one or both of these courses
with the permission of the program adviser.

COS 109 Computers in Our World (also EGR 109)
COS 432 Information Security
COS 444 Internet Auctions: Theory and Practice
ELE 222a/b The Computing Age (also EGR 222a/b)
ELE 386 Cyber Security (also EGR 386)
ELE 391 The Wireless Revolution: Telecommunications for the 21st Century (also EGR 391)
ORF 401 Electronic Commerce

Societal Courses. Each student is required to take two societal courses from a list that includes the courses below. An
advanced/one-time-only course may be used to replace one or both of these courses with the permission of the
program adviser.

PSY 214 Human Identity in the Age of Neuroscience and Information Technology
PSY 322 Human Machine Interaction (also ORF 322)
SOC 214 Creativity, Innovation, and Society
SOC 344 Communications, Culture, and Society
WWS 309 Media and Public Policy (also SOC 313)
*WWS 451 Special Topics in Public Affairs: The Internet and Public Policy

Breadth Course. In addition to the technology and society courses, each student is required to take one course that
combines technology and society in an area outside of IT. For engineering/science students this should be based in the
societal disciplines, and for humanities and social science students this should be based in the science/technology
disciplines.

Representative Technology Courses

CBE 260 Ethics and Technology: Engineering in the Real World (also EGR 260)
CEE 102a/b Engineering in the Modern World (also EGR 102a/b, MAE 102 a/b)
*ENV 360 Biotech Plants and Animals: Frankenfood or Important Innovations?
MAE 228 Energy Solutions for the Next Century (also EGR 228, CBE 228)
*MAE 244 Introduction to Biomedical Innovation and Global Health (also EGR 244)
MAE 445 Entrepreneurial Engineering (also EGR 445)
MOL 205 Genes, Health, and Society

Representative Societal Courses

ELE 491 High-Tech Entrepreneurship (also EGR 491, ORF 491)
EGR 495 Special Topics in Entrepreneurship
HIS 393 Science in American History from the Civil War to the Present
HIS 398 Technologies and Their Societies: Historical Perspectives
*NES 266 Oil, Energy, and the Middle East (also ENV 266)
WWS 304 Science, Technology, and Public Policy
WWS 315 Bioethics and Public Policy
WWS 320 Human Genetics, Reproduction, and Public Policy (also MOL 320)
WWS 327 Pharmaceutical Research and Public Policy (also CHM 443)

Annual Symposium. Students are required to present their projects/theses to the program students and faculty at an
annual symposium. This provides a mechanism for shared learning as well as for developing the common themes
across the program.

Independent Work

All students are required to undertake a one-semester independent research project in IT and society. For A.B.
students, this includes a junior paper. This may be substituted by a significant component in their senior thesis (at least
a chapter). It is expected that some of these projects/theses will be jointly supervised by faculty members across the
University divisions. The project/thesis component requires pre-approval of the student's program adviser.

Certificate of Proficiency

Students who fulfill the requirements of the program receive a certificate of proficiency in information technology and
society upon graduation.

http://www.princeton.edu/ua/
Program in Jazz Studies

Director
Anthony D. J. Branker

Executive Committee
V. Kofi Agawu, Music

Anthony D. J. Branker, Music
Scott G. Burnham, Music
Alexandra T. Vazquez, English, African American Studies

The Program in Jazz Studies is dedicated to providing an educational forum for the study of the performance practices and rich cultural legacy of jazz. As constructed, it provides the student performers and composers (and others interested in the tradition) with the opportunity to study jazz by way of a wide range of course offerings. Students in the program will participate in a number of academic courses from the music department curriculum, as well as other approved interdisciplinary offerings, that encourage the study of the historical, cultural, social, theoretical, stylistic, and creative issues that pertain to the jazz idiom. They will also have the opportunity to be involved in a number of jazz outreach activities that are designed to enrich elementary, middle school, and high school students throughout the state, as well as the community at large.

While the Program in Jazz Studies is not designed to produce professional jazz performers, it will provide a foundation upon which a student may build in order to go on to further training while receiving a superior liberal arts education.

Admission to the Program

The Program in Jazz Studies is open to juniors and seniors who have the appropriate background and are committed to studying the performance practices and rich cultural legacy of jazz. Admission to the program will be by application and audition. The number of students in the program will be limited by available resources. Although enrollment is restricted to juniors and seniors, students may begin taking courses that count toward certificate requirements in their freshman year.

Program of Study

To qualify for a program certificate, students are required to complete six related courses and participate as a performer in one of the music department's jazz performance groups. In addition, they must also be involved in educational outreach through the program's Jazz-in-the-Schools initiative.

Program Requirements

Students are required to take six courses from the following four categories (note: an asterisk indicates a one-time-only course or topic):

Jazz history (1 course) from:
MUS 262 Evolution of Jazz Styles (also AAS 262); or
*MUS 320 Jazz Performance Practice in Historical and Cultural Context

Jazz theory (2 courses) from:
MUS 311 Jazz Theory through Improvisation and Composition I;
MUS 312 Jazz Theory through Improvisation and Composition II; or
MUS 319 Seminar in Jazz Composition

Jazz performance (1 course):
MUS 215 Projects in Jazz Performance

Historical/cultural context electives (2 courses) to be chosen from the following list. Other courses may be substituted with the prior approval of the program director. New courses will be added to this area as they are developed; please check the music department's website for an up-to-date list of electives. (Note: if a jazz certificate student is also a music concentrator, the elective courses in historical/cultural context must be taken from outside of the music department offerings.)

African American Studies (AAS)

201 Introduction to African American Cultural Practices
*305 The History of Black Gospel Music (also REL 391)
*310 Music from the Hispanophone Caribbean (also ENG 324/MUS 256)
*342 Rhythm Nation (also ENG 397/MUS 364)
*348 Black Popular Music Culture (also ENG 348)
*372 Postblack-Contemporary African American Art (also ART 374/AMS 372)

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American Studies (AMS)
*301 Listening In: Sound, Music, Noise, and Technology in American History
English (ENG)
*212 Black Bohemia: Racial Authenticity in Post-Civil Rights Music and Literature (also AAS 212)
History (HIS)
*399: In the Groove: Technology and Music in America, From Edison to the iPod
Music (MUS)
258 Music of Africa (also AFS 258)
260 Music in the United States
Sociology (SOC)
*214 Creativity, Innovation, and Society

In addition, students are required to participate in a University jazz ensemble during each semester of enrollment in the jazz studies program (junior and senior years).

Independent Work

Students will develop an educational lecture/demonstration to be presented by a student-led jazz small group at an assembly program for an area elementary school or middle school. This will take place as part of the certificate program's Jazz-in-the-Schools outreach initiative.

Certificate of Proficiency

Students who fulfill the requirements of the program receive a certificate of proficiency in jazz studies upon graduation.
Program in Judaic Studies

Director
Peter Schäfer

Acting Director
Martha Himmelfarb (spring)

Executive Committee
Leora F. Batnitzky, Religion
David M. Bellos, French and Italian, Comparative Literature
Mark R. Cohen, Near Eastern Studies
Anthony T. Grafton, History
Hendrik A. Hartog, History
Wendy Heller, Music
Daniel Heller-Roazen, Comparative Literature
Martha Himmelfarb, Religion
William C. Jordan, History

Stanley N. Katz, Woodrow Wilson School
AnneMarie Luijendijk, Religion
Naphtali Meshel, Religion
Deborah E. Nord, English
Anson G. Rabinbach, History
Esther Robbins, Near Eastern Studies
Gideon A. Rosen, Philosophy, ex officio
Lawrence Rosen, Anthropology
Peter Schäfer, Religion
Esther H. Schor, English

Sits with Committee
Eran Kaplan, History
Yaacob Dweck, History

The Program in Judaic Studies provides students the opportunity to explore more than three millennia of Jewish culture, history, religion, thought, politics, and literature from the Bible to contemporary Jewish thought and society from an interdisciplinary perspective. A wide variety of courses, lectures, conferences, film series, and exhibitions taking advantage of Princeton’s rich resources in Judaic studies is offered. There is no "typical" certificate student; we serve students with a wide range of interests and welcome all who are motivated to deepen their knowledge of Judaic studies.

Program Requirements

In order to receive the certificate, students take a minimum of five courses in Judaic studies and write a senior thesis that draws significantly on some aspect of Judaic studies. Students are required to take JDS 202 Great Books of the Jewish Tradition, one course in Jewish religion, one course in Jewish history, and two other courses (see "Courses" below). A sound program of study will involve both historical range (courses in pre-modern and modern periods) and disciplinary breadth. While a junior paper in the field is not required, students are encouraged to explore the field of Judaic studies in their junior-year independent work. A freshman seminar may count as one of the required courses. Occasionally, after consultation with the program director, a student with a strong grounding in classical Jewish texts may be permitted to substitute another course for JDS 202.

Students must write a senior thesis in their department of concentration that draws significantly on some aspect of Judaic studies. Each student’s course of study and thesis topic must be approved by the program director as well as by the departmental representative in the student’s department of concentration. The certificate requirements are compatible with a concentration in any humanities or social science department. Students in departments where there is no possibility of Judaic studies content in the senior thesis may substitute a separate, shorter piece of independent work with the permission of the program director.

Languages

Judaic studies has no specific language requirement apart from what is normally required by the University. However, when appropriate, students are expected to use foreign language skills in their senior thesis research. Students also are strongly urged to develop a competency in Hebrew and may use one advanced (300 level) Hebrew course, if they wish, to fulfill the general course requirements for the certificate.

Study Abroad

The program encourages students to consider studying in Israel, either for a semester or for a summer. Study in Israel provides an excellent opportunity to improve one’s knowledge of Hebrew as well as to pursue other topics of interest. There are a number of intensive summer language programs in Hebrew and Yiddish in Israel, the United States, the United Kingdom, and elsewhere. Courses taken abroad, other than elementary language, may count for up to two of the program’s required courses.

Certificate of Proficiency

Students who fulfill all the requirements of the program will receive a certificate of proficiency in Judaic studies upon graduation.

http://www.princeton.edu/ua/
Courses

JDS 201 Introduction to Judaism: Religion, History, Ethics (also REL 223)  Not offered this year HA

Starting with ancient Israel's radically new conceptions of the divine, morality, and history, this course explores the complex nature of Judaism and its development as a religion and culture over millennia—a development marked by internal debates and external challenges to continuity and survival. Emphasis is on the traditional bases of Judaism, such as religious beliefs and practices, interpretations of sacred texts, and shared communal values. Attention also to the variety of Jewish encounters with modernity, philosophy, secularism, and non-Jewish cultures. Two classes, one preceptorial. Staff

JDS 202 Great Books of the Jewish Tradition (also REL 202)  Fall HA

Introduces students to the classical Jewish tradition through a close reading of portions of some of its great books, including the Bible, rabbinic midrash, the Talmud, Rashi's commentary on the Torah (probably the most influential Bible commentary among Jews ever), the Zohar (the central work of Kabbalah), and the Guide for the Perplexed (Maimonides's great philosophical work). Students will consider what these works say about the relationship between revelation and interpretation in Jewish tradition and how they come to define that tradition. Two 90-minute classes. E. Russ-Fishbane

JDS 214 Masterworks of Hebrew Literature in Translation (see NES 214)

JDS 220 Jews, Muslims, and Christians in the Middle Ages (see NES 220)

JDS 230 Hebrew Bible and Ancient Israel (see REL 230)

JDS 231 Hebrew Bible and Earliest Judaism (see REL 231)

JDS 242 Jewish Thought and Modern Society (see REL 242)

JDS 244 Rabbinic Judaism: Literature, History, and Beliefs (see REL 244)

JDS 245 Jewish Mysticism: From the Bible to Kabbala (see REL 245)

JDS 300 Israeli History through Film (also NES 300)  Spring HA

An introduction to modern Israeli history and culture through the medium of film. The course examines the transitions and changes in Israeli society over the past 60 years and presents students with some of the major themes of the Israeli experience. The history of Israel is the tale of the conflict between East and West, Arabs and Jews, and between the Jewish past and the Zionist ethos. It is the story of a transformation from a highly mobilized nation to a modern, self-doubting and pluralistic society that openly questions its past and constituting myths. Israeli cinema is a reflection of this history and culture. One three-hour seminar. E. Kaplan

JDS 301 Topics in Judaic Studies (also WOM 309)  Fall LA

The seminar, normally taken in the junior year, explores in depth a theme, issue, or problem in Jewish studies, often from a comparative perspective. Possible topics include gender and the family, comparative diasporas, messianic ideas and movements, Jewish history, anti-Semitism, authority, leadership, and conflict in Judaism, Jewish literature, Jewish popular culture. One three-hour seminar. F. Zeitlin

JDS 315 The Family in Jewish Tradition (also WOM 310)  Spring SA

This seminar will examine the historic flexibility and variability of the Jewish family in the context of selected times and places: Biblical period, early Common Era Diaspora, 20th-century Europe, contemporary United States and Israel. The major emphasis in this course will be on the different protocols and forms that may collectively be called the "Jewish Family." One three-hour seminar. R. Westheimer

JDS 317 Recent Jewish and Christian Thought (see REL 317)

JDS 338 The Arab-Israeli Conflict (see NES 338)

JDS 340 Ancient Judaism and the Dead Sea Scrolls (see REL 340)

JDS 346 Reason and Revelation in Jewish Thought (see REL 346)

JDS 347 Religion and Law (see REL 347)

JDS 349 Texts and Images of the Holocaust (see COM 349)

JDS 351 Golem: The Creation of an Artificial Man (see REL 351)

JDS 355 Between Swords and Stones: Jerusalem, a History (also NES 355/HIS 356)  Spring HA

For 3,000 years the city that is holy to all three monotheistic religions has known little peace and tranquility and has been the site of wars, conquests, and division. By drawing on historical, literary, religious, and cinematic sources, this course will explore the history of Jerusalem from antiquity to the modern period. It will examine its place in the religious imagination of Jews, Muslims, and Christians and trace the political history of a city that continues to be one of the most inflammable places on Earth. It will look at the conditions in today's "united" Jerusalem and explore the
different contingencies to bring peace to it. E. Kaplan

**JDS 359 Modern Jewish History: 1750-Present (see HIS 359)**

**JDS 367 Jewish Identities in France since 1945 (see FRE 347)**

**JDS 399 Modern Israel (also NES 399) Fall HA**

This course examines the formation and development of modern Israel, following the transition in Israel from a conformist society dominated by Zionist ideology to a society seriously questioning its values, ideals, and norms. It will focus on these changes in a wide range of sources: political and diplomatic, cultural, literary, cinematic, and more. The course will focus on the role of: the ideological origins of Zionist ideology; the Holocaust; the Arab-Jewish conflict; the Ashkenazi-Mizrahi; and the secular-religious divide on the development of contemporary Israeli society. Two 90-minute classes. E. Kaplan

**JDS 458 Zionism: From Ideology to Practice (also HIS 458/NES 458) Spring HA**

Examines the history of Zionism as a diverse political, social and cultural, movement. The course traces the origins of the Jewish national idea in Europe at the period of Jewish emancipation and the rise of modern anti-Semitism and examines the transformation of Zionism into a political and social movement in Palestine, the emergence of the Jewish-Arab conflict, and the 1948 War. Explores the impact of Zionist ideology on the early years of Israeli independence, and, lastly, the course surveys the post-Zionist debates and the relevance of the Zionist idea today. Two 90-minute seminars. E. Kaplan

http://www.princeton.edu/ua/
Program in Language and Culture

Faculty
Steven Chung, East Asian Studies
Marc Domingo Gygax, Classics
Thomas Y. Levin, German
Simone Marchesi, French and Italian
Pedro Meira Monteiro, Spanish and Portuguese Languages and Cultures
Petre Petrov, Slavic Languages and Literatures
Michael A. Reynolds, Near Eastern Studies

The Program in Language and Culture, administered through the individual language and literature departments, allows concentrators in any discipline to earn a certificate in language and culture. Certificates can be earned in the Departments of Classics, East Asian Studies, French and Italian, German, Near Eastern Studies, Slavic Languages and Literatures, and Spanish and Portuguese Languages and Cultures.

Admission to the Program

The program is open to undergraduates in all departments. Students should consult the appropriate departmental representative by the middle of the sophomore year. Ordinarily, students concentrating in language and literature departments, including comparative literature, will be eligible for the certificate in language and culture provided that: (a) the linguistic base for the language and culture certificate is different from the linguistic base of the concentration; and (b) the work required for the language and culture certificate does not duplicate the requirements of the major. Students pursuing area studies certificates may earn the certificate in language and culture provided that: (a) the courses they elect to satisfy the requirements of the area studies program are different from those they elect to satisfy the requirements of the language and culture certificate program; and (b) they submit a piece of independent work in addition to the independent work that satisfies the requirements of the area studies program and the home department.

Program Requirements

Because the length of time required to gain proficiency varies from language to language, the specific level and content of courses required for the certificate may vary from department to department. All language certificate programs will have the following common core:

1. The study of language beyond the level required for the completion of the University language requirement.

2. A minimum of three departmental courses in language, linguistics, literature, or culture, excluding courses that do not have a language prerequisite. Language courses above the level required for the completion of the University language requirement may be counted. At the discretion of the certificate-granting department, a student may substitute one cognate course with a substantial language component for one of the three departmental courses.

3. A piece of independent work. This requirement can be satisfied in one of several ways, depending on the requirements of the respective departments as well as on the student's concentration and interest.
   a) A substantial paper growing out of one of the courses taken to fulfill the certificate requirement. This paper will be in addition to the work required in the course; or
   b) A substantial paper on a topic agreed upon with an instructor in the department and approved by the program; or
   c) With the agreement of the home department and the program, a student may be allowed to do a piece of independent work that will satisfy the requirements of both the home department and the program. For example, a student could write a junior paper or senior thesis based in substantial part on foreign language sources.

Study and Work Abroad

Although not required, it is strongly recommended that students spend some time in the country whose language and culture they are studying. This can be done through an approved study abroad program or through a summer program of work and/or study. The area studies programs in East Asian, Latin American, Near Eastern, and Russian and Eurasian studies may be important resources in providing guidance, and students who are earning language certificates in these areas are urged to consult with the director of the relevant program in planning their course of study or work abroad.

Certificate of Proficiency

Students who have met all the requirements of the program will receive, upon graduation, a certificate of proficiency in the language and culture of the relevant department.

http://www.princeton.edu/ua/
Program in Latin American Studies

Director
Rubén Gallo

Executive Committee
João G. Biehl, Anthropology
Eduardo L. Cadava, English
Miguel A. Centeno, Woodrow Wilson School, Sociology
Rubén Gallo, Spanish and Portuguese Languages and Cultures
Douglas S. Massey, Woodrow Wilson School, Sociology
Pedro Meira Monteiro, Spanish and Portuguese Languages and Cultures
Michael G. Wood, English, Comparative Literature

Associated Faculty
Jeremy I. Adelman, History
Daniela Campello, Woodrow Wilson School, Politics
Vera S. Cândiani, History
Mariana P. Cândido, History
Bruno Carvalho, Spanish and Portuguese Languages and Cultures
Esther da Costa Meyer, Art and Archaeology
Susana Draper, Comparative Literature
Mario I. Gandelsonas, Architecture
James L. Gould, Ecology and Evolutionary Biology
Robert A. Karl, History
Thomas D. Kaufmann, Art and Archaeology
Noriko Manabe, Music
F. Nick Nesbitt, French and Italian
Gabriela Nouzeilles, Spanish and Portuguese Languages and Cultures
Stephen W. Pacala, Ecology and Evolutionary Biology
Christina H. Paxson, Woodrow Wilson School, Economics
Ricardo E. Piglia, Spanish and Portuguese Languages and Cultures
Grigore Pop-Eleches, Woodrow Wilson School, Politics
Alejandro Portes, Sociology
Rachel Price, Spanish and Portuguese Languages and Cultures
Ignacio Rodríguez-Ibáñez, Civil and Environmental Engineering
Esteban A. Rossi-Hansberg, Woodrow Wilson School, Economics
José A. Scheinkman, Economics
Edward L. Telles, Sociology
Marta Tienda, Woodrow Wilson School, Sociology
Alexandra T. Vazquez, English, African American Studies
Deborah J. Yashar, Woodrow Wilson School, Politics

Sits with Committee
Fernando Acosta-Rodríguez, Library
Kelly C. Baum, Art Museum
M. Patricia Fernández-Kelly, Sociology
Aníbal M. Goldani, Sociology
Bryan R. Just, Art Museum
Stanley N. Katz, Woodrow Wilson School

The Program in Latin American Studies promotes interdisciplinary study and seeks to inspire knowledge of and experience in Latin America and the non-English speaking Caribbean.

Courses are offered by the Departments of Anthropology, Art and Archaeology, Comparative Literature, Ecology and Evolutionary Biology, Economics, English, French and Italian (appropriate French courses only), History, Music, Politics, Sociology, Spanish and Portuguese Languages and Cultures, the Woodrow Wilson School, the Center for African American Studies, the Program in Latino Studies, and the Program in Latin American Studies. Through various approaches in the humanities and the social and natural sciences, the program seeks to guide students toward an understanding of Latin American culture, history, socioeconomic conditions, politics, and society. The student's work is supervised by a departmental adviser and is combined with a departmental program in a regular field of concentration.

Admission to the Program

Students normally enter the program in the sophomore year, but an earlier start is encouraged. The requirements for admission are:

1. Satisfactory completion of the requirements for admission to a department.

2. Satisfactory completion of SPA 107 or its equivalent. It is strongly recommended that Spanish-section students also complete a minimum of POR 108 where feasible and SPA 222. FRE 107 or its equivalent is required for those students planning to specialize in French-speaking areas. FRE 207 is strongly recommended.

Program of Study

For satisfactory completion of the program, a student must meet the following requirements:

1. Completion of the normal departmental program in the major department.

2. Satisfactory completion of the language requirement in Spanish, Portuguese, or French (or equivalent). This requirement also applies to certificate candidates who are pursuing degrees in the sciences and engineering.

3. Satisfactory completion of five courses in Latin American subjects sponsored or cross-listed by the program. At least one of these courses must be in Spanish American or Brazilian literature taught in either language, as well as one in history and one from anthropology, economics, politics, or sociology. The remaining two courses may be selected from any field.

Additional courses that may be used to satisfy program course requirements are:

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Anthropology 335 Medical Anthropology
Economics 351 Economics of Development
Spanish 346 Modern Latin American Fiction in Translation (This course counts for Latin American studies credit only if readings and writings are done in Spanish or Portuguese.)

Written course work for ANT 335 and ECO 351 must be on a Latin American or Caribbean topic.

With the program director’s permission, a maximum of two courses not listed above or from study abroad may, if they are relevant to the student’s area of research, be designated as "cognates" and count toward satisfaction of the course requirement.

Students pursuing science studies may fulfill program requirements by taking a number of approved courses in ecology and evolutionary biology and environmental studies.

No course may be taken pass/D/fail or audit for program credit.

4. At least one of the five qualifying courses must be an advanced undergraduate seminar in Latin American studies that examines significant problems of the region in an interdisciplinary fashion.

5. Completion of a senior thesis on a Latin American subject. Normally it should be written under the supervision of a faculty member associated with the program. If this is not the case, a faculty member associated with the program should be consulted early in the senior year concerning available sources. The thesis should also demonstrate an ability to use primary source materials in Spanish, Portuguese, or French, or, in more general terms, materials from the country, region, or countries studied, or from Latin American sources when appropriate. If the senior thesis is not devoted exclusively to a Latin American topic, the director and relevant program faculty will determine its acceptability. Ordinarily, at least half of the thesis content will deal with Latin America or the Caribbean, or a substantial portion of the research for the thesis should be conducted in a language--other than English--spoken in Latin America or the Caribbean.

6. Students majoring in science or engineering, but whose thesis cannot be devoted to a Latin American topic, may complete the program requirements by writing a research paper of sufficient complexity and length to substitute for the thesis requirement. The topic should be determined in consultation with the director and relevant program faculty.

Certificate of Proficiency

Students who have met the requirements of the program and of their departments will receive upon graduation a certificate of proficiency in Latin American studies.

Program Seminars. Latin American seminars are designed particularly for juniors and seniors enrolled in the program but are available to all students with permission of the instructor. Normally two or three seminars are offered each year.

Courses

LAS 210 Urban Sociology: The City and Social Change in the Americas (see SOC 210)
LAS 221 Art of Hispania (see ART 221)
LAS 222 Introduction to Latin American Cultures (see SPA 222)
LAS 223 Introduction to the Literature and Culture of the Portuguese-Speaking World (see POR 221)
LAS 245 Social Change: Modernization and Revolution (see SOC 245)
LAS 248 Modern Mexican Society (see SOC 248)
LAS 300 The Literature and Culture of Spain and Colonial Latin America: Medieval, Renaissance, and Baroque (see SPA 300)
LAS 301 Seminar. Research Methods, Sources, and Trends in Latin America Area Studies    Not offered this year
An examination of research trends, techniques, and resources necessary for the study of Latin America and the Caribbean in the social sciences and the humanities. The seminar is designed to expose students to the most relevant trends, scenarios, and strategies in both bibliographic and ethnographic field research. Prerequisites: reading knowledge of Spanish and/or Portuguese. Open to freshmen and sophomores. Staff
LAS 303 Modern Brazilian Literature and Culture (see POR 301)
LAS 304 Modern Latin America since 1810 (see HIS 304)
LAS 305 Colonial Latin America to 1810 (see HIS 303)
LAS 306 History of the Modern Caribbean (see HIS 305)

http://www.princeton.edu/ua/
LAS 309 Topics in the Sociology of Latin America (see SOC 309)
LAS 310 Gender and Development in the Americas (see SOC 310)
LAS 311 Topics in Brazilian Cultural and Social History (see POR 304)
LAS 315 Luso-Afro-Brazilian Literary Traditions (see POR 300)
LAS 319 Brazilian Cinema (see POR 319)
LAS 327 Modernism in Fiction (see COM 327)
LAS 331 Modern Latin American Fiction (see SPA 331)
LAS 332 Modern Latin American Poetry (see SPA 332)
LAS 336 Latinos in American Life and Culture (see LAO 200)
LAS 338 The Sociology of Latinos in the U.S. (see SOC 338)
LAS 342 Topics in Latin American Modernity (see SPA 342)
LAS 343 The Invention of Latin American Traditions (see SPA 343)
LAS 344 Literature and Society in Early Latin America (see SPA 344)
LAS 345 Topics in Latin American Literature and Ideology (see SPA 345)
LAS 346 Topics in Country and Regional Economics (see ECO 371)
LAS 348 Fictions and Communities in the Andes (see SPA 348)
LAS 349 Topics in Latin American Cultural Studies (see SPA 350)
LAS 350 Pre-Columbian Peoples of Tropical America and Their Environments (see EEB 332)
LAS 351 Tropical Biology (see EEB 338)
LAS 353 Topics in Gender and Representation (see SPA 353)
LAS 356 Topics in the Politics of Writing and Difference (see SPA 352)
LAS 366 Ancient Arts of Mexico (see ART 366)
LAS 367 Latin American Politics (see POL 367)
LAS 368 Political Economy of Latin America (see POL 368)
LAS 375 Special Topics in Creative Writing (see CWR 345)
LAS 401 Latin American Studies Seminar (also SPA 410) Fall LA
The seminar will concentrate upon themes and topics in Latin American history, politics, society, literature, and/or culture. The focus will vary from year to year. Staff
LAS 402 Latin American Studies Seminar (also POR 410/HIS 402) Spring HA
The seminar will concentrate upon themes and topics in Latin American history, politics, society, literature, and/or culture. The focus will vary from year to year. Staff
LAS 403 Latin American Studies Seminar (also SPA 407/COM 420) Not offered this year LA
The seminar will concentrate upon themes and topics in Latin American history, politics, society, literature, and/or culture. The focus will vary from year to year. Staff
LAS 404 Latin American Studies Seminar (also SPA 409/POR 409) Not offered this year
The seminar will concentrate upon themes and topics in Latin American history, politics, society, literature, and/or culture. The focus will vary from year to year. Staff
LAS 405 Latin American Studies Seminar Not offered this year
The seminar will concentrate upon themes and topics in Latin American history, politics, society, literature, and/or culture. The focus will vary from year to year. Staff
LAS 406 Latin American Studies Seminar (also ARC 411/SPA 406) Fall LA
The seminar will concentrate upon themes and topics in Latin American history, politics, society, literature, and/or culture. The focus will vary from year to year. Staff
LAS 408 Selected Topics in 20th-Century Latin America (see HIS 408)
LAS 428 Topics in Hispanic Culture (Europe and America) (see SPA 401)
LAS 431 Seminar in Comparative Politics (see POL 431)
LAS 432 Seminar in Comparative Politics (see POL 432)
LAS 443 Global Exchange in Art and Architecture (see ART 443)
Program in Latino Studies

Director
Marta Tienda

Acting Director
M. Patricia Fernández-Kelly (fall/spring)

Executive Committee
M. Patricia Fernández-Kelly, Sociology
Hendrik A. Hartog, History
Amaney Jamal, Politics
Edward E. Telles, Sociology
Alexandra T. Vazquez, English, African American Studies

Associated Faculty
Jeremy I. Adelman, History
Vera S. Candiani, History
Miguel A. Centeno, Sociology, Woodrow Wilson School
Rubén Gallo, Spanish and Portuguese Languages and Cultures
Angel Harris, Sociology, African American Studies
Douglas S. Massey, Woodrow Wilson School, Sociology
Alejandro Portes, Sociology
Deborah J. Yashar, Woodrow Wilson School, Politics

Sits with Committee
Fernando Acosta-Rodríguez, Library
Ricardo Montez, Council of the Humanities

The Program in Latino Studies offers an interdisciplinary curriculum that traverses the arts, humanities, and social sciences designed to provide students with a broad understanding of the emergence, transformation, and consolidation of Latinos as a pan-ethnic group, and to appreciate the range of Hispanic imprints on American society and culture.

Courses that satisfy the program certificate are offered by the Departments of English, History, Politics, Sociology, and Spanish and Portuguese Languages and Cultures, as well as the Woodrow Wilson School of Public and International Affairs, and the Center for African American Studies. Faculty affiliated with the program direct the study plans of students seeking a certificate in Latino studies, which is pursued in tandem with a disciplinary concentration.

Admission to the Program

Students from all departments are welcome to the program, but interested students are encouraged to complete the required gateway course, LAO 200 Latinos in American Life and Culture, by the end of their sophomore year.

Program of Study

In addition to the required gateway course, students must complete four courses outside their department of concentration that draw from both the social sciences and the arts and humanities. Of these, at least one should be a seminar (please consult with the program for the most current list of options), and one must emphasize comparative race relations. In order to qualify for the Latino studies certificate, a course must devote at least half of its content to the U.S. Hispanic population.

Students are also required to write a senior thesis on a topic relating to the Hispanic population of the United States. With the program director's approval, students majoring in one of the sciences, mathematics, or engineering whose senior thesis does not deal with the Hispanic population of the United States may complete the program by submitting an original piece of research dealing with a topic relating to Latinos in the United States. This should be written under the supervision of a faculty member associated with the program.

An up-to-date list of courses fulfilling the seminar and comparative race relations requirements, as well as Latino studies-related courses in the social sciences, arts, and humanities, may be found on the program's website.

Certificate of Proficiency

Students who fulfill all program requirements will receive a certificate of proficiency in Latino studies upon graduation.

Courses

LAO 200 Latinos in American Life and Culture (also AMS 346/SOC 341/LAS 336) Fall SA

This required gateway course will consider how Latinos are transforming the United States even as they embrace a racialized pan-ethnic identity. Readings expose students to the demographic underpinnings of the dramatic growth and historically unprecedented geographic dispersal, the ethical dilemmas posed by undocumented immigration, the historical and contemporary trends in social, economic, and political participation, and the hybrid cultural imprints forged in musical, literary, and artistic work. Two lectures, two preceptorials. M. Tienda

LAO 222 Introduction to Latin American Cultures (see SPA 222)

http://www.princeton.edu/ua/
Lewis Center for the Arts

Chair
Paul B. Muldoon

Professor
Jill S. Dolan, also English, Theater
Jeffrey Eugenides, also Creative Writing
Su Friedrich, also Visual Arts
Chang-rae Lee, also Creative Writing
Susan Marshall, also Dance
Paul B. Muldoon, also Creative Writing
Joyce Carol Oates, also Creative Writing
James Richardson, also English, Creative Writing
Joseph S. Scanlan, also Visual Arts
P. Adams Sitney, also Visual Arts
Edmund V. White, also Creative Writing

Associate Professor
Stacy E. Wolf, also Theater
Susan Wheeler, also Creative Writing

Assistant Professor
Tracy K. Smith, also Creative Writing

Senior Lecturer
Eve M. Aschheim, also Visual Arts
Michael W. Cadden, also Theater
Rebecca J. Lazier, also Dance

Lecturer with Rank of Professor
C. K. Williams, also Creative Writing

Hodder Fellow
Cynthia Cruz, Creative Writing
Ellen Lewis, Theater
Zuwena Packer, Creative Writing

Established in 2007, the Lewis Center for the Arts is an academic unit designed to put the creative and performing arts at the heart of the Princeton experience. This initiative is based on the conviction that exposure to the arts, particularly to the experience of producing art, helps each of us make sense of our life and the lives of our neighbors. The Lewis Center for the Arts gives a new focus and force to the Programs in Creative Writing, Dance, Theater, and Visual Arts, and to the Princeton Atelier. It also has close links to the Center for African American Studies, School of Architecture, Department of Art and Archaeology, Council of the Humanities, Department of Comparative Literature, Department of English, Department of Music, Princeton University Art Museum, and the McCarter Theatre Center. Students concentrating in molecular biology or mechanical engineering will be heartened to find that chemistry and physics, not to speak of mathematics, are all central to the idea of art-making. Students who are first and foremost interested in choreography, costume design, screenwriting, printmaking, photography, painting, poetry, or fiction writing, or indeed any aspect of the creative or performing arts, will discover that Princeton's faculty and facilities will be second to none.

Academic Opportunities in the Creative and Performing Arts

Certificate Programs. The certificate Programs in Creative Writing, Dance, Theater, and Visual Arts are offered under the auspices of the Lewis Center for the Arts, while the certificate Program in Musical Performance is offered under the auspices of the Department of Music. For information about their individual programs of study and course offerings, please refer to their separate entries in this catalog.

Academic Concentrations Involving Creative Work. Various academic departments offer special opportunities and tracks that involve creative work. The Department of English offers academic concentrations in English and creative writing and in English and theater (see their Program 4 and 5, respectively). The Department of Art and Archaeology offers a concentration in history of art and the visual arts. The Department of Comparative Literature offers the opportunity to incorporate creative work in their Program D, comparative work in literary study and the creative arts. For more information about these opportunities, please refer to the specific department entries in this catalog.

University Scholar Program. Finally, the University Scholar Program is designed for "a small group of students with outstanding and demonstrated talent in an academic or creative area that requires a substantial commitment of time and that cannot be pursued within the regular curriculum," such as artists who are already balancing the demands of a professional career with their educational requirements.

Other Opportunities in the Arts

The Department of Music offers musical performance courses, opportunities for private vocal and instrumental lessons, and special technical, electroacoustic, and computer facilities. In addition, the University has a broad array of opportunities for qualified students to participate in various University ensembles. These mostly extracurricular activities include, but are not limited to, the Princeton University Glee Club, the Chamber Choir, the University Orchestra, Chamber Orchestra, Jazz Ensemble, Opera Theater, Marching Band, and Wind Ensemble.

The Princeton University Art Museum is a teaching museum for the Department of Art and Archaeology as well as a cultural resource for the entire University and surrounding community. Its holdings range from ancient to contemporary art, with outstanding collections of prints, drawings, and photographs.

Visiting Artists and Fellows

The Lewis Center for the Arts eventually will be the home for the Society of Fellows in the Arts, bringing to campus some of the most exciting artists and performers--and scholars of art and performance--of our era. The center already

http://www.princeton.edu/ua/
administers the Hodder Fellowships, which bring to campus artists in the early stages of their careers to spend an academic year pursuing independent projects.

Princeton Atelier

Created in 1994 by Nobel laureate and the Robert F. Goheen Professor in the Humanities Emeritus Toni Morrison, the Princeton Atelier program brings professional artists to campus for intensive collaborative work with students and faculty. Guest artists select a project they want to explore in the company of students before developing it for the professional art world. Now offered under the auspices of the Lewis Center for the Arts, the Princeton Atelier attracts students studying engineering, molecular biology, politics, and architecture as well as the humanities and the arts. The Princeton Atelier provides students rare opportunities to work on creative projects alongside important emerging artists and acknowledged masters. Courses are open to all students by application and are generally offered in both the fall and spring semesters. Students receive general academic credit for Princeton Atelier seminars and frequently credit toward their work in the Programs in Visual Arts, Creative Writing, Musical Performance, Dance, and Theater. Princeton Atelier courses are listed in Course Offerings as ATL. For more information, please check the Lewis Center website.

Courses

ATL 494 Princeton Atelier (also THR 494)  Not offered this year LA

The Princeton Atelier brings guest artists from various fields to campus in order to collaborate with students and faculty on creating new work. The emphasis in the Atelier courses is on the creative process, although all courses result in some form of performance or exhibition. Courses are by application, audition, or portfolio review and are open to all students. Two three-hour seminars. Staff

ATL 495 Princeton Atelier  Not offered this year LA

The Princeton Atelier brings guest artists from various fields to campus in order to collaborate with students and faculty on creating new work. The emphasis in the Atelier courses is on the creative process, although all courses result in some form of performance or exhibition. Courses are by application, audition, or portfolio review and are open to all students. Two three-hour seminars. Staff

ATL 496 Princeton Atelier  Fall LA

This course brings together guest artists from different genres to collaborate with students and faculty in creating works that are then performed or exhibited on campus. Staff

ATL 497 Princeton Atelier  Not offered this year LA

The Princeton Atelier brings guest artists from various fields to campus in order to collaborate with students and faculty on creating new work. The emphasis in the Atelier courses is on the creative process, although all courses result in some form of performance or exhibition. Courses are by application, audition, or portfolio review and are open to all students. Two three-hour seminars. Staff

ATL 498 Princeton Atelier (also DAN 451)  Fall LA

The Princeton Atelier brings guest artists from various fields to campus in order to collaborate with students and faculty on creating new work. The emphasis in the Atelier courses is on the creative process, although all courses result in some form of performance or exhibition. Courses are by application, audition, or portfolio review and are open to all students. Two three-hour seminars. S. Marshall

ATL 499 Princeton Atelier (also THR 499)  Fall LA

This course brings together guest artists from different genres to collaborate with students and faculty in creating works that are then performed or exhibited on campus. Staff
Program in Linguistics

Director
Gideon A. Rosen

Executive Committee
Leonard H. Babby, Slavic Languages and Literatures
David M. Bellos, French and Italian, Comparative Literature
Robert A. Freidin, Council of the Humanities
Adele E. Goldberg, Council of the Humanities
Delia Graff Fara, Philosophy
Gilbert H. Harman, Philosophy
Joshua T. Katz, Classics
Sarah-Jane Leslie, Philosophy
Daniel N. Osherson, Psychology
Gideon A. Rosen, Philosophy
Edwin S. Williams III, Council of the Humanities

Sits with Committee
Christiane Fellbaum, Computer Science

Linguistics is the study of the distinctive properties of human language and the cognitive capacities of language users, including the rules that govern the structure of particular languages and the universal principles governing all languages. The basic areas of study include phonology (the study of the sound patterns of language), morphology (the study of the structure and meaning of words), syntax (the study of the structure of sentences), and semantics (the study of linguistic meaning). An understanding of these properties of human language provides a valuable analytic framework for students of language and literature, anthropology, computer science, philosophy, and psychology.

Students in the Program in Linguistics acquire the basic research tools for the formal study of language. Participants satisfy the requirements of their chosen departmental major and develop a complementary course of study in linguistics as outlined below.

Admission to the Program

The program is open to undergraduates majoring in any department. Students should meet with the program director, usually during the sophomore year, to apply to the program and plan a course of study. Applicants will be accepted on the basis of interest and a coherent academic plan.

Program of Study

The program of study will be approved by the program director. It will include completion of the following requirements:

1. Satisfactory completion of LIN 201 or an equivalent linguistics course by the end of fall term of the junior year.

2. Satisfactory completion of four additional courses from the list of linguistics courses and related courses available on the Program in Linguistics website. These four courses must include at least two core courses. The core courses are LIN 301 Phonetics and Phonology, LIN 302 Syntax, LIN 303 Linguistic Semantics, LIN 306 The Structure and Meaning of Words, and LIN 412 Advanced Syntax.

3. Completion of a senior thesis or comparable independent work in an area of the study of language. Some junior independent work in the study of language is strongly recommended.

Certificate of Proficiency

A student who fulfills the requirements of the program with satisfactory standing receives a certificate of proficiency in linguistics upon graduation.

Other Linguistics and Related Courses. Please consult the program's website for a list of related undergraduate courses in other departments. Other courses may be added to this list with the approval of the program director.

Courses

LIN 201 Introduction to Language and Linguistics (also ENG 241) Fall, Spring EC
Introduction to the scientific study and analysis of human language. Investigation of the mental representation of human language based on a formal analysis of linguistic structure (form, sound, and meaning)—including historical and social variation and the related issues of the acquisition of language, and the relation between language and the brain.
Two lectures, one preceptorial. R. Freidin, C. Anderson

LIN 212 Human Language: A User's Guide Fall EC
Where does language come from? How do we know that you can't say it that way? And who has the authority to tell you? Why are some sentences better than others? Why do the same words differently organized have different effects? This course is about human language, its nature, use, users, and origin, based primarily on English. Major topics include the structure of sentences, paragraphs, words; language and thought; and the historical and biological origins of language. Two 90-minute classes. R. Freidin

LIN 215 Linguistics and Language Acquisition (also PSY 215)  Not offered this year EC

What does it mean to know a language? Is it something we learn or something the brain "grows?" What aspects of language are innate? Is parents' speech important in language learning? An examination of the properties of child language through the lens of current linguistic theory. Two 90-minute classes. Staff

LIN 216 Language, Mind, and Brain (also PSY 216)  Not offered this year EC

This course examines the complex mental and neurological processes that underlie linguistic knowledge and behavior. It will be concerned with the precise description and measurement of language activity, with its governing principles, and with available indices for the associated neural computations and their location in the brain. Seminar. Staff

LIN 217 Law, Language, and Cognition (also PSY 217)  Fall SA

During the past half century, enormous strides have been made by linguists, philosophers, and cognitive psychologists in coming to an understanding of the human language faculty. Some of this progress has direct implications for the legal system. This course is designed to study some of the most interesting of these interactions. In particular, it will ask how this learning should cause us to question some of the tacit assumptions about language that are embedded in the law, and how knowledge about the human language faculty can bear directly on the resolution of disputes within the legal system. Two 90-minute seminars. L. Solan

LIN 270 African American English and Syntactic Variation (also AAS 230)  Fall EC

This introductory course considers empirical data from African American English (AAE) in addressing ways that formal approaches in linguistics can account for inter- and intra-speaker variation in the dialect. This course will be in three parts: (1) a general overview of linguistic variation and a review of traditional approaches to the study of variation in AAE; (2) an exploration of the ways variation in AAE and other English dialects can be analyzed using methods in syntax; and (3) an examination of the ways in which AAE-speaking children learn the linguistic variations in their speech communities. Two 90-minute classes. L. Green

LIN 301 Phonetics and Phonology  Not offered this year EC

The analysis of sound patterns of human languages. Examination of articulatory phonetics as incorporated into a system of phonological rules accounting for these patterns. Survey of basic concepts and relations including levels of representation (phonetic versus phonemic), types and ordering of rules, and phonological change. Three classes. Prerequisite: 201 or instructor's permission. Staff

LIN 302 Syntax  Fall EC

Methods of syntactic analysis of natural language (primarily English, with brief consideration of other languages). Foundations of a theory of generative grammar, covering phrase structure, transformations, and conditions on rules and representations. The general principles of syntactic structure that determine the form and interpretation of sentences are a major focus. Two 90-minute classes. Prerequisite: 201 or instructor's permission. E. Williams

LIN 303 Linguistic Semantics  Not offered this year EC

The central issues and leading theories of linguistic semantics for natural languages. Analyses of specific linguistic phenomena will be used to illustrate the interaction of syntax and semantics, the relation between language and the world, and the role of linguistic meaning in communication and understanding. Prerequisite: 201 or instructor's permission. Staff

LIN 306 The Structure and Meaning of Words  Spring EC

The structure of words and the overall lexicon for human languages. Topics include word formation rules; the relation between syntax and the lexicon; the psychology of the lexicon, especially word storage and access; the semantics of complex words; the phonology of word formation; lexical redundancy and the learning of the lexicon. Two 90-minute classes. Prerequisite: 201 or instructor's permission. E. Williams

LIN 307 Language and Information  Fall, Spring EC

Intonation is used in a language like English for several purposes. Different intonation contours signal different sentence types--questions, for example, have systematically different "tunes" from declarative statements, as do rebuttals, heges, and other speech-act types. In addition, the placement of the intonation nucleus signals what is new and what is old information, as in the difference between "JOHN died" and "John DIED." The course explores the principles of phonology, syntax, semantics and discourse structure that constitute our present understanding of such phenomena, both in English and across different language types. E. Williams

LIN 308 Bilingualism (also TRA 303)  Fall EC

The linguistic, psycholinguistic, neurolinguistic, and sociolinguistic aspects of bilingualism. The course examines language acquisition in monolingual and bilingual children, the notion of "critical age" for language acquisition, definitions and measurements of bilingualism, and the verbal behavior of bilinguals such as code-switching. It considers the effects of bilingualism on other cognitive domains, including memory, and examine neurolinguistic evidence comparing the brains of monolinguals and bilinguals. Societal and governmental attitudes toward
bilingualism in countries like India and the U.S. are contrasted. Two 90-minute classes. C. Fellbaum

LIN 309 Psychology of Language (see PSY 309)  

LIN 340 History of Modern Syntactic Thought  Fall EC  
The history of syntactic theory from Chomsky's *Syntactic Structures* (1957) to the present, examining the evolution of mechanisms and principles of syntactic analysis, their empirical and conceptual motivation. Topics include phrase structure and transformations; constraints on rules and representations; the role of the lexicon; how syntactic structure intersects with interpretation, especially with anaphora. This course charts the shift in focus from complex language-specific grammatical rules to simple abstract grammatical mechanisms whose behavior is governed by general principles that apply across languages. R. Freidin

LIN 360 Linguistic Universals and Language Diversity  Fall EC  
Linguistic theory accounts for what the grammars of all human languages share in common (linguistic universals) and the ways they differ (language diversity). The universality and diversity of syntactic subject, topic, voice, case, word order, and of constructions involving causatives, nonfinite verbal categories, relative clauses, and impersonal sentences. Two 90-minute classes. L. Babby

LIN 412 Advanced Syntax  Fall EC  
Development of a modular theory of grammar involving subtheories of case, government, predicate/argument structure, and binding. Investigation of parametric variation across languages for principles of grammar. Two 90-minute classes. R. Freidin

LIN 435 Advanced Semantics (also PHI 435)  Fall EC  
Advanced issues in linguistic semantics. Topics will include quantification, vagueness, presupposition, implicature, genericity, information structure, and event structure. E. Williams, G. Harman
Program in Materials Science and Engineering

Director
James C. Sturm

Program Committee
Craig B. Arnold, Mechanical and Aerospace Engineering
Robert H. Austin, Physics
Jay B. Benziger, Chemical and Biological Engineering
Andrew B. Bocarsly, Chemistry
Claire F. Gmachl, Electrical Engineering
Mikko P. Haataja, Mechanical and Aerospace Engineering
George W. Scherer, Civil Engineering and Environmental Engineering
Winston O. Soboyejo, Mechanical and Aerospace Engineering
James C. Sturm, Electrical Engineering

The certificate Program in Materials Science and Engineering is offered by the Princeton Institute for the Science and Technology of Materials (PRISM) and its nine affiliated departments. The program emphasizes the multidisciplinary nature of the study of materials and the engineering application of their properties. The program is designed for students in science and engineering departments who are considering careers that will include the exploration and exploitation of materials. Participants in the program will take courses in their own department together with a group of materials courses chosen from a selected list offered by the participating departments. Satisfactory completion of the program is recognized by the award of a certificate in materials upon graduation.

Admission to the Program

Admission to the program normally occurs during the sophomore year. Students are expected to have satisfactorily completed a freshman year program that would permit them to enter one of the participating departments. Departments that are currently participating in the certificate program are: chemical engineering, chemistry, civil and environmental engineering, electrical engineering, geosciences, mechanical and aerospace engineering, molecular biology, operations research and financial engineering, and physics. Application for admission can be obtained from the undergraduate coordinator. Upon acceptance into the program, the director of undergraduate studies assists students in planning a program of study and research that emphasizes the multidisciplinary nature of the materials arena.

Program of Study

Participants in the program will satisfy the degree requirements for their department as well as the course and independent work requirements for the program. A coherent course of study will be developed in conjunction with the program adviser and the departmental representative and will include materials courses outside the student's department. The program will be designed to expand the student's knowledge of topics essential for the understanding of materials beyond that normally encountered in a single department. In some cases, courses meeting the program requirements will also satisfy the regular requirements of the student's department. Specific program requirements are listed below.

Program Requirements

All program students must take:

1. One year of general physics (PHY 103, 104, or 105, 106), one term of general chemistry with a laboratory (CHM 201, 202, or 207), one year of mathematics, and a course in thermodynamics, such as CHÉ 246, MAE 221, CHM 306, or PHY 301. In addition, a course in quantum mechanics is recommended.

2. One core course in materials (selected from the following options: MSE 301, CEE 364, and MAE 324) and a course in experimental methods, MSE 302, or CHM 371.

3. Three additional program-approved courses at or above the 200 level, one of which must be from a department different from that in which the student is concentrating.

4. A two-semester senior thesis on a materials topic approved by the program committee.

To remain a member of the program in good standing, students must maintain at least a B- average in their technical subjects. To be awarded the program certificate upon graduation, students must achieve a minimum grade average of B- in program courses. Program courses may not be taken on a pass/D/fail basis.

Courses

MSE 301 Materials Science and Engineering  Spring
An introduction to the structure and properties of important current and future materials, including metals, semiconductors, and polymers from an atomic and molecular perspective. Emphasis will be placed on the phase
behavior and processing of materials, and on how structures in these materials impact their macroscopic physical, electrical, and thermal properties. Three lectures. L. Loo

MSE 302 Laboratory Techniques in Materials Science and Engineering  Fall ST

Laboratory techniques and structure property relationships in materials. The course includes lectures on the fundamentals and modern applications of materials science, from electrical and mechanical properties to electron microscopy, nanotechnology, polymers, and biomaterials. Corresponding laboratory sessions introduce students to techniques for modification of structure, properties, and function at different length scales. Critical practice in scientific writing, oral presentation, and literature analysis will be featured. Prerequisite: 301 or equivalent. Two 90-minute lectures, one laboratory. M. McAlpine

MSE 440 Advanced Mineralogy (see GEO 440)
### Department of Mathematics

**Chair**  
Sun-Yung Alice Chang

**Associate Chair**  
Christopher M. Skinner

**Departmental Representative**  
Christopher M. Skinner

**Director of Graduate Studies**  
David Gabai  
Anna Wienhard

**Professor**  
Michael Aizenman, also Physics  
Manjul Bhargava  
William Browder  
A. Robert Calderbank, also Electrical Engineering, and Applied and Computational Mathematics  
Sun-Yung Alice Chang  
John H. Conway  
Ingrid C. Daubechies, also Applied and Computational Mathematics  
Weinan E, also Applied and Computational Mathematics  
Charles L. Fefferman  
David Gabai  
Robert C. Gunning  
Alexandru D. Ionescu  
Nicholas M. Katz  
Sergiu Klainerman  
Simon B. Kochen  
János Kollár  
Elliott H. Lieb, also Physics  
John N. Mather  
Edward Nelson  
Andrei Okounkov  
Rahul V. Pandharipande  
Igor Y. Rodnianski  
Peter C. Sarnak  
Paul D. Seymour, also Applied and Computational Mathematics  
Yakov G. Sinai  
Christopher M. Skinner  
Elias M. Stein  
Zoltán Szabó  
Gang Tian  
Andrew J. Wiles  
Paul C. Yang

**Assistant Professor**  
Dmitry Belyaev  
Szua-Yu Chen  
Rupert Frank  
Michael Z. Hochman  
Sergey Norin  
Choonghong Oh  
Arieh Salehi Golsefidy  
Manjul Bhargava  
William Browder  
A. Robert Calderbank, also Electrical Engineering, and Applied and Computational Mathematics  
Sun-Yung Alice Chang  
John H. Conway  
Ingrid C. Daubechies, also Applied and Computational Mathematics  
Weinan E, also Applied and Computational Mathematics  
Charles L. Fefferman  
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Simon B. Kochen  
János Kollár  
Elliott H. Lieb, also Physics  
John N. Mather  
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Andrei Okounkov  
Rahul V. Pandharipande  
Igor Y. Rodnianski  
Peter C. Sarnak  
Paul D. Seymour, also Applied and Computational Mathematics  
Yakov G. Sinai  
Christopher M. Skinner  
Elias M. Stein  
Zoltán Szabó  
Gang Tian  
Andrew J. Wiles  
Paul C. Yang

**Senior Lecturer**  
Jennifer M. Johnson

**Associated Faculty**  
John P. Burgess, Philosophy  
René A. Carmona, Operations Research and Financial Engineering  
Bernard Chazelle, Computer Science  
Erhan Çinlar, Operations Research and Financial Engineering  
Philip J. Holmes, Mechanical and Aerospace Engineering  
Yannis G. Kevrekidis, Chemical and Biological Engineering  
William Massey, Operations Research and Financial Engineering  
Frans Pretorius, Physics  
Robert E. Tarjan, Computer Science  
Robert J. Vanderbei, Operations Research and Financial Engineering  
Sergio Verdú, Electrical Engineering

### Information and Departmental Plan of Study

The usual underclass sequences for mathematics courses are 103-104-201-202, which emphasizes applications, or 103-104-203-204, which provides a mixture of theory and application. For students who are not prepared to begin with 103 there is a two-semester sequence, 101-102, providing an introduction to calculus, which may be followed by 104 and higher courses. For economics majors who wish to take only one semester of sophomore-level mathematics, there is a sequence 103-104-200; however those students who may wish to continue with 300-level mathematics courses should not take this option.

For students with a very high aptitude in mathematics there are honors courses: 211, 214, 215, 217, and 218. Prospective majors are required to take at least one course introducing them to formal mathematical arguments and rigorous proofs; 211 provides this introduction through analysis-based applied mathematics, 214 through number theory, and 215 through one-variable analysis. Students need take only one of these three courses, but those not

http://www.princeton.edu/ua/
planning to become mathematics majors are encouraged to take more than one. Those students who have taken 211 or
215 follow this by 204 or 217, for linear algebra, and 218 or 203, for multivariable calculus (211 students need
instructor approval for 218). Those students who have taken 214 follow this by 203, for multivariable calculus, and
217 or 204, for linear algebra. The courses in 203 and 204 may be taken in either order.

Placement. Students with little or no background in calculus are initially placed in 103, or in 101 if their SAT
(mathematics aptitude) test scores indicate that they have insufficient preparation for 103. To qualify for placement in
104 a student should score either a 4 or better on the AB Advanced Placement Examination or should have completed
a year of high school calculus and scored 700 or better on the SAT (mathematics aptitude) test. To qualify for
placement into 200 or 201 a student should have a 4 or better on the BC Advanced Placement Examination. To place
into 203 a 4 on the BC Advanced Placement Examination and a 750 on the SAT (mathematics aptitude) test are
required. Students who have a very strong mathematics aptitude and achieve a 5 on the AB or BC Advanced Placement
Examination and 760 or better on the SAT (mathematics aptitude) test qualify for placement into 215 or 214.

Advanced Placement

One unit of advanced placement credit is granted when a student is placed in MAT 104. Two units of advanced
placement credit are granted when a student is placed in MAT 201, 203, or 217.

Prerequisites

Except in unusual circumstances, admission to the department requires the student to take, before the junior year, one
course from 211, 214, or 215, one course from 217 or 204, and one course from 218 or 203. Prospective mathematics
majors should consult their mathematics instructors or the departmental representative about their programs as early as
possible, particularly if they enter with advanced placement, and should plan their program from the honors sequence if
possible.

Program of Study

Students concentrating in mathematics must complete the following requirements:

1. one course in real analysis: 303, 304, 314, 330, 332, 350, 390, or a more advanced course;
2. one course in complex analysis: 317, 331, or a more advanced course;
3. one course in algebra: 322, 323, or a more advanced course;
4. either one course in geometry (325, 326, 327, 328, or a more advanced course), or alternatively one course in
discrete mathematics (306, 307, or 308);
5. a choice of an additional four courses at the 300 level or higher to be counted as "departmental courses." Up to three
of these may be cognate courses outside the mathematics department, with permission from the departmental
representative; the remainder are upper-division courses in the mathematics department.

The departmental grade, the average grade on the eight departmental courses, together with grades and reports on
independent work are the basis on which honors and prizes are awarded on graduation.

Students should refer to Course Offerings [http://registrar.princeton.edu/course-offerings/] to check which courses
are offered in a given term. Programs of study in various fields of pure and applied mathematics are available.

Appropriate plans of study may be arranged for students interested in numerical analysis, discrete mathematics,
optimization, physics, the biological sciences, probability and statistics, finance, economics, or computer science. For
students interested in these areas, a coherent program containing up to three courses in a cognate field may be
approved. The mathematics courses must include the three courses required for the departmental students. For
example, some students may be interested in combining work in computer science with a major in mathematics. For
those interested in theoretical computer science, a suitable group of courses would be MAT 302, 306, 314, and 317 and
COS 423, 487, and 524. For those students interested in applications, COS 217, 318, and 320 would be suitable. COS
425, 426, and 506 would also be appropriate for a mathematics major with an emphasis on computer science.

Excellent computing facilities are available to all students through the University Computing Center and in Fine Hall.

Independent Work

All departmental students engage in independent work, which is supervised by a member of the department chosen in
consultation with a departmental adviser. The independent work of the junior year generally consists of participating
actively in a junior seminar, but may alternatively consist of reading in a special subject, e.g., a topic in Fourier
analysis, representation theory, or Galois theory, and writing a paper based on that reading. The independent work in
the senior year centers on writing a senior thesis.

Senior Departmental Examination

Each senior takes an oral examination based on the senior thesis and the broader subfield to which it contributes. A
departmental committee conducts the examination in May.

Courses

http://www.princeton.edu/ua/
MAT 101 Calculus Fall
Basic concepts and methods of the differential and integral calculus of elementary functions of one variable, including a review of the necessary techniques from algebra, analytic geometry, and trigonometry. Emphasis on intuitive and graphical understanding, illustrated by problems in many fields. Three classes. Staff

MAT 102 Calculus Fall, Spring QR
Continuation of the differential and integral calculus of elementary functions in one variable, including applications. Three classes. S. Kochen

MAT 103 Calculus Fall QR
Basic concepts, methods, and applications of differential and integral calculus of elementary functions of one variable. Three classes. Staff

MAT 104 Calculus Fall, Spring QR
Further techniques and applications of differential and integral calculus. Sequences and series, including Taylor's series with remainder. Complex numbers and functions. Elementary differential equations. Three classes. Prerequisite: 102 or 103 or one term's advanced placement. Staff

MAT 191 An Integrated Introduction to Engineering, Mathematics, Physics (see EGR 191)
MAT 192 An Integrated Introduction to Engineering, Mathematics, Physics (see EGR 192)
MAT 193 An Integrated Introduction to Engineering, Mathematics, Physics (see EGR 193)
MAT 199 Math Alive (see APC 199)

MAT 200 Linear Algebra and Multivariable Calculus for Economists Fall, Spring QR
This course provides the student with the foundations to pursue studies in economic analysis. Topics include: systems of linear equations, matrices, determinants, Gaussian elimination, Euclidean space, differential vector calculus, the implicit function theorem, quadratic forms, and first- and second-order conditions for unconstrained and constrained optimization. The course stresses the computational aspects of these principles. Three classes. Prerequisite: 104 or instructor's permission. Staff

MAT 201 Multivariable Calculus Fall, Spring QR
Vectors in the plane and in space, vector functions and motion, surfaces, coordinate systems, functions of two or three variables and their derivatives, maxima and minima and applications, double and triple integrals, vector fields, and Stokes's theorem. Three classes. Prerequisite: 104, 217, or instructor's permission. A. Cannas da Silva

MAT 202 Linear Algebra with Applications Fall, Spring QR
Euclidean spaces, vector spaces, systems of linear equations, matrices and linear transformations, determinants, eigenvalues and applications to systems of differential equations, symmetric matrices, and quadratic forms. Differentiable vector functions, the chain rule, inverse and implicit functions, maxima and minima. Three classes. Prerequisite: 201, 203, or instructor's permission. J. Johnson

MAT 203 Advanced Multivariable Calculus Fall, Spring QR
Calculus of vector functions in space, gradients, chain rule, curvilinear coordinates, multiple integrals, Stokes' theorem, and applications. Emphasis on both theoretical aspects and problem solving. Recommended for mathematically inclined scientists and engineers. Three classes. Prerequisite: 104 or 217. Staff

MAT 204 Advanced Linear Algebra with Applications Fall, Spring QR
Vector spaces, linear transformations, matrices, determinants and systems of linear equations, eigenvalues, inner product spaces, symmetric matrices, and quadratic forms. Applications to calculus in n-dimensional space and systems of differential equations. Three classes. Prerequisite: 203. C. Sorensen

MAT 214 Numbers, Equations, and Proofs QR
An introduction to classical number theory to prepare for higher-level courses in the department. Topics include Pythagorean triples and sums of squares, unique factorization, Chinese remainder theorem, arithmetic of Gaussian integers, finite fields and cryptography, arithmetic functions, and quadratic reciprocity. There will be a topic from more advanced or more applied number theory, such as p-adic numbers, cryptography, and Fermat's Last Theorem. This course is suitable both for students preparing to enter the mathematics department and for nonmajors interested in exposure to higher mathematics. Three classes. S. Norin

MAT 215 Analysis in a Single Variable Fall, Spring QR
An introduction to the mathematical discipline of analysis, to prepare for higher-level course work in the department. Topics include the rigorous epsilon-delta treatment of limits, convergence, and uniform convergence of sequences and series. Continuity, uniform continuity, and differentiability of functions. The Heine-Borel theorem, the Riemann integral, conditions for integrability of functions and term by term differentiation and integration of series of functions, Taylor's theorem. Three classes. J. Conway

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MAT 217 Honors Linear Algebra  Fall, Spring QR

A rigorous course in linear algebra with an emphasis on proof rather than applications. Topics include vector spaces, linear transformations, inner product spaces, determinants, eigenvalues, the Cayley-Hamilton theorem, Jordan form, linear systems of differential equations, the spectral theorem for normal transformations, bilinear and quadratic forms. Three classes. R. Pandharipande

MAT 218 Analysis in Several Variables  Fall, Spring QR

A rigorous course in analysis with an emphasis on proof rather than applications. Topics include metric spaces, completeness, compactness, total derivatives, partial derivatives, inverse function theorem, implicit function theorem, Riemann integrals in several variables, Fubini's theorem, change of variables theorem, and the theorems of Green, Gauss, and Stokes. Three classes. Prerequisites: 215 and 217, or instructor's permission. Staff

MAT 301 Mathematics in Engineering I (see MAE 305)

MAT 302 Mathematics in Engineering II (see MAE 306)

MAT 303 Ordinary Differential Equations  Fall QR

Introduction to the study of ordinary differential equations; explicit solutions, general properties of solutions, and applications. Topics include linear equations with constant coefficients, the Laplace transform, separation and comparison theorems, power series solutions, matrix methods, and stability theorems. Three classes. Prerequisite: 202, 204, or 217. Staff

MAT 304 Introduction to Partial Differential Equations  QR

Introduction to the techniques necessary for the formulation and solution of problems involving partial differential equations in the natural sciences and engineering, with detailed study of the heat and wave equations. Topics include method of eigenfunction expansions, Fourier series, the Fourier transform, inhomogeneous problems, the method of variation of parameters. Three classes. Prerequisite: 202, 204, or 218. J. Mather

MAT 305 Mathematical Programming  Fall QR

Linear programs, duality, Dantzig's simplex method; theory of dual linear systems; matrix games, von Neumann's minimax theorem, simplex solution; algorithms for assignment, transport, flow; brief introduction to nonlinear programming. Three classes. Prerequisite: 202, 204, or 217. Staff

MAT 306 Introduction to Graph Theory (also COS 342)  Spring QR

The fundamental theorems and algorithms of graph theory. Topics include: connectivity, matchings, graph coloring, planarity, the four-color theorem, extremal problems, network flows, and related algorithms. Prerequisite: 202, 204, or 217, or instructor's permission. Three classes. P. Seymour

MAT 307 Combinatorial Mathematics (also APC 307)  Fall

Introduction to combinatorics, a fundamental mathematical discipline and an essential component of many mathematical areas. While basic combinatorial results were at first obtained by ingenuity and detailed reasoning, modern theory has grown out of this early stage and often relies on deep, well-developed tools. Covers several important areas and techniques such as Ramsey Theory, Turan Theorem and Extremal Graph Theory, Probabilistic Argument, Algebraic Methods and Spectral Techniques. Showcases the gems of modern combinatorics. Two 90-minute classes. R. Calderbank, J. Fox

MAT 308 Theory of Games (also ECO 318)  Spring

Games in extensive form, pure and behavioral strategies; normal form, mixed strategies, equilibrium points; coalitions, characteristic-function form, imputations, solution concepts; related topics and applications. Three classes. Prerequisite: 305 or instructor's permission. Offered in alternate years. G. Todorov

MAT 309 Probability and Stochastic Systems (see ORF 309)

MAT 310 Mathematical Statistics

The statistical problems of estimation, testing, and decision making will be formulated theoretically, especially in those situations where optimal solutions exist. Conventional and Bayesian methods will be compared. Broadening the usual assumptions leads to robust methods of estimation and testing. Three classes. Prerequisite: 309. Staff

MAT 311 Introduction to Modern Applied Mathematics  Spring QR

Classical topics blended with modern topics involving numerical methods and discrete mathematics, including both theory and application. Symmetric linear equations, Fourier series and Laplace's equation, initial value problems, design and stability of difference methods, conjugate gradients, combinational optimization and network flows. Three classes. Staff

MAT 312 Mathematical Logic  Spring QR

A development of logic from the mathematical viewpoint, including propositional and predicate calculus, consequence and deduction, truth and satisfaction, the Gödel completeness, and incompleteness theorems. Applications to model theory, recursion theory, and set theory as time permits. Three classes. Some underclass background in logic or in mathematics is recommended. Staff

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MAT 313 Advanced Logic (see PHI 323)

MAT 314 Introduction to Real Analysis  Fall QR

Introduction to analysis of n-dimensional space, the Riemann-Stieltjes integral, Lebesgue theory of measure and integration on the line, Fourier series. Three classes. Prerequisite: 218, or 204 and 215, or permission of instructor.  Staff

MAT 317 Complex Analysis with Applications  Fall, Spring QR

Study of functions of a complex variable, with emphasis on techniques and applications. Analytic functions and complex integration, power series, residues with applications to evaluation of integrals, and conformal mapping. Three classes. Prerequisite: 202, 204, or 218.  J. Streets

MAT 322 Algebra with Galois Theory  Fall QR

Group theory, field extensions, splitting fields, the main theorem of Galois theory, cyclotomic extensions, Kummer extensions, solvability by radicals. Two 90-minute classes. Prerequisites: 202, 204, or 217.  Staff

MAT 323 Algebra  Fall QR

Group theory: subgroups and quotient groups, examples including permutation groups and linear groups, and the Sylow theorems. Ring theory: ideals, fields of quotients, congruences, Fermat's theorem, modules over principal domains or Euclidean rings; applications to coding theory. Two 90-minute classes. Prerequisite: 202, 204, or 217.  R. Calderbank

MAT 325 Topology  Spring QR

Introduction to point-set topology; the characterization and properties of topological spaces, and the study of the fundamental group of a space and of covering spaces. Three classes. Prerequisite: 202, 204, or 218.  Staff

MAT 326 Algebraic Topology  Fall

Study of homology and homotopy groups of topological spaces, and of selected topics in algebraic topology. Three classes. Prerequisites: MAT 322 or MAT 323, and MAT 325.  Staff

MAT 327 Introduction to Differential Geometry  Fall QR

Differential geometry of curves and surfaces in three-dimensional space. Intrinsic geometry, geodesics, curvature, Gauss-Bonnet theorem. Three classes. Prerequisite: 202, 204, or 218. Offered in alternate years.  Staff

MAT 328 Differential Geometry  Spring QR

Manifolds, vector bundles, geometric structures, Riemann geometry and applications. Prerequisite: 327.  Staff

MAT 330 Analysis I: Fourier Series and Partial Differential Equations

Basic facts about Fourier Series, Fourier Transformations, and applications to the classical partial differential equations will be covered. Also Fast Fourier Transforms, Finite Fourier Series, Dirichlet Characters, and applications to properties of primes. Prerequisites: 215, 218, or permission of instructor. Three classes.  S. Klainerman

MAT 331 Analysis II: Complex Analysis

Study of functions of a complex variable, with emphasis on interrelations with other parts of mathematics. Cauchy's theorems, singularities, contour integration, power series, infinite products. The gamma and zeta functions and the prime number theorem. Elliptic functions, theta functions, Jacobi's triple product and combinatorics. An overall view of Special Functions via the hypergeometric series. This course is the second semester of a four-semester sequence, but may be taken independently of the other semesters. Prerequisites: 215, 218, or permission of instructor. Three classes.  Staff

MAT 332 Analysis III: Integration Theory and Hilbert Space  Spring

The theory of Lebesgue integration in n-dimensional space. Differentiation theory. Hilbert space theory and applications to Fourier Transforms, and partial differential equations. Introduction to fractals. This course is the third semester of a four-semester sequence, but may be taken independently of the other semesters. Prerequisites: 215, 218, or permission of instructor. Three classes.  Staff

MAT 350 Introduction to Differential Equations (see APC 350)

MAT 351 Topics in Mathematical Modeling (also APC 351)  Fall QR

Draws on problems from the sciences and engineering for which mathematical models have been developed to describe, understand, and predict natural and man-made phenomena. Topics vary from year to year, ranging over the physical sciences and biology, including cognitive science and neurobiology. Model-building strategies are described, including level of detail and selection of appropriate mathematical "languages." Analytical and computational results and their implications are described and the question of how applications motivate mathematical developments is addressed. Two 90-minute classes.  P. Holmes

MAT 390 Probability Theory  QR

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Sequence of independent trials, applications to number theory and analysis, Monte Carlo method. Markov chains, ergodic theorem for Markov chains. Entropy and McMillan theorem. Random walks, recurrence and non-recurrence; connection with the linear difference equations. Strong laws of large numbers, random series and products. Weak convergence of probability measures, Weak Helly theorems, Fourier transforms of distributions. Limit theorems of probability theory, percolation theory. Two 90-minute lectures. Prerequisite: 203, 218, or instructor's permission. Y. Sinai

MAT 391 Random Processes

Wiener measure. Stochastic differential equations. Markov diffusion processes. Linear theory of stationary processes. Ergodicity, mixing, central limit theorem for stationary processes. If time permits, the theory of products of random matrices and PDE with random coefficients will be discussed. Two 90-minute lectures. Prerequisite: 390. Y. Sinai

MAT 407 Mathematical Methods of Physics (see PHY 403)

MAT 424 Topics in Algebra   Spring

Selected topics such as: algebraic number theory, algebraic geometry, Noetherian rings, Wedderburn theory, representations of finite groups. Three classes. Prerequisite: MAT 322 or MAT 323. Č. Skinner

MAT 433 Analysis IV: Special Topics in Analysis

Selected topics in analysis. Course content may vary from year to year. Topics may include complex variables, Hilbert Space Theory, basic partial differential equations. Prerequisites: 331 and 332, or permission of instructor. Two 90-minute classes. J. Mather

MAT 443 Cryptography (see COS 433)

MAT 447 Theory of Computation (see COS 487)

MAT 448 Introduction to Nonlinear Dynamics (see CBE 448)

MAT 451 Advanced Topics in Analysis

Topics in analysis selected from areas such as functional analysis, operator theory, and harmonic analysis. Content varies from year to year. Three classes. Prerequisite 314 or instructor's permission. E. Lieb

MAT 452 Advanced Topics in Analysis

Topics in analysis selected from areas such as functional analysis, operator theory, and harmonic analysis. Content varies from year to year. Three classes. Prerequisite 314 or instructor's permission. I. Daubechies

MAT 453 Advanced Topics in Algebra   Fall

Topics in algebra selected from areas such as the analytic and algebraic theory of numbers and algebraic geometry. Three classes. Prerequisite: MAT 322 or MAT 323. Staff

MAT 454 Advanced Topics in Algebra

Topics in algebra selected from areas such as the analytic and algebraic theory of numbers and algebraic geometry. Three classes. Prerequisite: MAT 322 or MAT 323. N. Katz

MAT 455 Advanced Topics in Geometry

Topics in geometry selected from areas such as differentiable and Riemannian manifolds, point set and algebraic topology, integral geometry. Three classes. Prerequisite: departmental permission. J. Mather

MAT 456 Advanced Topics in Geometry

Topics in geometry selected from areas such as differentiable and Riemannian manifolds, point set and algebraic topology, integral geometry. Three classes. Prerequisite: departmental permission. Staff
Department of Mechanical and Aerospace Engineering

Chair
Alexander J. Smits

Departmental Representative
Michael G. Littman

Director of Graduate Studies
N. Jeremy Kasdin

Professor
Garry L. Brown
Emily A. Carter, also Applied and Computational Mathematics
Edgar Y. Choueiri
Frederick L. Dryer
Philip J. Holmes
N. Jeremy Kasdin
Chung K. Law
Naomi E. Leonard
Michael G. Littman
Richard B. Miles
Alexander J. Smits
Winston O. Soboyejo
Robert H. Socolow
Robert F. Stengel

Howard A. Stone
Szymon Suckewer

Associate Professor
Craig B. Arnold
Yiguang Ju
Luigi Martinelli
Daniel M. Nosenchuck
Clarence W. Rowley

Assistant Professor
Alexander Glaser, also Woodrow Wilson School
Mikko P. Haataja
Michael C. McAlpine

Lecturer with Rank of Professor
Marlan O. Scully

Associated Faculty
Ilhan Aksay, Chemical and Biological Engineering
Nathaniel Fisch, Astrophysical Sciences
Jean-Hervé Prévost, Civil and Environmental Engineering
George W. Scherer, Civil and Environmental Engineering
David N. Spiegel, Astrophysical Sciences
Salvatore Torquato, Chemistry

Information and Departmental Plan of Study

The Department of Mechanical and Aerospace Engineering recognizes that students may have a variety of career objectives. Some may intend to enter industry directly in an engineering capacity or to continue studies in graduate school in engineering or applied science. Others may wish to take an engineering program in preparation for careers in business, law, or medicine. The department offers sufficient flexibility to students planning an undergraduate program that meets any of these objectives and builds a foundation of engineering disciplines and associated problem-solving skills. The disciplines of solid and fluid mechanics, thermodynamics, dynamics, control systems, materials, and applied mathematics, combined with the experience of engineering design, are the core of the department's curriculum. Both the mechanical and aerospace engineering programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone (410) 347-7700.

General Requirements

Requirements for study in the department follow the general requirements for the School of Engineering and Applied Science. In addition, the following four courses and one laboratory are normally completed by departmental students before entry into the junior year.

Mechanical and Aerospace Engineering

206 Introduction to Engineering Dynamics
221 Thermodynamics
222 Mechanics of Fluids
223 Modern Solid Mechanics
224 Integrated Engineering Science Laboratory

All of the above can be satisfied by equivalent courses. For example, students with an interest in structures may take CEE 205 Mechanics of Solids in place of MAE 223; and students with an interest in engineering physics may take PHY 205 Classical Mechanics or PHY 207 Mechanics and Waves in place of MAE 206.

Each departmental student will learn practical electronics in the MAE 224 laboratory.

Departmental Requirements

In order to qualify for graduation each departmental student must satisfactorily complete the following:

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I. Two upper-level courses involving applications of mathematics
   A. One of these must be a course in ordinary differential equations: MAE 305 Mathematics in Engineering I
   B. The other must be a course in matrix analysis and finite-element methods: MAE 325 Structural Analysis and Introduction to Finite-Element Methods (see CEE 361)

II. Eight upper-level departmental courses
   A. Among these are engineering science courses selected from the following list:

   **Dynamics and Control**
   - 331 Aircraft Flight Dynamics
   - 341 Space Flight
   - 433 Automatic Control Systems
   - 434 Modern Control

   **Fluid Mechanics/Thermal Sciences**
   - 328 Energy for a Greenhouse-Constrained World
   - 335 Fluid Dynamics
   - 336-552 Viscous Flows--Viscous Flows and Boundary Layers
   - 423 Heat Transfer
   - 426 Rocket and Air-Breathing Propulsion Technology
   - 427 Energy Conversion and the Environment: Transportation Applications

   **Materials/Structures**
   - 324 Structure and Properties of Materials
   - 334 Materials Selection and Design
   - MSE 301 Materials Science and Engineering
   - CEE 362 Structural Dynamics and Earthquake Engineering

   B. A minimum of three courses must be in the area of engineering design. At least two of these must be selected from the following list:

   - 321 Engineering Design (required for all students)
   - 322 Mechanical Design (required for mechanical engineering or 412)
   - 332 Aircraft Design (required for aerospace engineering or 342)
   - 342 Space System Design (required for aerospace engineering or 332)
   - 412 Microprocessors for Measurement and Control (required for mechanical engineering or 322)

III. All students are required to participate in a self-directed research or engineering project. (See Independent Work below.)

The remainder of the 36 courses required for the B.S.E. may be chosen from a wide variety of options. At least seven of these must be in the humanities or social sciences, as required by the School of Engineering and Applied Science. The rest of the courses may be used to pursue a specialty within the department, combine studies with another department, follow one of the topical program curricula, or further expand studies within the humanities or social sciences.

Each student’s program is planned individually in consultation with the class adviser. Suggested plans of study for each of the programs in the department are available from the departmental representative.

**Program of Study**

The department offers two programs of study: mechanical engineering and aerospace engineering. These programs draw on courses in the underlying fundamental sciences and mathematics during the first year, which lead to broad introductory engineering science courses during the second year, where students are introduced to the creative application of this knowledge to the solution of technical problems. Aspects of engineering design, the process of devising a system to meet a need, are introduced to the student through laboratories in the second year and continue through the upperclass years. During the third year all students take a two-semester design sequence as well as further engineering science courses dealing with analysis and application in the areas of energy sources and power systems, structures, aerodynamics and flow systems, and the dynamics of machines and their control. The introduction of design during the third year combined with further depth in engineering science, enables students to undertake realistic design projects during their senior year. The programs are designed to prepare the graduate for an engineering career and give him or her the ability to continue to grow professionally.

**Mechanical Engineering.** This program deals with the analysis and design of machines, their motion, power sources, and control. The curriculum is based on dynamics, thermodynamics, and the study of the structure and behavior of fluid and solid materials; it is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone (410) 347-7700. Students are exposed to the process of engineering design through 321 Engineering Design, 322 Mechanical Design, or 412 Microprocessors for Measurement and Control, and one additional design elective.

All mechanical engineering students must take:

- 423 Heat Transfer or 335 Fluid Dynamics and
433 Automatic Control Systems
and a mathematics elective normally selected from the following list:

**Mechanical and Aerospace Engineering**

306 Mathematics in Engineering II

**Operations Research and Financial Engineering**

245 Fundamentals of Engineering Statistics
307 Optimization
309 Probability and Stochastic Systems

**Mathematics**

304 Introduction to Partial Differential Equations
305 Mathematical Programming
306 Introduction to Graph Theory
317 Complex Analysis with Applications

**Computer Science**

309 Fundamentals of Scientific Computing
340 Reasoning about Computation

The dynamics and design option is recommended for students desiring an emphasis on the study of the motion and control of vehicles and machines. The departmental requirements (II. A. above) are normally satisfied by:

331 Aircraft Flight Dynamics
341 Space Flight
344 Introduction to Bioengineering and Medical Devices
345 Robotics and Intelligent Systems
423 Heat Transfer
434 Modern Control

The energy sciences option is recommended for students desiring an emphasis on power sources. The departmental requirements (II. A. above) are normally satisfied by:

328 Energy for a Greenhouse-Constrained World
423 Heat Transfer
426 Rocket and Air-Breathing Propulsion Technology
427 Energy Conversion and the Environment: Transportation Applications
434 Modern Control

In either case, in order to satisfy the departmental requirement for upper-level courses, at least one is to be selected from each of the three stems (Dynamics and Control; Fluid Mechanics and Thermal Sciences; and Materials/Structures).

**Aerospace Engineering.** This program deals with the analysis and design of aerospace vehicles. The curriculum is based on the applications of principles from dynamics, control, thermodynamics, and fluid and solid mechanics; it is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone (410) 347-7700. Part of the departmental design requirement (II. B. above) is satisfied by 321 Engineering Design and 332 Aircraft Design or 342 Space System Design.

The departmental requirements (II. A. above) are normally satisfied by:

331 Aircraft Flight Dynamics or 341 Space Flight
335 Fluid Dynamics
427 Energy Conversion and the Environment: Transportation Applications
433 Automatic Control Systems

**Independent Work**

At least one semester of independent work as applied science research or an engineering project is required. This may be satisfied by a semester of independent work (339 or 340). If approved by the departmental representative, an independent work project may satisfy a portion of the design requirement II.B. (339D, 340D). 339 and 339D are offered in the fall, and 340 and 340D are offered in the spring. A year-long senior project (440) or senior thesis (442) or senior project with design (440D) or senior thesis with design (442D) also meets this requirement. Students are strongly encouraged to select the year-long project or thesis option. Senior projects are intended for teams or groups while the senior thesis is intended for individuals. For the senior project or thesis, one final grade is issued in the spring.

**Preparation for Graduate Study**

Students who are considering graduate work in applied science may elect the engineering physics option by combining the engineering courses in the department with the requirements of the interdepartmental engineering physics program.
Program in Sustainable Energy. This program provides an understanding of Earth, global climate, and environmental change from the perspective of engineering, technology, and policy. The future of societies, the global economy, and the global environment depend on collaborative research into renewable energy, alternative fuels, advanced energy conversion and storage systems, technology transfer to developing countries, and prudent judgment on policies to support sustainable energy technology. Innovations and inventions require multidisciplinary approaches and entrepreneurship, as well as grounding in theory and practice, in topics that are not covered by a single department. This certificate program offers an integrated set of core and elective courses, introducing students to fundamental concepts, providing depth in specific fields of interest, gaining laboratory and site visit experiences, and setting the stage for further work in the field. See the Program in Sustainable Energy entry or view program information online.

Program in Engineering Physics. Students with a strong interest in applied science may combine their studies in the department with courses in physics through the interdepartmental Program in Engineering Physics. Many of the requirements of that program may be applied toward the fulfillment of the departmental requirements. For example, PHY 205 or PHY 207 may be substituted for MAE 206 Introduction to Engineering Dynamics. The program's mathematics requirement is identical to that of mechanical engineering. Aerospace engineers will need a second 300- or 400-level mathematics course.

Program in Robotics and Intelligent Systems. Robotics and intelligent systems have become focal points for research and development, and they are central to advances in manufacturing technology. New approaches for analysis, design, and synthesis of systems are being developed using symbolic representation of knowledge, electronic neural networks, and parallel supercomputers. Students have an opportunity to learn the theory and practice of automation and to pursue independent study projects in related areas. The mechanical and aerospace engineering department offers a number of courses in this area and is preparing a new generation of engineers in robotics and intelligent systems. For more information, see the Program in Robotics and Intelligent Systems entry or view program information online.

Program in Materials Science and Engineering. The materials concentration in mechanical engineering is designed to provide a coherent understanding of the structure, properties, and performance of materials from a mechanics and materials perspective. The materials concentration will provide a foundation in basic and applied science, as well as an introduction to the design and applications of materials. Students are given the opportunity to specialize in areas such as structural materials, biological materials, micro- and nanotechnology, and material modeling and simulations. This can be achieved by taking a sequence of electives drawn from different departments, and also by engaging in a materials-related senior thesis topic designed to facilitate the specializations. This course of study will prepare students for graduate education in a wide range of areas, or the beginning of a professional career in materials engineering. Students electing this concentration will receive a degree in mechanical engineering. Students are encouraged to simultaneously participate in the Program in Materials Science and Engineering. All students in this concentration normally take:

MAE 324 Structure and Properties of Materials
MSE 302 Laboratory Techniques in Materials Science
MAE 325 Structural Analysis and Finite-Element Methods
MAE 344 Introduction to Bioengineering and Biomedical Devices

Other Programs. Students in mechanical and aerospace engineering with an interest in applied statistics or operational research, in addition to their departmental studies, may wish to follow the Program in Engineering and Management Systems. Students may also wish to pursue the Program in Engineering Biology or the Program in Applied and Computational Mathematics. Some of the program courses may also satisfy departmental requirements.

Energy and Environmental Studies. Students with an interest in energy conversion and the generation and control of environmental pollutants normally take:

328 Energy for a Greenhouse-Constrained World
423 Heat Transfer
427 Energy Conversion and the Environment: Transportation Applications

See also the Program in Environmental Studies.

Courses

MAE 102A Engineering in the Modern World (see CEE 102A)
MAE 102B Engineering in the Modern World (see CEE 102B)
MAE 206 Introduction to Engineering Dynamics Spring QR

Formulation and solution of equations governing the dynamic behavior of engineering systems. Fundamental principles of Newtonian mechanics. Kinematics and kinetics of particles and rigid bodies. Motion relative to moving reference frames. Impulse-momentum and work-energy relations. Free and forced vibrations of mechanical systems. Introduction to dynamic analysis of electromechanical and fluid devices and systems. Two lectures, one laboratory. Prerequisites: MAT 201, PHY 103, and MAE 223 or CEE 205. N. Kasdin

MAE 221 Thermodynamics Fall ST

Heat and work in physical systems. Concepts of energy conversion and entropy, primarily from a macroscopic viewpoint. Applications to engines, heat pumps, refrigeration, and air-conditioning systems. In the laboratory students

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will carry out experiments in the fields of analog electronics and thermodynamics. For MAE concentrators only, a combined final laboratory grade will be issued in the spring laboratory course 224, which includes the laboratory work of both 221 and 224. Three lectures, one class, and one three-hour laboratory. Prerequisites: PHY 103 and MAT 201, which may be taken concurrently. R. Miles

MAE 222 Mechanics of Fluids (also CEE 208) Spring

Introduction to the physical and analytical description of phenomena associated with the flow of fluids. Topics include the principles of conservation of mass, momentum, and energy; lift and drag; open channel flow; dynamic similarity; laminar and turbulent flow. Three lectures, one preceptorial. Prerequisites: MAT 104 and 202; MAT 202 may be taken concurrently. A. Smits

MAE 223 Modern Solid Mechanics (also CEE 323) Fall

Fundamental principles of solid mechanics: equilibrium equations, reactions, internal forces, stress, strain, Hooke's law, torsion, beam bending and deflection, and deformation in simple structures. Integrates aspects of solid mechanics with applications to mechanical and aerospace structures (engines and wings), and microelectronic and biomedical devices (thin films). Topics include stress concentration, fracture, plasticity, fatigue, visco-elasticity and thermal expansion. The course synthesizes descriptive observations, mathematical theories, and engineering consequences. Two 90-minute lectures. Prerequisites: MAT 104, and PHY 103. M. Haataja

MAE 224 Integrated Engineering Science Laboratory Spring ST

Core laboratory course for concentrators, who carry out experiments in the fields of digital electronics, fluid mechanics, and dynamics. Students also complete an independent research project. Continuation of the laboratory component of 221; a combined final grade will be issued based upon laboratory work in both 221 and 224. Prerequisite: 221 Typically taken concurrently with 222. One three-hour laboratory, one class. Staff

MAE 228 Energy Solutions for the Next Century (also EGR 228/CBE 228) Fall

Addresses issues of regional and global energy demands, including sources, carriers, storage, current and future technologies, costs for energy conversion, and their impact on climate and the environment. Also focuses on emissions and regulations for transportation. Students will perform cost-efficiency and environmental impact analyses from source to end-user on both fossil fuels and alternative energy sources. Designed for both engineering and non-engineering concentrators. Two 90-minute lectures, one preceptorial. Y. Ju, J. Benziger

MAE 305 Mathematics in Engineering I (also MAT 301/EGR 305) Fall, Spring QR


MAE 306 Mathematics in Engineering II (also MAT 302) Spring


MAE 321 Engineering Design Fall

Focus on design processes and procedures using modern engineering tools. Parametric design techniques are introduced in the computer-design laboratory along with simulation tools. Instruction in basic and computer-based manufacturing methods is given in the manufacturing laboratory. Teams of students conduct projects that involve the complete design cycle from concept and first principles through optimization, prototype, and test. Two lectures, one laboratory. Prerequisites: 206, 221, 222, and 223 or CEE 205, or instructor's permission. W. Soboyejo

MAE 322 Mechanical Design Spring

This course builds on the technical foundation established in 321, and extends the scope to include a range of advanced mechanical design. Teams of students will design and fabricate a wheeled robotic system that will draw upon multidisciplinary engineering elements. The robot will facilitate common daily tasks which vary each year. CAD, CAE, and CAM will be utilized in the design/simulation/prototype process. Labs are designed to reinforce and expand CAD and CAE skills. Two 90-minute lectures, one laboratory. Prerequisites: 321 or instructor's permission. D. Nosencuck

MAE 324 Structure and Properties of Materials Fall

An introduction to the properties of engineering materials that emphasizes the correlation between atomic and microscopic structure and the macroscopic properties of the materials. Topics include structural, mechanical, thermodynamic, and design-related issues important to engineering applications. Three lectures, one preceptorial. C. Arnold

MAE 325 Matrix Structural Analysis and Introduction to Finite-Element Methods (see CEE 361)

MAE 328 Energy for a Greenhouse-Constrained World (also EGR 328/ENV 328) Spring

This course addresses, in technical detail, the challenge of changing the future global energy system to accommodate
constraints on the atmospheric carbon dioxide concentration. Energy production strategies are emphasized, including renewable energy, nuclear fission and fusion, the capture and storage of fossil-fuel carbon, and hydrogen and low-carbon fuels. Efficient energy use is also considered, as well as intersections of energy with economic development, international security, local environmental quality, and human behavior and values. Two 90-minute lectures. R. Socolow

MAE 331 Aircraft Flight Dynamics Fall
Introduction to the performance, stability, and control of aircraft. Fundamentals of configuration aerodynamics. Methods for analyzing the dynamics of physical systems. Characterization of modes of motion and desirable flying qualities. Two 90-minute lectures. Prerequisites: 206 and 222. R. Stengel

MAE 332 Aircraft Design Spring
Building on strength of materials and calculus, this course integrates physical laws to analyze stress and displacement fields in structures. The course introduces basic concepts and equations in three dimensions and then applies them to aircraft structures. Phenomena to be discussed include elastic anisotropy, bending, buckling, fracture, and fatigue. The course is important for anyone interested in structured design. Two 90-minute lectures. Prerequisites: 335 or instructor's permission. L. Martinelli

MAE 334 Materials Selection and Design Not offered this year
Introduction to the basic principles involved in the selection and design of engineering materials and structures. Review of the role of materials in the design process, engineering materials, and relevant mechanics. Materials selection and design involving considerations of shape, weight, processing, cost, and aesthetics. Framework for failure analysis, design of balanced properties, and performance. Prerequisite: 223 or CEE 205, or instructor's permission. Three lectures. W. Soboyejo

MAE 335 Fluid Dynamics Fall
Low-speed incompressible potential flow theory and high speed compressible flows. Low-speed topics include circulation, vorticity, d'Alembert's paradox, potential flows, and finite speed theory. High-speed topics include speed of sound, nozzles, shock waves, expansion waves, and effects of heat addition and friction. Three lectures, one preceptorial. Prerequisites: 221, 222 or instructor's permission. L. Martinelli

MAE 336 Viscous Flows Spring
Viscous flow with main emphasis on boundary layer theory and CFD methods. Derivation of Navier-Stokes equations, the boundary layer approximations and boundary conditions. Introduction to computational methods for fluid flow. Studies of typical laminar boundary layers, the transition problem, semi-empirical analysis of turbulent boundary layers, and convective heat transfer. Three lectures. Prerequisites: 221, 222 or instructor's permission. Staff

MAE 339 Independent Work Fall
Independent work is intended for juniors or seniors doing only a one-term project. Students develop a topic of their own or select from a list of topics prepared by the faculty. They develop a work plan and select an adviser and are assigned a second reader. At the end of the term, students submit a written report and make a presentation to faculty, staff, fellow students, and guests. Enroll in either 339 for fall or 340 for spring. L. Martinelli

MAE 339D Independent Work with Design Fall
Independent work with design is intended for juniors or seniors doing only a one-term project. Similar to 339, with the principal difference that the project must incorporate aspects and principles of design in a system, product, vehicle, device, apparatus, or other design element. At the end of the term, students submit a written report and make a presentation to faculty, staff, fellow students, and guests. Enroll in 339D for fall, or 340D for spring. L. Martinelli

MAE 340 Independent Work Spring
Independent work is intended for juniors or seniors doing only a one-term project. Students develop a topic of their own or select from a list of topics prepared by the faculty. They develop a work plan and select an adviser and are assigned a second reader. At the end of the term, students submit a written report and make a presentation to faculty, staff, fellow students, and guests. Enroll in either 339 for fall or 340 for spring. L. Martinelli

MAE 340D Independent Work with Design Spring
Independent work with design is intended for juniors or seniors doing only a one-term project. Similar to 340, with the principal difference that the project must incorporate aspects and principles of design in a system, product, vehicle, device, apparatus, or other design element. At the end of the term, students submit a written report and make a presentation to faculty, staff, fellow students, and guests. Enroll in 339D for fall, or 340D for spring. L. Martinelli

MAE 341 Space Flight Not offered this year
This course addresses the various concepts that form the basis of modern space flight and astronautics. The focus is on space flight analysis and planning and not hardware or spacecraft design. The topics include space flight history, orbital mechanics, orbit perturbations, near-Earth and interplanetary mission analysis, orbit determination and satellite tracking, spacecraft maneuvers and attitude control, launch, and entry dynamics. Use of advanced software for the planning and analysis of space missions. Two 90-minute lectures. Prerequisite: 305 or instructor's permission. E. Choueiri

MAE 342 Space System Design Not offered this year

http://www.princeton.edu/ua/
This course examines the design of a modern spacecraft or complex space system, including the space environment and its impact on design. The principles and design aspects of the structure, propulsion, power, thermal, communication, and attitude subsystems are studied. The course also introduces systems engineering, project management, manufacturing and test, mission operations, mission design, and space policy. Acting as a single project team, students will design a satellite or space system from conception to critical design review. Two 90-minute lectures. Prerequisite: 305; 341 recommended, or instructor's permission. N. Kasdin, E. Choueiri

MAE 344 Introduction to Bioengineering and Medical Devices Spring

The fundamental concepts required for the design and function of implantable medical devices, including basic applications of materials, solid mechanics and fluid mechanics to bone/implant systems. The course examines the interfaces between cells and the surfaces of synthetic biomaterials that are used in orthopedic and dental applications. Prerequisites: MAT 103 and 104, and PHY 103 and 104. Two 90-minute lectures. W. Soboyejo

MAE 345 Robotics and Intelligent Systems Not offered this year

This course provides students with a working knowledge of methods for design and analysis of robotic and intelligent systems. Particular attention is given to modeling dynamic systems, measuring and controlling their behavior, and making decisions about future courses of action. Topics include system modeling and control, principles of decisionmaking, Monte Carlo evaluation, genetic algorithms, simulated annealing, neural networks, and expert systems. Prerequisites: MAT 202 or 204, and COS 111 or COS 126 or ORF 201. A.B. students must have met ST requirement; B.S.E. students must have met freshman science requirement. Two 90-minute lectures. R. Stengel

MAE 412 Microprocessors for Measurement and Control Fall

Introduction to microcontroller applications. A laboratory course dealing with the design and construction of self-contained computer-based electronics projects. Major topics include a review of digital and linear electronics, an introduction to microcomputer architecture and assembly language programming, device interfacing, and system design. Two lectures, two two-hour laboratories. Prerequisite: 221 and 224, or equivalent. M. Littman

MAE 423 Heat Transfer Fall

Covers the fundamentals of heat transfer and applications to practical problems in energy conversion and conservation, electronics, and biological systems. Emphasis will be on developing a physical and analytical understanding of conductive, convective, and radiative heat transfer, as well as design of heat exchangers and heat transfer systems involving phase change in process and energy applications. Students will develop an ability to apply governing principles and physical intuition to solve multi-mode heat transfer problems. Three lectures, one preceptorial. F. Dryer

MAE 425 Introduction to Physical Oceanography (see GEO 425)

MAE 426 Rocket and Air-Breathing Propulsion Technology Spring

The study of principles, flight envelopes, and engine designs of rocket and ram/scramjet propulsion systems. Topics include jet propulsion theory, space mission maneuver, combustion control, and system components of chemical and non-chemical rockets (nuclear and electrical propulsion), gas turbine, ramjet, and scramjet engines. Characteristics, optimal flight envelopes, and technical challenges of combined propulsion systems will be analyzed. Prerequisites: 221 and 222. Three lectures. Y. Ju

MAE 427 Energy Conversion and the Environment: Transportation Applications Spring

An overview of energy utilization in, and environmental impacts of, current and future propulsion systems for ground, air, and space propulsion applications. Introduces students to principles of advanced internal combustion, electric hybrid, and fuel cell energy conversion systems for ground transportation. Relevant thermodynamics, chemistry, fluid mechanics, and combustion fundamentals will be stressed. Performance properties of power plants, control of air pollutant emissions, and minimization of resource-to-application carbon emissions will be explored. Three lectures, one preceptorial. Prerequisites: 221, 222, or instructor's permission. F. Dryer

MAE 433B Automatic Control Systems Spring

Introduction to the analysis and design of automatic control systems. Mathematical models of mechanical and electrical feedback systems. Block diagram algebra. Accuracy, speed of response, and stability. Root locus, Bode, and Nyquist techniques. Introduction to digital control. Regulation, tracking, and compensation. Effects of nonlinearity, disturbance, and noise. Prerequisite: 305 or instructor's permission. Two 90-minute lectures. Laboratory mini-project. C. Rowley, M. Littman

MAE 434 Modern Control Fall


MAE 435 Special Topics in Mechanical and Aerospace Engineering Not offered this year

Presentation of timely and advanced topics in mechanical and aerospace engineering. Subject matter will vary depending upon the interest of the faculty and students. Possible topics could include acoustics and noise, biomechanics, lasers, space propulsion, solar energy conversion. Three lectures. Staff

MAE 436 Special Topics in Mechanical and Aerospace Engineering Spring

http://www.princeton.edu/ua/
Presentation of timely and advanced topics in mechanical and aerospace engineering. Subject matter will vary depending upon the interest of the faculty and students. Possible topics could include acoustics and noise, biomechanics, lasers, space propulsion, solar energy conversion. 

MAE 440 Senior Project  Spring

The senior project is a year-long independent study intended for students who choose to work in teams of two or more. Work begins in the fall, but enrollment is only in the spring term when a double grade is awarded. Groups develop their own topic or select a topic from a list of topics prepared by the faculty. Groups develop a work plan and select an adviser and are assigned a second reader for their work. A written progress report is expected at the end of the fall term. Groups submit a written final report and make an oral presentation to faculty, staff, fellow students, and guests at the end of the spring term. L. Martinelli

MAE 440D Senior Project with Design  Spring

Similar to 440 with the principal difference that the team or group project must incorporate aspects and principals of design, whether for a system, product, vehicle, device, software, or apparatus. The year-long senior project with design may be used to satisfy a portion of the department's design requirement. L. Martinelli

MAE 442 Senior Thesis  Spring

The senior thesis is an independent study for individual students. Work begins in the fall, but enrollment is only in the spring term when a double grade is awarded. Students develop their own topic or select one from a list prepared by the faculty. Students develop a work plan and select an adviser and are assigned a second reader for their work. A written progress report is expected at the end of the fall term. Students submit a written final report and make an oral presentation to faculty, staff, fellow students, and guests at the end of the spring term. L. Martinelli

MAE 442D Senior Thesis with Design  Spring

Similar to 442 with the principal difference that the thesis must incorporate aspects and principals of design, whether for a system, product, vehicle, device, software, or apparatus. The year-long senior thesis with design may be used to satisfy a portion of the department's design requirement. L. Martinelli

MAE 445 Entrepreneurial Engineering (also EGR 445)  Fall

Addresses the business, financial, and marketing components that lead to successful entrepreneurial ventures. Students engage directly in the process of identifying, creating, and exploiting entrepreneurial opportunities. Entrepreneurial design is introduced and developed. Working in small multidisciplinary teams, students identify, design, and prototype a highly marketable, consumer product. Classic and modern market analysis, manufacture and distribution are introduced along with business planning and finance. Open to AB and BSE students. Two 90-minute lectures D. Nosenchuck

MAE 456 Global Technology  Spring

An introduction to key ideas in science, technology, humanities, and social sciences relevant to global development. Highlights essential needs in the rural environment and considers how to develop environmentally friendly scientific and technological solutions to satisfy these needs. Also examines the potential role of global technology in the development of rural and urban areas within the developing world. Morning lectures will be followed by field activities and group projects. Enrollment is restricted to students participating in the Tropical Biology Program in Kenya. W. Soboyejo
Program in Medieval Studies

**Director**
D. Vance Smith

**Executive Committee**
Marina S. Brownlee, Spanish and Portuguese Languages and Cultures, Comparative Literature
Daniel Heller-Roazen, Comparative Literature
William C. Jordan, History
Helen Sheppard Kay, French and Italian
Sara S. Poor, German
Gideon A. Rosen, Philosophy, ex officio
D. Vance Smith, English

**Associated Faculty**
Peter R. Brown, History
Mark R. Cohen, Near Eastern Studies
Michael A. Cook, Near Eastern Studies
Pietro Frassica, French and Italian
John F. Haldon, History, Hellenic Studies
Andras P. Hamori, Near Eastern Studies
Thomas F. Leisten, Art and Archaeology
Simone Marchesi, French and Italian
Helmut Reimitz, History
Peter Schäfer, Religion
Ronald E. Surtz, Spanish and Portuguese Languages and Cultures
Rob C. Wegman, Music
Nino Zchomelidse, Art and Archaeology

**Sits with Committee**
Colum P. Hourihane, Index of Christian Art
Donald C. Skemer, Firestone Library
Alan Stahl, Firestone Library

The Program in Medieval Studies encourages the interdisciplinary study of the European Middle Ages: its art, literature (Latin and vernacular), music, religion, science, philosophy, politics, and economic and social structures. Supported by the vast resources for medieval studies at Princeton (including an outstanding medieval manuscript collection and the photographic archive known as the Index of Christian Art), the program sponsors three courses: an introductory course, an upper-level seminar, and a (noncredit) thesis writers' colloquium for seniors. Approximately another 40 courses directly relevant to medieval studies are listed following this description.

**Admission to the Program**
During the freshman or sophomore year each student who wishes to enroll in the program should take MED 227 The World of the Middle Ages or discuss with the director what other kinds of preparation might be acceptable instead. At the time of the selection of a major in a department, a student wishing to obtain a certificate in medieval studies at graduation should also seek admission to the program from the director.

**Program of Study**
MED 227 (or some equivalent) is required, as is, in the senior year, the thesis writers' colloquium. In addition, the student should take and pass four courses listed in the roster of courses following this description. (They should not all be from the same department.) It is also highly recommended that a student take MED 412 Topics in Medieval Studies, a seminar whose subject and faculty change yearly. The senior thesis and at least one junior paper must deal directly with the European Middle Ages. The student's course of study must receive the prior approval of the departmental representative (in the major) and the director of the Program in Medieval Studies.

**Languages**
Most students, especially those interested in pursuing medieval studies at the graduate level, are urged to take Latin, including medieval Latin, or Greek. But many students will be interested in the vernacular traditions; in the absence of competency in Latin or Greek (or as a supplement to competency), students will need to demonstrate appropriate proficiency in another medieval language (for example, Old English) or in one of the major modern European languages to the 207 level: Russian, German, French, Spanish, Italian. In no case will a student be eligible for a certificate if he or she has failed to fulfill the language requirements as described here.

**Certificate of Proficiency**
Students who fulfill all requirements of the program will receive a certificate of proficiency in medieval studies upon graduation.

**Senior Thesis Colloquium.** Separate from any other departmental requirements, this noncredit colloquium will regularly bring together all seniors in the program in order to discuss mutual problems of data, research strategies, organization, and writing. In consultation with the director of the colloquium, each student will choose a date to report to and discuss with the other members of the colloquium his or her work-in-progress.

**Courses**

http://www.princeton.edu/ua/
MED 227 The World of the Middle Ages (also HUM 227)  Fall LA
An introduction to medieval Europe from late Antiquity to 1400. The course focuses on themes such as collective mentalities and dominant social practices, and addresses major forms of cultural expression in various media. Two 90-minute lectures. D. Smith

MED 303 Dante's Inferno (see ITA 303)
MED 304 Dante's "Purgatorio" and "Paradiso" (see ITA 304)
MED 329 Sex and Gender in the Ancient World (see CLA 329)

MED 412 Topics in Medieval Studies  Spring LA
An intensive seminar devoted to a particular aspect of European medieval life and culture. Topics change yearly. One three-hour seminar. S. Anderson
Department of Molecular Biology

Chair
Lynn W. Enquist

Associate Chair
James R. Broach

Departmental Representative
S. Jane Flint
Yibin Kang
Mark D. Rose
Thomas J. Silhavy

Director of Graduate Studies
Jean E. Schwarzbauer

Professor
Bonnie L. Bassler
David Botstein, also Lewis-Sigler Institute for Integrative Genomics
James R. Broach
Edward C. Cox
Lynn W. Enquist, also Princeton Neuroscience Institute
S. Jane Flint
Jacques R. Fresco
Elizabeth R. Gavis
Frederick M. Hughson
Mark D. Rose
Paul D. Schedl
Gertrud M. Schüpbach
Jean E. Schwarzauer
Thomas E. Shenk
Thomas J. Silhavy
Lee M. Silver, also Woodrow Wilson School
Jeffry B. Stock
David W. Tank, also Princeton Neuroscience Institute
Saeed Tavazoie, also Lewis-Sigler Institute for Integrative Genomics
Shirley M. Tilghman
Eric F. Wieschaus, also Lewis-Sigler Institute for Integrative Genomics
Ned S. Wingreen, also Lewis-Sigler Institute for Integrative Genomics
Virginia A. Zakian

Associate Professor
Michael J. Berry, also Princeton Neuroscience Institute
Carlos D. Brody, also Princeton Neuroscience Institute
Yibin Kang
John D. Storey, also Lewis-Sigler Institute for Integrative Genomics
Samuel S. H. Wang, also Princeton Neuroscience Institute

Assistant Professor
Lisa M. Boulanger, also Princeton Neuroscience Institute
Rebecca D. Burdine
Hilary A. Collier
Ileana M. Cristea
Jonathan T. Eggenschwiler
Benjamin A. Garcia
Zemer Gitai
Manuel Llinás, also Lewis-Sigler Institute for Integrative Genomics
Coleen T. Murphy, also Lewis-Sigler Institute for Integrative Genomics
Mala Murthy, also Princeton Neuroscience Institute

Senior Lecturer
Alison E. Gammie
Alan Gelperin, also Princeton Neuroscience Institute
Heather A. Thieringer

Lecturer with Rank of Professor
Adel A. Mahmoud, also Woodrow Wilson School
Leon E. Rosenberg

Lecturer
Robyn E. Tanny

Associated Faculty
Peter Andolfatto, Ecology and Evolutionary Biology, Lewis-Sigler Institute for Integrative Genomics
Jannette L. Carey, Chemistry
Thomas Gregor, Physics, Lewis-Sigler Institute for Integrative Genomics
Michael H. Hecht, Chemistry
Leonid Kruglyak, Ecology and Evolutionary Biology, Lewis-Sigler Institute for Integrative Genomics
Laura F. Landweber, Ecology and Evolutionary Biology
A. James Link, Chemical and Biological Engineering
Celeste M. Nelson, Chemical and Biological Engineering
Joshua D. Rabinowitz, Chemistry, Lewis-Sigler Institute for Integrative Genomics
Joshua W. Shaevitz, Physics, Lewis-Sigler Institute for Integrative Genomics
Stanislav Y. Shvartsman, Chemical and Biological Engineering, Lewis-Sigler Institute for Integrative Genomics
Mona Singh, Computer Science, Lewis-Sigler Institute for Integrative Genomics
David L. Stern, Ecology and Evolutionary Biology
Olga G. Troyanskaya, Computer Science, Lewis-Sigler Institute for Integrative Genomics

Information and Departmental Plan of Study

At Princeton, courses in the biological sciences are offered in two departments. Students with interests in molecular, cellular, and developmental processes should enroll in the Department of Molecular Biology. Those with an evolutionary orientation and interest in organismal, population, and community processes should enroll in the Department of Ecology and Evolutionary Biology.

Every student considering majoring in the department is encouraged to attend a departmental open house that is held in the spring term to introduce students to the departmental courses, faculty, and research interests.

http://www.princeton.edu/ua/


**Prerequisites**

Prerequisites for entry into the Department of Molecular Biology are the courses MOL 214 or MOL 215.

**Early Concentration**

Qualified students who have been granted advanced placement credit in departmental prerequisites, and who have taken advanced courses in molecular biology (300 level and above) during the freshman and/or sophomore years may be eligible for independent work in the spring of the sophomore year and/or fall of the junior year. To qualify for early concentration status, students must have received grades of B+ or better on departmental prerequisites and advanced molecular biology courses. Early concentrators may engage in experimental research in the laboratories of members of the department and associated faculty. A limited number of early concentrators will be offered the possibility of continuing research in the laboratories of their faculty advisers during the summer following the sophomore year. Students who are interested in an early concentration should contact a departmental representative early in the sophomore year.

Early concentrators have the option of doing more intensive experimental research as part of an independent reading course in an area of molecular biology, under the supervision of a faculty member of the department, in the spring of the sophomore year or the fall of the junior year. Independent study will take the form of an intensive reading course intended to prepare students for experimental research in molecular biology. Students will read relevant background literature for their overall field of study, as well as literature pertinent to experimental techniques. Based upon the experience of the students, and at the discretion of the adviser, students may begin experimental laboratory research. Students will meet with faculty advisers on a weekly basis to discuss assigned literature, plan experiments, and review results. At the end of each semester, students will write a term paper based on the literature and any experimental research undertaken during the semester. The paper may take the form of a grant proposal or a research report in the format of a scientific journal article, including a scholarly review of the literature along with description and discussion of the results. Students interested in an independent reading course must consult with a departmental representative early in the prior semester and obtain approval for the plan of study.

**Program of Study**

The following courses are requirements and, in general, should be completed before the beginning of the junior year:

- **General Chemistry** (CHM 201 and 202) or CHM 215 or two units of CHM credit
- **Organic Chemistry** (CHM 301 and 302) or (CHM 303 and 304)
- **Mathematics** (MAT 101 and 102) or (MAT 103 and [MAT 104 or COS 126, PSY 251, MOL 410, MOL 436, MOL/EEB 355]). Other courses may be substituted upon approval by a departmental representative.
- **General Physics** (PHY 101 and 102) or (PHY 103 and 104)
- EB 211 (or equivalent AP plus one 300-level EEB course)

All of the above prerequisites and requirements, with the exception of MOL 214 or MOL 215, can be satisfied with advanced placement and/or summer courses at other universities (within University guidelines). MOL 214 or MOL 215 must be taken at Princeton University. If EEB 211 is not taken at Princeton (for example, because of advanced placement), the student must take one upper-level course (300 level or above) in the Department of Ecology and Evolutionary Biology, which can also count as a departmental. All 300-level and above courses, where EEB is the primary listing, will be accepted; cross-listed courses must be individually approved.

The following departmental courses are required:

- Genetics (MOL 342)
- Biochemistry (MOL 345)
- Cell and Developmental Biology (MOL 348)
- Core Lab (MOL 350)

Except under very special circumstances, these courses must be taken during the junior year or earlier. All count as departmentals and they must be successfully completed. No substitutes are allowed, except for students who wish to study abroad and who have received departmental approval. Additional departmentals can be chosen from among all 300 or higher-level courses in molecular biology, and selected upper-level courses with a strong molecular or biological component from other departments (see list). Other courses can only be taken as departmentals with the written approval of a departmental representative. All students must take at least eight, but not more than 12, departmentals. Only Princeton courses can count as departmentals; there are no exceptions to this rule.

A degree from the molecular biology department requires successful completion of the prerequisites in MOL 342, MOL 345, MOL 348, MOL 350, and four other departmentals.

No courses in biological sciences or other departmental courses may be taken pass/D/fail.

**Independent Work**

**Junior Independent Work.** In the fall semester of the junior year students participate in tutorials with postdoctoral instructors, read papers from the original literature, and prepare two short papers on assigned topics. In the spring term students carry out a second program of independent work with a faculty adviser with whom they will eventually do their senior thesis. In some instances this may include experimental work. A monograph summarizing this work is due...
in early May.

**Senior Independent Work.** During the senior year each student, with the guidance of a faculty adviser, undertakes a major research effort. This research project can be a laboratory, field, or independent study that will be written and presented as a senior thesis.

**Senior Departmental Examination**

Students are required to present their work to the two (non-adviser) thesis readers during an oral exam, at which the adviser is not present. The exam usually takes about one-half hour and students should be prepared to describe the background of the thesis, defend its contents, and propose future directions. The grade for the oral defense will be the average of the two from the (non-adviser) faculty members. A grading rubric will be used by the examination committee. Grades are assigned by the Undergraduate Committee with the approval of the faculty.

**Study Abroad**

Students concentrating in molecular biology may spend part of the junior year abroad, provided that at least one core departmental course has been taken in the sophomore year and suitable arrangements are made to complete the junior independent work. Students may take part in existing exchange programs with the University of Oxford and the Karolinska Institute or may arrange, in consultation with departmental representatives and the Office of International Programs, to participate in other approved programs abroad. Study abroad is most easily arranged for the fall semester. Students interested in study abroad should consult with departmental representatives and Dean Nancy Kanach as early as possible, preferably during the first year.

**Integrated Science Sequence**

An alternative path into the department is through the integrated science curriculum. ISC/CHM/COS/MOL/PHY 231-4 (a double course) can be taken in the freshman year, and ISC/CHM/COS/MOL/PHY 235-6 can be taken in the sophomore year. These courses can be substituted for CHM 203-204, PHY 103-104 or 105-6, and COS 126 in the freshman year and MOL 214, 342, and 345 in the sophomore year. For full course descriptions and more information, see the integrated science website.

**Approved Courses for Departmental Credit.** See the departmental website for an up-to-date list of approved departmentals. Other courses may be approved upon consideration by a departmental representative. Note: Only one non-MOL course, in which the content is primarily related to ethical, social science, or policy implications of biomedical topics, will be accepted for departmental credit.

**Early Research Opportunities.** Students interested in research prior to junior year should consult the faculty Web page to become familiar with the types of research being conducted in the department. Students should then meet with the freshman/sophomore adviser, who can provide information about specific research opportunities.

**Program in Biophysics.** The Program in Biophysics is designed for students with strong interests in molecular biology and physics who wish to combine these two subjects in their junior and senior independent work. The program offers a combination of courses and interdisciplinary research that meet the requirements of the physics or molecular biology departments, and entry requirements of graduate schools in both physics and molecular biology. Courses are chosen with the help of advisers in the Departments of Physics and Molecular Biology. A certificate in biophysics is awarded to students who successfully complete the program. Students are admitted to the program once they have chosen their field of concentration and consulted with the program director, who will assign them an adviser.

**Program in Global Health and Health Policy.** The Program in Global Health and Health Policy is an interdepartmental program in which undergraduates can study the determinants, consequences, and patterns of disease across societies; the role of medical technologies and interventions in health improvements; and the economic, political, and social factors that shape domestic and global public health. In addition to the core departmental courses, molecular biology concentrators would take GHP 350 by the end of junior year and GHP 351 by the end of senior year. Most upper-level MOL courses fulfill the requirements for the global health and health policy certificate.

**Program in Neuroscience.** The department offers the opportunity for concentrators to participate in the neuroscience program. Interested students should discuss the program with the directors and their departmental representative.

**Program in Quantitative and Computational Biology.** The Program in Quantitative and Computational Biology (QCB) is designed for students with a strong interest in multidisciplinary and systems-level approaches to understanding molecular, cellular, and organismal behavior. The curriculum introduces the students to experimental and analytic techniques for acquisition of large-scale quantitative observations, and the interpretation of such data in the context of appropriate models. Strong emphasis is placed on using global genome-wide measurements (e.g., microarray gene expression, sequence, phenotype) to understand physiological and evolutionary processes. At the core of the curriculum is the project lab (QCB 301), a double-credit laboratory course, taken during the fall of junior year, in which students participate in the design, execution, and analysis of experiments. The required courses provide a strong background in modern methodologies in data analysis, interpretation, and modeling. Courses are chosen with the help of advisers in molecular biology, ecology and evolutionary biology, physics, chemistry, computer science, and other related departments. A certificate in quantitative and computational biology is awarded to students who successfully complete the program requirements.

**Courses**
MOL 101B From DNA to Human Complexity  Fall ST

This lecture and laboratory course will acquaint nonbiology majors with the theory and practice of modern molecular biology, with a focus on biological topics of current public interest. Topics include: structure of DNA, RNA, proteins, genomes, and an overview of state-of-the-art technologies including cloning, recombinant DNA, and PCR. The course will address how recent scientific advances impact issues relevant to human biology, including understanding how genes control complex patterns of cell differentiation and the origins of mutations and inherited defects. Three lectures, one three-hour laboratory. E. Wieschaus, H. Thieringer, B. Bassler

MOL 110 Neuroscience and Everyday Life (see NEU 101)

MOL 205 Genes, Health, and Society  Spring SA

What should students know about their genes? Today, the field of human genetics is explored and debated like no other. To understand the medical applications and ethical implications of human genetics, one must grasp its scientific foundations. The course approaches these topics using lectures; textbook, journal, and newspaper readings; precept discussions; and patient interviews. It will consider: gene structure and function; the genetics and genomics of populations and of selected human disorders (cancer, mental illness, metabolic diseases); and clinical genetics (inheritance patterns, diagnosis, treatment). Two lectures, one preceptorial. L. Rosenberg

MOL 210 Evolutionary Ecology (see EEB 210)

MOL 211 The Biology of Organisms (see EEB 211)

MOL 214 Introduction to Cellular and Molecular Biology (also EEB 214)  Spring ST

Important concepts and elements of molecular biology, biochemistry, genetics, and cell biology are examined in the context of classic experiments. During the last four weeks, the class will split into topic-based sections taught by different faculty in the following areas: cell biology, biochemistry, neuroscience, microbiology, and development. This course is strongly recommended as the introductory course for students who are considering majoring in the biological sciences. It also satisfies the biology requirement for entrance to medical school. Two 90-minute lectures, one three-hour laboratory. T. Shenk, H. Thieringer

MOL 215 Quantitative Principles in Cell and Molecular Biology (also EEB 215)  Fall ST

Central concepts and experiments in cellular, molecular, and developmental biology with an emphasis on underlying physical and engineering principles. Topics include the genetic code; energetics and cellular organization; communication, feeding, and signaling between cells; feedback loops and cellular organization; problems and solutions in development; the organization of large cellular systems, such as the nervous and immune systems. Satisfies the biology requirement for entrance into medical school. Prerequisites: AP biology, physics, and calculus. Three lectures, one three-hour laboratory. E. Cox, P. Felton, R. Tanny

MOL 231 An Integrated, Quantitative Introduction to the Natural Sciences I (see ISC 231)

MOL 232 An Integrated, Quantitative Introduction to the Natural Sciences I (see ISC 232)

MOL 233 An Integrated, Quantitative Introduction to the Natural Sciences II (see ISC 233)

MOL 234 An Integrated, Quantitative Introduction to the Natural Sciences II (see ISC 234)

MOL 235 An Integrated, Quantitative Introduction to the Natural Sciences III (see ISC 235)

MOL 236 An Integrated, Quantitative Introduction to the Natural Sciences IV (see ISC 236)

MOL 301 Experimental Project Laboratory in Quantitative and Computational Biology (see QCB 301)

MOL 320 Human Genetics, Reproduction, and Public Policy (see WWS 320)

MOL 330 Molecular Evolutionary Genetics (see EEB 320)

MOL 342 Genetics  Fall

Basic principles of genetics illustrated with examples from prokaryote and eukaryote organisms with emphasis on classic genetic techniques. The evolving conception of the gene and genome will be the primary focus of the course. Selected advanced topics will include Drosophila developmental genetics, yeast cell biology, and human disease. Two 90-minute lectures, one class. Prerequisite: 214 or 215, or permission of instructor. G. Schupbach, M. Rose

MOL 345 Biochemistry (also CHM 345)  Fall

Fundamental concepts of biomolecular structure and function will be discussed, with an emphasis on principles of thermodynamics, binding and catalysis. A major portion of the course will focus on metabolism and its logic and regulation. Three lectures, one class. Prerequisite: 214 or 215. Prerequisite or concurrent: CHM 304 and 304B. F. Hughson

MOL 348 Cell and Developmental Biology  Spring

The mechanisms that underlie development of multicellular organisms, from C. elegans to humans, will be examined using biochemical, genetic, and cell biological approaches. The course will investigate the roles that gene regulation,
cell–cell communication, cell adhesion, cell motility, signal transduction, and intracellular trafficking play in the commitment, differentiation, and assembly of stem cells into specialized cell types. Two 90-minute lectures, one two-hour class. Prerequisite: 342 or 345. H. Coller, E. Gavis

MOL 350 Laboratory in Molecular Biology  Spring ST
The major objective of the course is to introduce students to a variety of tools required to perform independent research in the field of molecular biology. While conducting original research, students will employ a number of techniques that are used by molecular biologists, molecular geneticists, and biochemists. Students will gain an understanding of how, when, and why certain techniques and skills are used in a research setting. In addition, students will learn to write a research report modeled on the scientific literature. One lecture, two laboratories. Prerequisite: 342 and 345, or either course alone with permission of instructor. R. Tanny

MOL 408 Cellular and Systems Neuroscience (see NEU 408)

MOL 410 Introduction to Biological Dynamics  Fall QR
Designed for students in the biological sciences, this course focuses on the application of mathematical methods to biological problems. Intended to provide a basic grounding in mathematical modeling and data analysis for students who might not have pursued further study in mathematics. Topics include differential equations, linear algebra, difference equations, and probability. Each topic will have a lecture component and computer laboratory component. Students will work extensively with the computing package MATLAB. No previous computing experience necessary. Two 90-minute lectures, one laboratory. N. Wingreen, C. Brody

MOL 414 Genetics of Human Populations (see EEB 414)

MOL 422 Evolutionary Developmental Biology (see EEB 422)

MOL 429 Selected Topics in Molecular Biology and Human Genetics  Spring
An in-depth analysis of one area in which recent advances in molecular biology will have significant impact upon society. One three-hour seminar. Prerequisites: 342 and 348, or 214 and permission of the instructor. Staff

MOL 431 Advanced Topics in Developmental Neurobiology  Fall
Contemporary approaches to the study of neural development, emphasizing genetic and molecular techniques. Topics include generation, patterning, differentiation, migration and survival of neurons and glia, axon growth and guidance, target selection, synapse formation/elimination, activity-dependent remodeling of connectivity, and the relationship between neural development and behavior. Two 90-minute classes. Prerequisites: 342, 348, or permission of instructor. J. Eggenschwiler

MOL 434 Macromolecular Structure and Mechanism in Disease  Not offered this year
This course examines structure–function relationships for a number of proteins involved in human diseases. Topics will include oncoprotein, signal–transduction and apoptosis, as well as protein folding, mis-folding, and trafficking. Classes will involve a mixture of lecture and discussion of original scientific papers, with emphasis given to developing an understanding of how to examine and evaluate primary literature. Prerequisite: 345 or permission of instructor. Two 90-minute lectures. Staff

MOL 435 Pathogenesis and Bacterial Diversity  Not offered this year
An examination of current topics exploring the microbial world with emphasis on signal transduction, and the molecular basis for bacterial diversity and their roles in bacterial pathogenesis. Topics will include the regulation of cell division and sporulation, quorum sensing, mechanisms of microbial differentiation, evolution of communicable diseases, molecular mechanisms of pathogenesis, and identification of virulence factor and immunization. Two lectures, one preceptorial. Prerequisites: 214, 215, or permission of the instructor. A. Newton

MOL 437 Computational Neuroscience (see NEU 437)

MOL 448 Chemistry, Structure, and Structure-Function Relations of Nucleic Acids (also CHM 448)  Spring
The chemistry and structure of mononucleotides, oligonucleotides, and polynucleotides and their helical complexes as a basis for understanding and predicting the structures and structure-function relations of naturally occurring DNAs and RNAs. Related functions may include fidelity of DNA replication, mutagenic mechanisms, molecular evolution, telomeres, recently discovered RNA functions, structure of the genetic code. Prerequisite: general chemistry and one semester of organic chemistry. Two 90-minute lectures. J. Fresco

MOL 450 Stem Cells and Cell Fate Decision Processes in the Genomic Era  Not offered this year
Focuses on the current state of stem cell research and the future directions for this field. Stem cell research has great promise for the future of regenerative medicine. Very little is known about the molecular biology that underlies stem cell fate determination. The completion of the human and mouse genome sequences, together with novel technologies to observe global gene expression, offer unique opportunities to unravel stem cell regulatory mechanisms. Explores parallels to other, more mature biological systems. Two lectures, one preceptorial. Prerequisite: 342 and 348, or instructor's permission. Staff

MOL 455 Introduction to Genomics and Computational Molecular Biology (also COS 455)  Fall
Introduction to computational and genomic approaches used to study molecular systems. Topics include computational approaches to sequence similarity and alignment, phylogenetic inference, gene expression analysis, structure
prediction, comparative genome analysis, and high-throughput technologies for mapping genetic networks. Two lectures, one preceptorial. M. Singh, S. Tavazoie

MOL 457 Computational Aspects of Molecular Biology  Fall

The applications of computers to research in molecular biology with emphasis on the acquisition of competence in using available tools. Topics include: nucleic acid sequence analysis, secondary structure prediction, sequence homology, the protein folding problem, computer-aided molecular design, and the use of genetic databases. Prerequisites: one 300-level course in molecular biology, chemistry, or biochemistry. Three lectures. J. Welsh

MOL 459 Viruses: Strategy and Tactics  Not offered this year

Viruses are unique parasites of living cells and may be the most abundant, highest evolved life forms on the planet. The general strategies encoded by all known viral genomes are discussed using selected viruses as examples. The course covers the molecular biology (the tactics) inherent in these strategies. It also introduces the biology of engagement of viruses with host defenses, what happens when viral infection leads to disease, vaccines and antiviral drugs, and the evolution of infectious agents and emergence of new viruses. Three lectures, one two-hour preceptorial. Prerequisite: 342 and 348, or instructor's permission. L. Enquist

MOL 460 Diseases in Children: Causes, Costs, and Choices (also STC 460)  Spring

Within a broader context of historical, social, and ethical concerns, a survey of normal childhood development and selected disorders from the perspectives of the physician and the scientist. Emphasis on the complex relationship between genetic and acquired causes of disease, medical practice, social conditions, and cultural values. The course features visits from children with some of the conditions discussed, site visits, and readings from the original medical and scientific literature. Prerequisite: 214 or 215. Two 90-minute classes. D. Notterman
Department of Music

Chair
Steven Mackey

Departmental Representative
Paul Lansky

Director of Graduate Studies
Simon Morrison (Musicology)
Dmitri Tymoczko (Composition)

Professor
V. Kofi Agawu
Scott G. Burnham
Wendy Heller
Paul Lansky
Steven Mackey

Associate Professor
Barbara A. White

Dmitri Tymoczko
Rob C. Wegman

Assistant Professor
Noriko Manabe

Senior Lecturer
Anthony D. J. Branker, University Jazz Ensembles
Gabriel Crouch, University Glee Club, Chamber Choir
Michael J. Pratt, University Orchestra, University Opera Theatre, and Composers’ Ensemble

Information and Departmental Plan of Study

The Department of Music encourages students to explore music according to their individual needs, interests, and aspirations. Students may pursue work in composition, music history, theory, analysis and interpretation, non-Western music, music technology, performance, and improvisation. Courses offered through the department cover this wide range of activities. Many courses are geared not only to majors but also to students involved with music and music making.

Advanced Placement

The Department of Music does not grant advanced placement exam credit. Freshmen who wish to enroll in a course where "any music course" is listed as a prerequisite must obtain the permission of the departmental representative or the course instructor.

Prerequisites

Students are expected to attain a certain competence in music theory before entering the department. This general prerequisite may be satisfied by the completion of 105, 106 or 205, 206. Because certain upper-level courses have as a prerequisite a year of music theory, students who are considering majoring in music are advised to take 105, 106 their freshman year.

Early Concentration

Qualified students who have completed the departmental prerequisites early may be allowed to begin departmental concentration in the sophomore year.

Program of Study

Students majoring in music design their program in close consultation with the departmental representative. In addition to the two prerequisite courses (105, 106 or 205, 206), music majors are required to take a minimum of nine additional courses.

A second year of theory, 205, 206, is required. (In cases where 205, 206 has already been taken as a prerequisite, majors are expected to take two additional electives.) Also required are three courses chosen from those listed below under Group I (Western music history sequence), one course from Group II (non-Western and non-canonical music), and three additional electives at the 300-level or higher (with a strong recommendation that one of these be another theory course). Music majors in the performance program may use 213, 214, or 215 as a departmental course.

Group I (Western music history): 230, 232, 234, 236, 238, 240, 242
Group II (non-Western and non-canonical music): 250, 251, 257, 258, 260, 262, 264

Languages

Technical, Electro-acoustic, and Computer Facilities. The music department is equipped with complete facilities

http://www.princeton.edu/ua/
for recording, editing, creating, and processing sound. There are six studios: a central studio equipped with a
Digidesign Control 24 mixing surface, a Macintosh computer, ProTools TDM system with a large supply of plug-ins, a
Kurzweil K2500 synthesizer, ADAT and Tascam multi-track tape recorders, MAX/MSP, most standard software
packages, and surround-sound capabilities; two other studios have similar setups but with RTAS hardware, specialized
video editing equipment and software and other specialized software. There is a room dedicated to hardware
construction with a soldering station, Windows, LINUX, and Macintosh computers; and a studio that doubles as a
rehearsal space with audio dubbing facilities. Additionally, there is a computer keyboard workstation in a sixth studio
dedicated to composition and score production.

Independent Work

Junior Independent Work. Juniors participate in a junior seminar their first semester. This weekly seminar is led by
the departmental representative. Students in the seminar are responsible for various writing assignments, including one
substantial paper. In the second semester, students either (1) write a research paper that allows them to explore the
theoretical, historical, and analytical literature on music as well as develop their own ideas; or (2) write a substantial
musical composition.

Senior Independent Work. The senior thesis may range from an extended essay on a musicology topic to a project in
composition. The specific topic or project of the thesis is agreed upon in discussions with a faculty adviser.

Senior Departmental Examination

Departmental examinations are held after the submission of senior theses. The examination is broad in scope and
covers a wide range of musical knowledge.

Study Abroad

Beginning in 2007, Princeton began a unique collaboration with the Royal College of Music in London, in which
students have the opportunity to participate in a five-year double degree program (A.B. and M.M.). Students spend one
semester of the junior year in London.

Musicianship. Some training in musicianship is a component in the undergraduate theory courses, but it is expected
that students will also work on aural and practical skills on their own. At least a minimal competence at the keyboard is
expected of all music concentrators as well.

Instrumental and Vocal Lessons. The Department of Music manages a noncredit extracurricular program for the
private study of vocal and instrumental performance, including beginning piano. Students wishing to participate in this
program must audition for the relevant teachers in the program. If accepted, they sign contracts for 10 weekly lessons
each semester, for which the student will be billed by the University. Departmental concentrators are expected to be
pursuing some kind of performance study, and therefore the department subsidizes the entire cost of weekly lessons
with teachers under contract to the department. Partial subsidies are available to other students under certain
conditions. Special arrangements for instruction at Westminster Choir College can be made for a limited number of
students through an inter-institutional exchange agreement.

Performance for Departmental Concentrators. Serious students of music, whatever their particular interests or
eventual orientation, need to have at least some experience in performing music. Music concentrators are expected to
be pursuing some performance study by taking vocal or instrumental lessons. It is recommended that prospective
concentrators without at least minimal keyboard skills study piano. Concentrators are also urged to participate in the
ensembles conducted by department staff.

Courses

MUS 103 Introduction to Music   LA
A listener's introduction to musical styles of the high baroque, Viennese classical, romantic, and contemporary periods.
The course is designed for students with no previous musical background and is taught essentially without musical
notation. Emphasis is on guided analytic listening to selected works of Bach, Haydn, Mozart, and Beethoven. Two
lectures, one class. Staff

MUS 104 When Music Is Made   LA
An introduction to the fundamental materials of a variety of musics, including Western concert music, jazz, and
popular music. Course activities center around interrelated theoretical, compositional, and analytical projects that serve
to explore issues of music theory, style, and creativity. Two lectures, two preceptorials. Staff

MUS 105 Music Theory through Performance and Composition   Fall LA
An introduction to the procedures, structures, and aesthetics of tonal music. Composing, singing, playing, analysis of
music such as 18th-century chorale, and 18th- and 19th-century piano music. Emphasis on fluency in handling tonal
materials as a means of achieving a variety of formal and expressive ends. Two lectures, two classes, one session in
practical musicianship. Staff

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MUS 106 Music Theory through Performance and Composition  Spring LA
An introduction to the procedures, structures, and aesthetics of tonal music. Composing, singing, playing, analysis of music such as 18th-century chorale, and 18th- and 19th-century piano music. Emphasis on fluency in handling tonal materials as a means of achieving a variety of formal and expressive ends. Two lectures, two classes, one session in practical musicianship. Prerequisite: ability to read music. Staff

MUS 205 Species Counterpoint  Fall LA
An introduction to the principles of voice leading and linear construction through a series of systematic compositional exercises. Two lectures, two classes. Prerequisite: 106 or equivalent. Staff

MUS 206 Tonal Syntax  Spring LA
An introduction to the syntactic structure of the music of the 18th and 19th centuries through exercises in analysis and composition. Two lectures, two classes. Prerequisite: 205 or equivalent. Staff

MUS 210 Beginning Workshop in Musical Composition  LA
A continuous cycle of creation, discussion, and response based on the creative musical activity of the students. Varieties of kind and style--noted composition, multimedia music, multitracking, and improvisation--are encouraged. Prerequisite: instructor's permission. Two 90-minute classes. Staff

MUS 213 Projects in Instrumental Performance  LA
Guides students in extended projects in performance. Prerequisite: instructor's permission. Staff

MUS 214 Projects in Vocal Performance  LA
Guides students in extended projects in performance. Prerequisite: instructor's permission. Staff

MUS 215 Projects in Jazz Performance  Fall LA
A performance course that focuses on the development of style, concept, and repertoire in the jazz idiom. Students are coached by faculty in extended projects in performance. One three-hour class. Staff

MUS 216 Techniques of Conducting  LA
This course will introduce the vocabulary and skills necessary for a conductor to communicate with an ensemble, including score-reading, hearing, rehearsing, interpreting, and solving problems in the musical text. As the final project, students will conduct an ensemble of instruments and/or singers in a concert. Prerequisite: background in music theory, some keyboard skill, permission of instructor. Two 90-minute classes. Staff

MUS 220 The Opera  LA
An introduction to opera. Lectures deal with works by major composers, conventions of libretto poetry, singers and voice types, musical forms and dramatic pacing, and opera staging. Classes are devoted to close study of two works and the plays on which they were based. Two lectures, one class. Prerequisite: any music course, or some musical background, or instructor's permission. Open to freshmen. Staff

MUS 221 Choral Music (also REL 221)  LA
A survey of vocal literature (excluding opera) from the early Middle Ages to the present. Relations between text and music are stressed. The classes are devoted to a close study of two or three works. Two lectures, one class. Prerequisite: instructor's permission. Staff

MUS 225 Instrumental Music: The Symphony from Haydn to Stravinsky  LA
A study of the development of the symphony from its origins in the mid-18th century through the first half of the 20th. Representative works will be chosen for detailed study in the class meetings. Two lectures, one class. Prerequisite: any music course, some musical background, or instructor's permission. Staff

MUS 226 Instrumental Music: The Concerto  LA
A study of the concerto genre persisting through stylistic and formal changes from the 17th to the 20th centuries. Two lectures, one class. Prerequisite: any music course, some musical background, or instructor's permission. Staff

MUS 230 Music in Antiquity and the Middle Ages  LA
Major developments of Western music up to about 1400, including some of the following: the origin and growth of chant, its liturgical context and musical properties; medieval secular song; early polyphony and Parisian organum; the French a nova and Machaut; the Italian trecento; English medieval music. Prerequisite: a year of theory or instructor's permission. Staff

MUS 232 Music in the Renaissance  LA
Introduction to the history and current scholarship of European music in the period 1400-1600. The principal thread is compositional history; in addition, the course includes extensive coverage of these topics: aesthetics, orality/literacy, improvisation, gender and sexuality. Staff
MUS 234 Music of the Baroque  LA
An introductory survey of style developments, aesthetic trends affecting music, and principal vocal and instrumental genres (opera, cantata, concerto, sonata, and suite) of the period 1600-1750. Major figures to be considered include Monteverdi, Schütz, Lully, Corelli, Vivaldi, Handel, and J. S. Bach. Two lectures, one preceptorial. Prerequisite: any music course or instructor's permission. Staff

MUS 236 Music of the Classical Period  LA
This course provides a comprehensive introduction to the music of the Viennese Classical period. In addition to becoming familiar with some 20 musical works by Haydn, Mozart, and Beethoven, students will engage the cultural context of this music, including historical, aesthetic, and biographical issues. Includes units on the primary instrumental genres of the Classical style and concludes with a series of in-depth analyses of large-scale works by each composer. Two lectures, one class. Staff

MUS 238 Music of the Romantic Era  LA
A study of major styles and issues in European music from the death of Beethoven through the generation after Wagner, as seen against the aesthetic and cultural backgrounds of the time. Selected works from Schubert through Strauss and Mahler may be included. Two one-hour lectures and one one-hour class. Prerequisite: any music course, or some musical background, or instructor's permission. Staff

MUS 240 Musical Modernism 1890-1945  LA
An introduction to modern music, beginning with its origins in late Romanticism, up to World War II. Composers considered include Mahler, Stravinsky, Debussy, Ravel, and Berg. Topics range from urban centers for modern music (Paris and Vienna), the relationship of musical modernism to contemporary literature and visual arts, music and politics, to the impact of recording technology and cinema on musical arts. Prerequisite: any music course, some classical music background, or instructor's permission. Two lectures, one preceptorial. Staff

MUS 242 Music since 1945  LA
European and American music since World War II. Study of many recent approaches to music and their cultural, social, and philosophical bases. Topics include: postwar European avant-garde, American extensions of serialism, technological developments, influences of popular and folk cultures, American avant-garde. Prerequisite: any music course, some musical background, or instructor's permission. Two lectures, one preceptorial. Staff

MUS 240 Musical Modernism 1890-1945  LA
An introduction to modern music, beginning with its origins in late Romanticism, up to World War II. Composers considered include Mahler, Stravinsky, Debussy, Ravel, and Berg. Topics range from urban centers for modern music (Paris and Vienna), the relationship of musical modernism to contemporary literature and visual arts, music and politics, to the impact of recording technology and cinema on musical arts. Prerequisite: any music course, some classical music background, or instructor's permission. Two lectures, one preceptorial. Staff

MUS 250 Musical Cultures of the World (also ANT 250)  LA
Music cultures outside the mainstream European and American tradition. Focus on aspects of musical style as well as on understanding social, cultural, and historical context of folk art and tribal musics of Europe, the Middle East, and Africa. The course is designed for nonmajors. Two lectures, one preceptorial. Staff

MUS 251 Music and Film  LA
An examination of the effect of different compositional practices and different sound technologies on the film viewer. The course will focus on three parameters of film music: music that has a visual point of origin on the screen (diegetic music), music that does not have a visual point of origin on the screen (nondiegetic music, also called background scoring), and music that floats between these two realms. Prerequisite: 103, or 105, or permission of instructor. One three-hour seminar. Staff

MUS 257 Introduction to the Music of India  LA
An introduction to the melodic types (raga), metric types (tala), and the principal vocal and instrumental genres of South Asian art music. One three-hour class. Prerequisite: instructor's permission. Staff

MUS 258 Music of Africa (also AFS 258)  LA
Introduction to the vocal and instrumental music of Africa south of the Sahara. Topics include the place of music in society, the influence of language on musical composition, principles of rhythmic organization, urban popular music, "art" music as a response to colonialism, and the impact of African music on the earliest forms of African American music. Two 90-minute lectures. Staff

MUS 260 Music in the United States  LA
Introduction to the history of American music from the 18th to mid-20th centuries, including sacred music and folk song in the American colonies, concerts and opera, spiritual songs, dances, band music, ragtime, the "high-art" music traditions, Charles Ives, Aaron Copland, jazz, swing, blues, musicals. Prerequisite: 103. Two 90-minute classes. Staff

MUS 262 Evolution of Jazz Styles (also AAS 262)  LA
An introduction survey examining the historical development of jazz from its African origins through the present. The course will place emphasis on the acquisition of listening skills and explore related musical and social issues. Staff

MUS 264 Urban Blues and the Golden Age of Rock  LA
Examines post-World War II blues, rock music mostly of the late sixties and early seventies, and the connections between them. Explores wider musical and extramusical connections. Two lectures, one class. Staff

MUS 270 Medieval and Renaissance Music from Original Notation  LA

http://www.princeton.edu/ua/
A "hands-on" course that explores music from before 1600 using the pedagogical methods of the period. Medieval and Renaissance techniques of sight-singing, memorization, improvisation, and harmonization will be learned. Modern computer technology will also be used to investigate the deeper mystical and philosophical content of music from this period. Two 90-minute classes. Prerequisite: ability to read modern music notation comfortably. Staff

**MUS 308 Contemporary Music through Composition and Performance  LA**

An introduction to a variety of 20th-century approaches to composition. Emphasis on understanding different techniques, syntaxes, and musical languages through exercises in compositional emulations and in performance projects of student and studied works, using available performance skills of participants. Prerequisite: 206 or instructor's permission. One three-hour seminar, one preceptorial. Staff

**MUS 309 Advanced Tonal Analysis  LA**

The course will deal closely with a small number of works from the tonal repertoire and will serve as a critical introduction to several pertinent and influential analytical methodologies, including motivic, formal, semiotic, and voice-leading analysis. The focus will be on the musical and aesthetic values that each method either enhances or attenuates. Prerequisite: 206 or instructor's permission. One three-hour seminar. Staff

**MUS 310 Advanced Workshop in Musical Composition  LA**

An opportunity for students who have developed sufficient compositional skills to work on more extended and advanced projects. Prerequisite: 210 or instructor's permission. Three hours per week. Staff

**MUS 311 Jazz Theory through Improvisation and Composition I  LA**

An exploration of the melodic, harmonic, and rhythmic principles of the bebop paradigm. The course includes analysis of representative works by various jazz masters and will place a strong emphasis on student projects in improvisation and composition. Prerequisites: 105 or permission of instructor. Two 90-minute classes. Staff

**MUS 312 Jazz Theory through Improvisation and Composition II  LA**

An examination of the theoretical principles found in modal jazz through analysis of representative works by such composers as Wayne Shorter, Joe Henderson, and Herbie Hancock. The course will place a strong emphasis on student projects in improvisation and composition. Prerequisites: 105 or permission of instructor. Two 90-minute classes. Staff

**MUS 314 Computer and Electronic Music through Programming, Performance, and Composition (also COS 314)  QR**

An introduction to the fundamentals of computer and electronic music in the context of the Princeton Laptop Orchestra (PLOrk). The music and sound programming language ChucK, developed here at Princeton, will be used in conjunction with Max/MSP, another digital audio language, to study procedural programming, digital signal processing and synthesis, networking, and human-computer interfacing. Staff

**MUS 315 Transforming Reality by Computer (see COS 325)**

**MUS 316 Computer and Electronic Music Composition  LA**

Compositional projects involving computers and synthesizers. Some work may involve interactions between live and electronic sounds. Two 90-minute classes. Prerequisite: 314 or permission of instructor. Staff

**MUS 323 Studies of Orchestral Music  LA**

Particular works or groups of works by a single composer but with reference to other music, either by the same or by related composers. Two 90-minute lectures. Prerequisite: 206. Staff

**MUS 324 Romantic Piano Music  LA**

A survey of piano music in the 19th century, including works for solo piano, songs for piano and voice, and concerti. Topics include the piano as instrument and innovation, piano genres and idioms, social contexts for piano performance, virtuosity. Prerequisites: 105, or experience as performer, or permission of instructor. One three-hour seminar. Staff

**MUS 332 Monteverdi: Madrigal and Opera 1575-1650  LA**

Detailed examination of the principal genres of Italian secular music of the late 16th and early 17th centuries, using the works of Monteverdi as a main point of reference. Some attention to placing musical issues in a context of political and social history. Classes will concentrate on a close analysis of selected works by Monteverdi and his contemporaries, with emphasis on the relationship between text and music. Two lectures, one class. Prerequisite: one year of theory or permission of instructor. Staff

**MUS 333 Bach and Handel  LA**

The contrasting careers and oeuvres of the two greatest representatives of the late baroque in music will be considered both individually and comparatively. Prerequisite: a year of theory or instructor's permission. Staff

**MUS 335 Mozart's Operas  LA**

A study of the integration of music, language, and drama through close reading of the seven completed operas of Mozart's maturity. One three-hour class-seminar. Prerequisite: one year of music theory or instructor's permission. Staff
MUS 336 Beethoven  LA
A survey of Beethoven's works, touching in addition upon his life, the music of his contemporaries, and his influence upon later composers. Two 90-minute classes. Prerequisite: a year of theory (105/106) or instructor's permission. Staff

MUS 337 Wagner (also GER 302)  LA
An introduction to Richard Wagner's operas, to Wagner as a revolutionary presence in 19th-century musical and aesthetic thought, to Wagner's theoretical and polemical prose writings, and contemporary writings about him. Three hours. Prerequisite: a year of theory or instructor's permission. Ability to read German helpful but not necessary. Staff

MUS 339 Russian Music (also SLA 311)  LA
A detailed survey of Russian national and international composers. Topics of discussion and analysis will include magic opera, realism, orientalism, the relationship between composers and poets of the Russian Symbolist era, the World of Art movement and the Ballets Russes, Soviet film music, Soviet arts doctrine, and musical aesthetics (especially as they pertain to authorship and identity). Prerequisites: 105 or permission of instructor. Two 90-minute classes. Staff

MUS 352 Music in Antebellum America, 1800-1860  LA
An introduction to the varieties of musical experience in 19th-century America through the Civil War, paying particular attention to popular music, classical music, hymns, and African American traditions. The course will relate these experiences to contemporaneous literature, painting, sociocultural, political, and racial conditions. Two 90-minute classes. Staff

MUS 366 American Musical Theater History (see THR 366)

MUS 430 Topics in History, Analysis, and Interpretation  Fall LA
Topics chosen from, but not limited to: a group of works by a single composer (Leonin's organa, Monteverdi's madrigals, Brahms's symphonies); a certain genre (19th-century choral works, Hindustani Khayal, contemporary rock, late 16th-century madrigal); a specific theoretical or historical problem (atonal theory, composers' sketches and musical analysis, the origins of opera). One three-hour seminar. Staff

MUS 431 Topics in History, Analysis, and Interpretation  Spring LA
Topics chosen from, but not limited to: a group of works by a single composer (Leonin's organa, Monteverdi madrigals, Brahms's symphonies); a certain genre (19th-century choral works, Hindustani Khayal, contemporary rock, late 16th-century madrigal); a specific theoretical or historical problem (atonal theory, composers' sketches and musical analysis, the origins of opera). One three-hour seminar. Staff
Program in Musical Performance

**Director**
Michael Pratt

**Associate Director**
Anthony D. J. Branker (Jazz Performance)
Gabriel Crouch (Vocal Performance)

**Executive Committee**
Steven Mackey, Music
Simon Morrison, Music
Barbara White, Music
Stacy Wolf, Lewis Center for the Arts, Theater

The Program in Musical Performance provides an opportunity for students to develop their performing skills in the context of regular liberal arts study. One of the goals of the program is to enhance the study of performance through the study of theory, composition, and music history. While the program is not designed to produce professional performers, it will provide a foundation upon which a student may build to go on to further training, such as conservatory study at the graduate level.

**Admission to the Program**

The program is open to juniors and seniors who can demonstrate a high level of proficiency in a performance medium, such as an orchestral instrument, piano, electronic music, voice, or jazz. The number of students in the program will be limited by available resources. A prerequisite to admission is the completion of Music 105-106 or demonstration of equivalent knowledge.

**Program of Study**

Students are required to take two semesters of a department performance course. These include MUS 213 Projects in Instrumental Performance (chamber music), MUS 214 Projects in Vocal Performance (lieder or opera); MUS 215 Projects in Jazz Performance; MUS 216 Techniques of Conducting; MUS 314 Computer and Electronic Music through Programming, Performance, and Composition; or MUS 316 Computer and Electronic Music Composition (electronic media performance). Other courses may also qualify to meet this requirement with the permission of the director of the Program in Musical Performance.

Students must also complete at least two of the music courses required for the music major. Please look under the Department of Music for a list of these courses.

**Independent Project.** In either the junior or senior year, each student will undertake a major performance project. This may be in the form of a recital or other project relevant to a student's interests and needs. Where possible, the project will be coordinated with independent work in the student's major department.

**Lessons.** Certificate program in musical performance students are required to take private vocal or instrumental lessons. The cost of private lessons with the department's instrumental and vocal teachers is fully subsidized for all students in the program.

**Participation in Music Department Ensembles.** Students in the program are required to participate in a music department performance ensemble (orchestra, glee club, or jazz ensemble) appropriate to their discipline.

**Certificate of Proficiency**

Students who fulfill the requirements of the program will receive a certificate of proficiency in musical performance upon graduation.

http://www.princeton.edu/ua/
Department of Near Eastern Studies

Chair
M. Şükrü Hanioğlu

Departmental Representative
Michael A. Reynolds

Director of Graduate Studies
Michael A. Cook

Professor
Mark R. Cohen
Michael A. Cook
Andras P. Hamori
M. Şükrü Hanioğlu
Bernard A. Haykel
Heath W. Lowry
Hossein Modarressi
Muhammad Q. Zaman, also Religion

Assistant Professor
Mirjam Künkler
Emmanuel Papoutsakis
Michael A. Reynolds
Cyrus Schayegh
Max D. Weiss, also History

Senior Lecturer
Nancy Coffin

Lecturer
Michael Barry
Gregory J. Bell
Hebatalla Elkhateeb-Musharraf
Tarak Elsayed
Erika H. Gilson
George E. Hatke
Amineh Mahallati
Hisham Mahmoud
Esther Robbins

Associated Faculty
Molly Greene, History, Hellenic Studies
Amaney A. Jamal, Politics
Michael F. Laffan, History
Thomas F. Leisten, Art and Archaeology
Lital Levy, Comparative Literature
Shaun E. Marmon, Religion

Information and Departmental Plan of Study

The Department of Near Eastern Studies offers a liberal arts major designed to give students competence in a Near Eastern language and a broad knowledge of the literatures, civilizations, and history of the ancient, medieval, and modern Near East (comprising Afghanistan, the Arab countries, Central Asia, Iran, Islamic Africa, Israel, and Turkey). Accordingly, a major is built around departmental and cognate courses in languages, history, literature, religion, law, anthropology, politics, economics, and the Woodrow Wilson School of Public and International Affairs, combined with the study of one or more Near Eastern languages (Arabic, Hebrew, Persian, or Turkish), determined by the student's interest.

In addition to serving as the focal point of a broad liberal arts education, the Near Eastern studies major can be the basis for graduate or professional study. In small classes and seminars, which allow extensive student/teacher interaction, students become equipped to take up careers in business, economics, international affairs, government, diplomacy, and journalism.

For non-majors the Department of Near Eastern Studies provides a wide range of courses that are relevant to the study of history, politics, religion, comparative literature, linguistics, and anthropology. Most undergraduate courses require no knowledge of a foreign language, and the department's popular survey courses present comprehensive portraits of past and present Near Eastern civilizations.

Departmental Courses and Programs. Departmental concentrators who wish to acquire a broad background in Near Eastern civilization are free to study a wide variety of topics (for example, history, literature, and religion) in their courses and independent work. The department welcomes flexibility and encourages the idea of individual study plans with varying degrees of disciplinary specialization. Concentrators are required to take eight departmental or cognate courses, which include language courses beyond the second-year level. No more than three cognate courses will be counted as departmentals. Frequently the department offers special courses on subjects not currently included in the regular curriculum (recent examples: Afghanistan and the Great Powers, 1747-2001; Ethnic Cleansing: Ottoman Muslims and the Rise of Modern Turkish Nationalism; Genre East and West: A History of Literature of the Ancient Near East; Oil, Energy, and the Middle East), and these courses are recognized as departmentals.

Advanced Placement

Advanced placement is available in all of the languages offered by the department. Students seeking advanced placement in Arabic, Persian, or Turkish should consult the departmental representative to arrange for testing with the appropriate language instructor. A student with a Hebrew Subject Test score of 740 or a high score on the departmental Hebrew placement examination given during freshman orientation week will be considered to have satisfied the A.B. foreign language requirement and to be eligible for placement in a 300-level course.

http://www.princeton.edu/ua/
Prerequisites

A student who has completed at least one course in the department is eligible to concentrate in Near Eastern studies. This course may be a language class or a course or seminar offered in any of the disciplines covered by the department.

Early Concentration

Students who meet the prerequisite for entrance into the department may be admitted and begin their program of concentration in the second term of sophomore year.

Language Requirements

The departmental language requirement is four terms (i.e., through 107 level) of Arabic, Hebrew, Persian, or Turkish. However, students are encouraged to utilize their chosen Near Eastern language for senior thesis research and are therefore advised to begin their language training as early as possible. Language courses beyond the second year count as departmentals, as does either elementary or intermediate study of a second Near Eastern language. Much of the necessary language training for the A.B. degree can be acquired through some combination of language study at Princeton, intensive summer language study, and year abroad programs. The department will work out with each undergraduate concentrator a language training schedule appropriate to his or her planned course of study.

Independent Work

Junior independent work consists of one paper each semester. The choice of a senior thesis topic must be approved by the student's adviser.

Senior Departmental Examination

The comprehensive examination in the department consists of an oral examination based on the senior thesis and related topics.

Study Abroad

The department encourages students to consider a semester or year abroad for language and area study in the Middle East. The department also makes every effort to facilitate student participation in any of a number of excellent intensive summer language study programs in the U.S. and the Middle East. The Program in Near Eastern Studies offers an active program of support for students who wish to take advantage of such intensive study opportunities.

Certificate in Language and Culture

The Department of Near Eastern Studies offers students an opportunity to earn a certificate in one of the area's languages and cultures while concentrating in another department.

Certificate Requirements. The certificate is open to undergraduates in all departments. Students should consult the departmental representative by the middle of the sophomore year to plan a program of study. Ordinarily, students concentrating in language and literature departments, including comparative literature, will be eligible for the certificate in language and culture provided that: (a) the linguistic base for the language and culture certificate is different from the linguistic base of the concentration; and (b) the work required for the language and culture certificate does not duplicate the requirements of the major. Students pursuing area studies certificates may earn the certificate in language and culture provided that: (a) the courses they elect to satisfy the requirements of the area studies program are different from those they elect to satisfy the requirements of the language and culture certificate program; and (b) they submit a piece of independent work in addition to the independent work that satisfies the requirements of the area studies program and the home department. The requirements for work done in the Department of Near Eastern Studies are:

1. Studying one of the languages taught in the department--Arabic, Hebrew, Persian, Turkish--beyond the level required for completion of the University language requirement

2. Completing at least three departmental courses at the 200 level or higher in language, literature, or culture that involve extensive use of the designated language

3. As independent work, writing one substantial paper (approximately 5,000 words) normally under the supervision of a member of the department

In addition to 300- and 400-level language courses, any graduate courses open to qualified undergraduates, such as those listed below, may be used to satisfy the departmental requirements above:

In Arabic:
NES 529 (Readings in Modern Arabic Literature)
NES 531/532 (Readings in Classical Arabic Literature)

In Hebrew:
NES 508 (Readings in Medieval Hebrew Literature)
NES 509 (Readings in Modern Hebrew Literature)
NES 523 (Readings in Judeo-Arabic)

*In Persian:*
NES 539/540 (Studies in Persian Literature)

*In Turkish:*
NES 504 (Introduction to Ottoman Turkish)

In addition to these courses, any course in which the student arranges with the instructor to do substantial reading in his or her designated language may count toward the certificate in language and culture. This includes all the literature in translation courses. This must be arranged on a case-by-case basis with the instructor involved.

Any questions regarding the certificate in language and culture should be addressed to the departmental representative in Jones Hall.

**Graduate Courses.** A list of graduate courses frequently elected by undergraduates with appropriate linguistic qualifications may be found on the Department of Near Eastern Studies website.

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**Courses**

**ARA 101 Elementary Arabic I  Fall**

Students in this course will develop their skills in speaking, hearing, reading, and writing Modern Standard Arabic, the form of the Arabic language shared by all Arab countries. The course covers phonics, the alphabet and numerals, as well as noun-adjective agreement and how to form sentences using past and present tense verbs. Also covered: greetings and courtesy phrases in spoken Arabic. Five classes, one hour of drill. *Staff*

**ARA 102 Elementary Arabic II  Spring**

Continuation of 101. Students will expand their language skills through conversational and grammatical exercises based on the audio-visual approach. Students will be able to speak and write simply and accurately about topics such as daily activities, studies, family members, and hopes and plans for the future. Five classes, one hour of drill. *N. Coffin, H. Elkhateeb-Musharraf, M. Fischer*

**ARA 105 Intermediate Arabic I  Fall**

Building upon the skills gained in 101 and 102, this course offers further practice in speaking and listening and increases proficiency in reading and writing. Topics to be covered include use of dual and feminine plural forms; conditional sentences; use of superlatives and comparatives; and the study of case markings in formal written Arabic. Five classes, one hour of drill. *Staff*

**ARA 107 Intermediate Arabic II  Spring**

Continuation of 105. Students will expand their reading, writing, speaking, and oral comprehension skills through oral and written exercises involving more sophisticated texts derived from authentic newspaper and journal sources. Five classes, one hour of drill. *G. Bell, M. Fischer*

**ARA 111 Colloquial Arabic I  Not offered this year**

An introduction to a specific spoken dialect of the Arabic language. This course currently focuses on the Arabic dialects used in the Levant, especially Palestinian and Lebanese dialects. The material of the course is designed to promote functional usage of the language stressing vocabulary and grammar in conversation of everyday life. Four classes. *N. Coffin*

**ARA 113 Colloquial Arabic II  Spring**

A continuation of ARA 111. Focusing on Arabic dialects used in the Levant, especially Palestinian and Lebanese dialects, the material of the course further develops functional usage of the language stressing vocabulary and grammar in conversation of everyday life. *N. Coffin*

**ARA 301 Advanced Arabic I  Fall**

Reading and accurate translation of numerous selections from modern Arabic works as well as reading for general understanding of simple prose, mostly from newspapers and magazines. Review of morphology, introduction to the systematic study of syntax. Speaking about the readings and about other assigned topics. English to Arabic translation. Emphasis on building vocabulary. Two 90-minute classes, two periods of drill. *Staff*

**ARA 302 Advanced Arabic II  Spring**

Continuation of 301. Class reading of more sophisticated discursive prose and short stories. Class discussion in Arabic of assigned texts not translated in class. Emphasis on the systematic study of syntax. Increased emphasis on speaking about a variety of topics. Arabic composition. Two 90-minute classes, two periods of drill. *T. Elsayed, H. Mahmoud*

**ARA 401 Advanced Arabic Skills Workshop  Fall**

This course develops to a more advanced and natural level the linguistic skills of listening, speaking, and reading
through the reading and class discussion of lengthy texts, primarily literary ones. Term papers written in Arabic provide the opportunity to improve composition, and aural comprehension is honed through the use of tapes of Arabic broadcasts, and through viewing films from various parts of the Arab world. Prerequisite: 302 or instructor's permission. Two 90-minute classes. A. Hamori

**HEB 101 Elementary Hebrew I  Fall**

Introductory course develops skills of reading, speaking, comprehension, and writing through various techniques, with an emphasis on a solid grammatical basis and awareness of idiomatic usage of the language. Teaching materials include ones developed in Israel. Five classes. E. Robbins

**HEB 102 Elementary Hebrew II  Spring**

A continuation of 101, with emphasis on the development of all skills. The course will expose students to contemporary Israeli culture by using authentic material such as films, TV series, newspaper articles, and Web-based material. Class activities include role-playing, drills, group discussion, and oral presentations. Five classes. E. Robbins

**HEB 105 Intermediate Hebrew I  Fall**

Expansion of reading, oral, aural, and written skills, as well as coverage of more advanced grammar. Students will be gradually introduced to contemporary Israeli prose and poetry. Maximum participation by students is encouraged through discussion of readings and films. Five classes. E. Robbins

**HEB 107 Intermediate Hebrew II  Spring**

A continuation of 105, covering remainder of grammar. Further explores contemporary Israeli prose, poetry, and more complex essays from textbooks and photocopied material. Five classes. E. Robbins

**HEB 301 Advanced Hebrew Language and Style I  Fall LA**

For advanced students, this course seeks to improve further the active command of written and spoken Hebrew through work with a variety of literary texts, styles, and artistic expressions, including film. Topics are selected to explore fundamental issues of Israeli culture and society. Prerequisite: 107 or instructor's permission. Two 90-minute classes. E. Robbins

**HEB 302 Advanced Hebrew Language and Style II  Spring LA**

Continuation of 301. Growing emphasis on individual and small group work. Students prepare final project of their choosing in consultation with instructor. Prerequisite: 301 or instructor's permission. Two 90-minute classes. E. Robbins

**HEB 307 Topics in Biblical Literature in Translation  Spring LA**

This course traces the midrashic career of a biblical story into the medieval period. Students will examine the way in which the ancient translations, extra-canonical texts, Dead Sea texts, rabbinic literature, and early medieval Jewish exegesis responded to both textual and extra-textual stimuli so as to create a rich and polyphonic tradition of interpretation. The course also explores the theory and practice of the midrashic method of interpretation. One three-hour seminar. Staff

**NES 201 Introduction to the Middle East (also HIS 223)  Fall HA**

An overview of the history of the Middle East from the rise of Islam to the present day with a focus on the "core" of the Middle East, i.e., the region defined by present-day Turkey and Egypt to the west, Iran to the east, and Arabia to the south. Issues raised include difficulties in the study of foreign cultures, religion and society, the interplay between local and global processes, identity formation, and the Middle East in the broader world. One lecture, two classes. M. Cook

**NES 202 Contemporary Arabic Literature in Translation  LA**

A survey of the literature of the modern Arab world, starting with the late 19th century and continuing up to within the last five years. Narrative (novel and short story), theater, poetry, as well as (briefly) folk literature will be treated. Works are assigned in English translation, but students who are able to read them in Arabic are welcome to do so. Two lectures, one preceptorial. Offered in alternate years. N. Coffin

**NES 203 Introduction to Classical Arabic Literature in Translation  Spring LA**

A survey of classical Arabic literature from the pre-Islamic period to the 15th century. Readings will cover not only belles-lettres (prose and poetry), but also historical, biographical, geographical, allegorical philosophical writings, The Thousand and One Nights, as well as the Qur'an. Works are assigned in English translation, but students who are able to read them in Arabic are welcome to do so. Two lectures, one preceptorial. Offered in alternate years. Staff

**NES 205 The Art and Archaeology of the Ancient Near East and Egypt (see ART 200)**

**NES 214 Masterworks of Hebrew Literature in Translation (also JDS 214)  Spring LA**

An introduction to modern Hebrew literature, represented by selected translations from major works of the last hundred years, in prose (Agnon, Almog, Izhar, Kahana-Carmon, Mendele, Oz, and Yehoshua) and in poetry (Alterman, Amichai, Bialik, Rabikovitch, Zach, and others). Two 90-minute classes. Staff

**NES 220 Jews, Muslims, and Christians in the Middle Ages (also HIS 220/JDS 220)  Fall HA**
An introduction to the history and culture of the Jews in the Middle Ages (under Islam and Christendom) covering, comparatively, such topics as the interrelationship between Judaism and the other two religions, interreligious polemics, political (legal) status, economic role, communal self-government, family life, and cultural developments. Two 90-minute classes. M. Cohen

NES 230 Early Islamic Art and Architecture (see ART 230)

NES 232 The Arts of the Islamic World (see ART 232)

NES 235 In the Shadow of Swords: Martyrdom and Holy War in Islam (see REL 235)

NES 236 Introduction to Islam (see REL 236)

NES 240 Muslims and the Qur'an (also REL 240)  Fall EM

A broad-ranging introduction to pre-modern, modern, and contemporary Islam in light of how Muslims have approached their foundational religious text, the Qur'an. Topics include: Muhammad and the emergence of Islam; theology, law and ethics; war and peace; mysticism; women and gender; and modern debates on Islamic reform. This course examines the varied contexts in which Muslims have interpreted their sacred text, their agreements and disagreements on what it means, and more broadly, their often competing understandings of Islam and of what it is to be a Muslim. Three classes. M. Zaman

NES 245 The Islamic World from its Emergence to the Beginnings of Westernization (also HIS 245)  Spring HA

Begins with the formation of the traditional Islamic world in the seventh century and ends with the first signs of its transformation under Western impact in the 18th century. The core of the course is the history of state formation in the Middle East, but other regions and themes make significant appearances. The course can stand on its own or serve as background to the study of the modern Islamic world. Two 90-minute classes. M. Cook

NES 265 Political and Economic Development of the Middle East (also POL 268)  Spring SA

Provides a framework for understanding the political and economic issues that both challenge and encourage development in the Middle East and Northern Africa. Students will think creatively about the issues raised by designing a development project aimed at tackling a specific problem in a Middle Eastern country. Two lectures, one preceptorial. M. Künkler

NES 268 Political Islam (also POL 376)  Spring HA

For decades scholars predicted that as nations modernized, religion and its corresponding institutions would become increasingly irrelevant. No phenomenon has discredited the secularization thesis more than the powerful resurgence of Islamist movements that began in the 1970s. Given the rapid social and economic development experienced by most Muslim countries, why has political Islam emerged as the most potent force of political opposition in all of these countries? To address this question, the course examines the origins and discourse of political Islam and the goals and organization of Islamist groups. Two lectures, one preceptorial. Staff

NES 269 The Politics of Modern Islam (also POL 353)  Fall HA

An examination of the political dimensions of Islam, involving a study of the nature of Islamic political theory, the relationship between the religious and political establishments, the characteristics of an Islamic state, the radicalization of Sunni and Shi'i thought, and the compatibility of Islam and the nation-state, democracy, and constitutionalism, among other topics. Students will be introduced to the complex and polemical phenomenon of political Islam, using examples drawn mainly, though not exclusively, from cases and writings from the Middle East. Two lectures, one preceptorial. B. Haykel

NES 300 Israeli History through Film (see JDS 300)

NES 304 Islam, Empire, and Modernity: Turkey from the Caliphs to the 21st Century (see GLS 301)

NES 315 War and Politics in the Modern Middle East  Fall SA

Drawing on case studies of Middle Eastern wars, this course examines the changing nature of warfare from the second half of the 20th century through the present day. It begins with Clausewitz's theory of war and examples of conventional state warfare in the Middle East, then moves on to cases of insurgency and so-called fourth generation warfare and uses them to test Clausewitz's ideas and less state-centric alternatives. Two 90-minute classes. M. Reynolds

NES 322 Politics of the Middle East (see POL 364)

NES 331 The Ancient Near East  Not offered this year HA

A survey of the history of the Ancient and Pre-Islamic Near East. Focuses on the civilizations of Mesopotamia, Egypt, Syria-Palestine, and Anatolia from the beginning of writing until the Persian period, as well as on the Christian communities of the Near East before the emergence of Islam. Some attention will also be given to the history of these communities in the Islamic period. Emphasizes the socio-cultural, religious, and intellectual developments in the region as they are revealed by archaeological and literary evidence. Knowledge of ancient languages is not required. Two 90-minute classes. Staff

NES 334 Modern Islamic Political Thought (also REL 334)  Fall EM

An examination of major facets of Islamic political thought from the late 19th century to the present in a broadly

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comparative framework and against the backdrop of medieval Islamic thought. Topics include: the "fragmentation" of
gereral religious authority and its consequences for Muslim politics; conceptions of the shari'a and of the Islamic state; and
Islamist discourses on gender, violence, and relations with non-Muslims. One three-hour seminar. M. Zaman

NES 336 Pilgrimage, Travel, and Sacred Space: Muslims, Christians, and Jews in the Land of Islam (see REL 336)

NES 337 The Middle East in the 20th Century (also HIS 334)  Spring HA
Reviews the history of great power politics in the Middle East, the dynamics of the Middle East sub-system, and trends
originating from the region that impact contemporary global affairs. Issues covered include: colonial rule, the Arab
Israeli conflict, pan-Arabism, regional divisions during the Cold War, the politics of oil, regional integration into the
global economy, and the rise of Islamism. Two lectures, one preceptorial. J. Landis

NES 338 The Arab-Israeli Conflict (also JDS 338)  Spring HA
The history of the Arab-Israeli conflict up to 1967. Due to its contentious theme, it stresses historiographic problems
and primary sources; also, it looks at Israeli and Palestinian societies as much as at the conflict between them.
Questions include the ideological vs. practical roots of, and religious/secular elements in, Zionism and Palestinian
nationalism; politico-economic links between the two societies; breaks in their social and/or ethnic composition; the
effects of collective traumas and warfare on socio-political structures and gender; and the role of foreign powers and
regional states. Two lectures, one preceptorial. C. Schayegh

NES 339 Introduction to Islamic Theology (also REL 339)  Fall HA
A general survey of the main principles of Islamic doctrine. Focuses on the Muslim theological discourse on the
concepts of God and God's attributes, man and nature, the world to come, revelation and prophethood, diversity of
religions, and the possibility and actuality of miracles. One three-hour seminar. H. Modarressi

NES 340 Muslim South Asia (also REL 338)  Spring HA
Religious, cultural, and political developments in South Asia, home to nearly a third of the world's Muslim population,
have long exerted considerable influence on the greater Muslim world. This seminar is concerned with religio-political
thought and movements in Muslim South Asia from the 18th century to the present. Topics include: Sufi ethics; the
impact of colonialism on Islamic thought and institutions; evolving Islamist trends from late colonial times to the
present; and debates on Islamic law and the position of women in India and Pakistan. One three-hour seminar. M.
Zaman

NES 345 Introduction to Islamic Law  Spring SA
A survey of the history of Islamic law, its developments, and the attempts of the Muslim jurists to come to terms with
the challenges of modern time. The course will focus on the issues of constitutional, public, international, and personal
laws that have the greatest relevance to the modern era. One three-hour seminar. H. Modarressi

NES 347 Islamic Family Law  SA
Examines the outlines of Islamic family law in gender issues, sexual ethics, family structure, family planning, marriage
and divorce, parenthood, and child guardianship and custody. Provides a general survey of the Islamic legal system: its
history and developments, structure and spirit, and the attempts of the Muslim jurists to adapt law to changing times.
One three-hour seminar. H. Modarressi, M. Syed

NES 348 Islamic Ritual Laws  SA
Examines the outlines of Islamic ritual law. Starting with a general survey of pre-modern Islamic legal discourse, the
course focuses on such issues as Islamic festivals, religious birth and death rituals, the concepts of worship and
sacrifice, and various Islamic acts of devotion in matters such as prayer, fasting, almgsiving, and annual pilgrimage to
Mecca. One three-hour seminar. H. Modarresi

NES 355 Between Swords and Stones: Jerusalem, a History (see JDS 355)

NES 356 Moses and Jesus in the Islamic Tradition (see REL 335)

NES 358 Modern Turkey  Spring HA
An examination of changes currently affecting the Republic of Turkey, including internal and external problems
precipitated by factors such as rapid urbanization, growing ethnic conscience, and regional instability. Two 90-minute
classes. H. Lowry

NES 363 Islamic Social and Political Movements (also ANT 363)  Fall SA
An introduction to the vast number of Islam-inspired sociopolitical movements. An attempt is made to present the
contemporary movements in the light of the Islamic tradition of rebellion and revolution. Islamic movements will be
surveyed against the historical and social context in which they occurred, with emphasis on the Arab World and Iran.
Questions will be raised about the ways in which these movements have been approached and interpreted. Two 90-
minute classes. Staff

NES 365 Modern Iran  Fall HA
A general introduction to Iran in the period from the establishment of the Qajar dynasty in the late 18th century to the
present day. Particular emphasis will be given to the social and cultural development of Iran under the stimulus of its

http://www.princeton.edu/ua/
contacts with the West. Two lectures, one preceptorial. Offered in alternate years. C. Schayegh

NES 399 Modern Israel (see JDS 399)

NES 416 Nation, State, and Empire: The Ottoman, Romanov, and Hapsburg Experiences (also HIS 434)  HA

An exercise in comparative history and the application of theoretical constructs to historical events. Examines a range of theories of nationalism, state, and empire; applies them to the historical records of three multi-ethnic dynastic empires—the Ottoman, Russian, and Austro-Hungarian; explores the ways in which theories can both elucidate and obscure historical processes. Questions of the nature of empire, the rise of nationalism, and the processes of imperial collapse, among others, will be explored. One three-hour seminar. M. Reynolds

NES 428 Representation of Faith and Power: Islamic Architecture in Its Context (see ART 438)

NES 433 Imperialism and Reform in the Middle East and the Balkans (also HIS 433)  Fall HA

The major Near Eastern and Balkan diplomatic crises, the main developments in internal Near Eastern history, and the Eastern Question as perceived by the Great Powers. The focus will be on the possible connections between diplomatic crises and the process of modernization. One three-hour seminar. M. Hanioglu

NES 435 The Madrasa: Islam, Education, and Politics in the Modern World (also REL 435)  Spring EM

Since 9/11, madrasas have often been viewed as sites of indoctrination into Islamic radicalism. This seminar seeks to examine the broad range of institutions to which the term "madrasa" refers in modern Muslim societies, as well as other related institutions of Islamic education. Addresses the transformations they have undergone since the 19th century, and how these institutions shape and are shaped by Muslim politics in varied contexts. One three-hour seminar. M. Zaman

NES 437 The Ottoman Empire, 1300-1800 (also HIS 337/HLS 337)  Fall HA

An analysis of political, economic, and social institutions with emphasis on the problems of continuity and change, the factors allowing for and limiting Ottoman expansion, and Ottoman awareness of Europe. Two 90-minute classes. Offered in alternate years. H. Lowry

NES 438 The Late Ottoman Empire  Spring HA

An examination of the Westernization movement; administrative reforms; Young Ottoman, Young Turk, and ethnically-nationalist movements; great diplomatic crises of the 19th and 20th centuries; emergence of modern Turkish republic; and the consequences of the Ottoman collapse. Two 90-minute classes. Offered in alternate years. M. Hanioglu

NES 458 Zionism: From Ideology to Practice (see JDS 458)

NES 466 Special Topics in Public Affairs (see WWS 466)

PER 101 Elementary Persian I  Fall

Introduction to Persian language and culture. By the end of the semester, students will have an overview of Persian grammar and will be able to read and converse in Persian at a basic level. Class activities include group discussions, skits, short stories, oral presentations, and comprehension and grammar drills. Class instruction is supplemented with other media such as movies and online Persian news media. Five classes. A. Mahallati, S. Moinfar-Yazdi

PER 102 Elementary Persian II  Spring

Continuation of 101 with a greater emphasis on reading, writing, and comprehension. By the end of the semester, most instruction will be delivered in Persian, and students will be able to communicate comfortably using everyday language and read more elaborate prose. Class instruction is supplemented with other media such as movies and online Persian news media. Five classes. S. Moinfar-Yazdi, A. Mahallati

PER 105 Intermediate Persian I  Fall

An introduction to modern Persian prose and poetry. The course introduces advanced grammar while developing communication skills through the discussion of modern and classic novels, movies, and online Persian media (news, weblogs, etc). This class will be conducted mainly in Persian. Prerequisite: 102 or instructor's permission. Five classes. S. Moinfar-Yazdi

PER 107 Intermediate Persian II  Spring

Continuation of 105. Reading and discussion of selected works by major authors. This class will be conducted mainly in Persian. Five classes. S. Moinfar-Yazdi

PER 301 Introduction to Classical Persian Literature  Fall LA

An introduction to the language of classical Persian literature. Intensive reading and discussion of texts by major poets and writers from Rudaki to Hafez. Texts will vary from year to year. Prerequisite: 107 or instructor's permission. Three classes. Staff

PER 302 Advanced Persian Reading I  Fall

Aimed at developing proficiency in reading and communication in Persian, using materials written for native speakers. Texts used include classical Persian novels, modern works, and Persian translations of classical Western works such as

http://www.princeton.edu/ua/
*Le Petit Prince* and *Les Misérables*. This class will be conducted entirely in Persian. Prerequisite: two years of Persian or instructor's permission. Two 90-minute classes. *S. Moinfar-Yazdi*

**PER 303 Advanced Persian Reading II  Spring**

Continuation of 302. This course is designed to improve students' proficiency in the reading and comprehension of a variety of Persian texts. Prerequisite: two years of Persian or instructor's permission. Two 90-minute classes. *S. Moinfar-Yazdi*

**TUR 101 Elementary Turkish I  Fall**

A performance-oriented, multimedia introductory course in modern spoken and written Turkish. Based on authentic input, grammatical properties of the language are introduced. Language skills are developed through communicative activities in class and individualized work with interactive learning aids. Five classes; laboratory required. *E. Gilson*

**TUR 102 Elementary Turkish II  Spring**

A continuation of 101. Coverage of basic grammar. There will be a growing emphasis on Turkish culture, reading, and increasing vocabulary. Final exam includes an oral interview. Five classes; laboratory work required. Prerequisite: 101. Students who complete 102 normally place into 105. *E. Gilson*

**TUR 105 Intermediate Turkish I  Fall**

Building on students' knowledge, this course aims to further all language skills through extensive exposure to current news, authentic multimedia sources, and close reading of graded authentic materials. Weekly modules to reinforce more complex language structures. Prerequisite: 102 or permission of the instructor. Five classes; laboratory work recommended as needed. *E. Gilson*

**TUR 107 Intermediate Turkish II  Spring**

A continuation of 105. Emphasis on developing all language skills and cultural understanding. Review of grammar as needed. In addition to exposure to current events, students will be introduced to modern Turkish literature, with close reading of selected prose and poetry. Final exam includes an oral interview. Five classes; laboratory work recommended as needed. *E. Gilson*
Program in Near Eastern Studies

Directors
M. Şükrü Hanioğlu

Executive Committee
Michael A. Cook, Near Eastern Studies
Andras Hamori, Near Eastern Studies
M. Şükrü Hanioğlu, Near Eastern Studies
Amaney A. Jamal, Politics
Mirjam Künkler, Near Eastern Studies
Thomas F. Leisten, Art and Archaeology
Lital Levy, Comparative Literature
Shaun E. Marmon, Religion
Michael A. Reynolds, Near Eastern Studies
Cyrus Schayegh, Near Eastern Studies
Muhammad Q. Zaman, Near Eastern Studies, Religion

The Program in Near Eastern Studies provides students in any department of the University the opportunity to study the languages, modern history, and contemporary institutions of the Near East. Its purpose is to enhance a liberal education and to offer additional training for students who plan a career in that area. For this program, the Near East is defined as the entire Arab world and the present-day states of Iran, Israel, and Turkey.

Admission to the Program

Students may enter the program through the Departments of Anthropology, East Asian Studies, Economics, History, Near Eastern Studies, Politics, Religion, Sociology, or the Woodrow Wilson School of Public and International Affairs. Students from other departments who have an interest in Near Eastern studies may enter the program by special arrangements with the director. Students must meet the entrance requirements of the selected department in addition to those of the program.

Program of Study

The student's plan of study is guided and given coherence by the departmental adviser and the director of the program. The specific courses are described in this site for each of the cooperating departments listed above. In general, students follow the plan of study of their department; the Woodrow Wilson School student in the program selects the Near East in the modern world as a field of concentration. The requirements of the program are as follows:

Language: Students who have had no relevant language training will take at least two years of Arabic, Hebrew, Persian, or Turkish language as elective courses.

History: All students will take, as departmental courses, at least one appropriate history course in the Department of Near Eastern Studies. Students in the Department of History will take at least two such courses.

Social Sciences: All students will take at least two courses treating the Near East that are chosen from the offerings of the Departments of Anthropology, Near Eastern Studies, Politics, Religion, and Sociology, and the Woodrow Wilson School.

Junior independent work is divided between the student's department and the program.

The senior thesis is written on a Near Eastern subject under the supervision of a Near Eastern specialist in the appropriate department and the program.

Students take the regular senior departmental examination given by their department, except that a portion of it deals with the Near Eastern fields studied. These examinations are described in the sections of this catalog for each department.

Languages

Students are encouraged to begin the study of a Near Eastern language as early as possible in order to enable them to continue it beyond the required minimum and, if desired, to offer it to meet the language requirement for the A.B. degree. The program also encourages qualified students to enroll in summer sessions in Near Eastern languages.

Study Abroad

For a student whose career plans make it appropriate, the program encourages an intervening year abroad devoted to intensive study of a Near Eastern language and society. This additional year would be spent at a university or other center in the Near East. Upon returning, the student would resume regular studies at Princeton as a member of the junior class. The program will nominate students on the basis of ability.

Students of demonstrated ability who are interested in the Arab world are encouraged to apply to the Center for Arabic Study Abroad, located at the American University in Cairo and governed by a group of universities of which Princeton is one. For students interested in other Near Eastern languages, appropriate arrangements will be made wherever possible.

http://www.princeton.edu/ua/
Certificate of Proficiency

A student who completes the requirements of the program with satisfactory standing receives a certificate of proficiency in Near Eastern studies. A student who satisfactorily completes the intervening year abroad will have this fact noted on the certificate.
The Program in Neuroscience is offered by the Princeton Neuroscience Institute (PNI). The program is designed for undergraduates with strong interests in molecular biology, psychology, and related disciplines who wish to pursue an interdisciplinary study of brain function. The program encourages the intensive study of molecular, cellular, developmental, systems, computational, cognitive, and social neuroscience. Students in the program will be prepared to meet the entry requirements of graduate schools in neuroscience, as well as molecular biology or psychology. Recent certificate students have included majors in molecular biology, psychology, ecology and evolutionary biology, computer science, philosophy, electrical engineering, physics, chemistry, and art and archaeology. Courses are chosen with the help of advisers in the molecular biology, psychology, and other related departments.

In addition to fulfilling the course requirements, neuroscience certificate students gain experience working on neuroscience research projects. Independent work is considered an important component of the neuroscience certificate program and students are encouraged to take advantage of the wide range of opportunities available on the Princeton campus. Current examples of neuroscience research at Princeton include: advanced instrumentation for imaging and electrophysiology, viral infections of the nervous system, event analysis at single synapses, brain imaging studies of cognitive functions such as attention and memory in human subjects, and mathematical and computational analysis of neural network function.

Students who desire a more quantitative and computational focus in neuroscience, including those in the integrated sciences curriculum, can pursue the quantitative and computational neuroscience (QCN) track of the program as outlined below.

Admission to the Program

Students are admitted to the program once they have declared a major, selected an adviser, and submitted an enrollment form. If the adviser is not a member of the PNI core or affiliated faculty, students will choose a co-adviser from this group late in the junior year. Normally, students entering the program will have completed the prerequisites and the neuroscience requirements (other than electives) listed under the Program of Study.

Program of Study

http://www.princeton.edu/ua/
Students in the Program in Neuroscience develop, in consultation with their home department adviser, a course of study built upon their departmental concentration that consists of the curriculum listed below, plus senior independent work in neuroscience, and electives.

Note: An asterisk indicates a one-time-only course or topic.

Prerequisites:

One year of mathematics, preferably taken at Princeton:
MAT 101 or 103, and MAT 102 or 104 or ORF 245, or advanced placement credit.

MOL 214 Introduction to Cellular and Molecular Biology or MOL 215 Quantitative Principles in Cell and Molecular Biology; or the integrated sciences curriculum (CHM/COS/MOL/PHY 231-4 as a freshman and CHM/COS/MOL/PHY 235-6 during the sophomore year)

Neuroscience Requirements:

NEU/PSY 258 Fundamentals of Neuroscience
NEU/PSY 259 Introduction to Cognitive Neuroscience
NEU/MOL 408/PSY 404 Cellular and Systems Neuroscience

Two neuroscience electives from the approved list which is available on the PNI website.

In addition, a course in physics is highly recommended for advanced work in the program. Students in other departments should consult with their departmental representatives and the certificate program representatives to develop a course of study that incorporates the neuroscience requirements listed above.

Quantitative and Computational Neuroscience (QCN). QCN is a special honors track within the certificate in neuroscience. It is designed for undergraduates who wish to pursue an intensive computational approach to the study of brain function. Students must maintain a B+ average in the required courses and the senior thesis. As is the case with the Program in Neuroscience certificate, graduates of the QCN track will be prepared to meet the entry requirements of graduate school in neuroscience, as well as molecular biology or psychology; in addition, QCN students will have acquired computational, modeling, and programming skills. See the QCN website for more information.

Students pursuing the QCN track will complete the prerequisites and take two electives from among the following: NEU 437 (Computational Neuroscience), NEU 330 (Introduction to Connectionist Models: Bridging between Brain and Mind), *PSY/NEU 338 (Animal Learning and Decision Making: Psychological, Computational and Neural Perspectives), or *MAT/APC 351 (Topics in Mathematical Modeling: Mathematical Neuroscience), and either NEU 501B (Neuroscience: From Molecules to Systems to Behavior) or NEU 502B (From Molecules to Systems to Behavior). NEU 501B and NEU 502B are the lab courses which will introduce students to a variety of techniques and concepts used in modern neuroscience.

Study abroad courses cannot be used to fulfill the requirements but can be used as electives if the course is deemed comparable in level and content to neuroscience electives available at Princeton University.

Students considering medical school or an M.D./Ph.D. program may have additional course requirements, and should speak with a health professions adviser during their first year or second year at Princeton. Pre-medical students in psychology should plan on taking one additional biology laboratory course in order to meet medical school entrance requirements.

Junior and Senior Independent Research. Students will follow departmental guidelines for independent work during their junior year. While it is not required that students focus their work on neuroscience during their junior year, it is customary to extend research projects into the senior year, and it is therefore advantageous to begin a neuroscience focus early on in the program. For students concentrating in departments that make it impossible to do junior and senior work that fulfills both departmental and certificate program expectations, additional independent work may be required. For all students, independent research topics can be laboratory or theoretical research projects, and are approved in advance by the program directors, in consultation with faculty advisers. Program courses may not be taken pass/D/fail.

Certificate of Proficiency

Students who fulfill all the requirements of the program will receive a certificate in neuroscience upon graduation.

Courses

NEU 101 Neuroscience and Everyday Life (also MOL 110)  Spring ST

This lecture and laboratory course will acquaint non-science majors with classical and modern neuroscience. Lectures will give an overview at levels ranging from molecular signaling to cognitive science with a focus on the neuroscience of everyday life, from the general (love, memory, and personality) to the particular (jet lag, autism, and weight loss). The laboratory will offer hands-on experience in recording signals from single neurons, examining neural structures, and analysis of whole-brain functional brain imaging data. S. Wang, A. Gelperin

http://www.princeton.edu/ua/
NEU 258 Fundamentals of Neuroscience (also PSY 258)  Fall

An introduction to brain function, neuroscience, and physiological psychology. The first half will survey structure and function of the nervous system. The second half will deal in depth with selected problems in the neuroscience of motivation (e.g., appetite), emotion (e.g., addiction) and mental disorder (e.g., chronic depression). Appropriate for departmental and non-departmental students, particularly pre-medical, pre-psychology, and pre-neuroscience students. Two lectures, one preceptorial. A. Ghazanfar

NEU 259A Introduction to Cognitive Neuroscience (also PSY 259A)  Spring EC

An introduction to cognitive brain functions, including higher perceptual functions, attention and selective perception, systems for short- and long-term memory, language, cerebral lateralization, motor control, executive functions of the frontal lobe, cognitive development and plasticity, and the problem of consciousness. Major neuropsychological syndromes (e.g., agnosia, amnesia) will be discussed. Prerequisite: 258 or instructor's permission. Two 90-minute lectures, one preceptorial. Y. Niv

NEU 259B Introduction to Cognitive Neuroscience (also PSY 259B)  Spring ST

An introduction to cognitive brain functions, including higher perceptual functions, attention and selective perception, systems for short- and long-term memory, language, cerebral lateralization, motor control, executive functions of the frontal lobe, cognitive development and plasticity, and the problem of consciousness. Major neuropsychological syndromes (e.g., agnosia, amnesia) will be discussed. Prerequisite: 258 or instructor's permission. Two 90-minute lectures, one three-hour laboratory. Y. Niv

NEU 306 Memory and Cognition (see PSY 306)

NEU 330 Introduction to Connectionist Models: Bridging between Brain and Mind (also PSY 330)  Not offered this year ST

A fundamental goal of cognitive neuroscience is to understand how psychological functions such as attention, memory, language, and decisionmaking arise from computations performed by assemblies of neurons in the brain. This course will provide an introduction to the use of connectionist models (also known as neural network or parallel distributed processing models) as a tool for exploring how psychological functions are implemented in the brain, and how they go awry in patients with brain damage. Prerequisite: instructor's permission. Two 90-minute lectures, one laboratory. K. Norman

NEU 336 The Diversity of Brains (see PSY 336)

NEU 408 Cellular and Systems Neuroscience (also MOL 408/PSY 404)  Fall

A survey of fundamental principles in neurobiology at the biophysical, cellular, and system levels. Lectures will address the basis of the action potential, synaptic transmission and plasticity, local circuit computation, sensory physiology, and motor control. Prerequisites: MOL 214 or MOL 215, PSY 258, PHY 103-104, and MAT 103-104, or permission of instructor. Two 90-minute lectures, one preceptorial. M. Berry

NEU 410 Depression: From Neuron to Clinic (see PSY 410)

NEU 437 Computational Neuroscience (also MOL 437/PSY 437)  Spring

Introduction to the biophysics of nerve cells and synapses, and the mathematics of neural networks. How can networks of neurons compute? How do we model and analyze data from neuroscientific experiments? Data from experiments running at Princeton will be used as examples (e.g., blowfly visual system, hippocampal slice, rodent prefrontal cortex). Each topic will have a lecture and a computer laboratory component. Prerequisite: 410, or elementary knowledge of linear algebra, differential equations, probability, and basic programming ability, or permission of the instructor. Two 90 minute lectures, one laboratory. C. Brody
Department of Operations Research and Financial Engineering

Chair
Robert J. Vanderbei

Departmental Representative
Alain L. Kornhauser

Director of Graduate Studies
Patrick Cheridito

Professor
René A. Carmona
Erhan Çinlar
Jianqing Fan
Alain L. Kornhauser
William A. Massey
John M. Mulvey
Warren B. Powell
K. Ronnie Sircar
Robert J. Vanderbei

Associate Professor
Patrick Cheridito
Alexandre W. d’Aspremont

Assistant Professor
Philippe Rigollet
Birgit Rudloff
Ramon van Handel

Associated Faculty
Yacine Aït-Sahalia, Economics
Markus K. Brunnermeier, Economics
Ingrid C. Daubechies, Mathematics, Applied and Computational Mathematics
Weinan E, Mathematics
Christodoulos A. Floudas, Chemical and Biological Engineering
Sanjeev R. Kulkarni, Electrical Engineering
José A. Scheinkman, Economics
Paul D. Seymour, Mathematics
Yakov G. Sinai, Mathematics
Christodoulos A. Floudas, Chemical and Biological Engineering
Yacine Aït-Sahalia, Economics
Markus K. Brunnermeier, Economics
Ingrid C. Daubechies, Mathematics, Applied and Computational Mathematics
Weinan E, Mathematics
Christodoulos A. Floudas, Chemical and Biological Engineering
Sanjeev R. Kulkarni, Electrical Engineering
H. Vincent Poor, Electrical Engineering
Robert E. Schapire, Computer Science
Paul D. Seymour, Mathematics
Yakov G. Sinai, Mathematics
Elias M. Stein, Mathematics
John D. Storey, Molecular Biology and Lewis-Sigler Institute for Integrative Genomics
Wei Xiong, Economics

Information and Departmental Plan of Study

Operations research and financial engineering may be considered as the modern form of a liberal education: modern because it is based on science and technology, and liberal in the sense that it provides for broad intellectual development and can lead to many different types of careers. By choosing judiciously from courses in engineering, economics, public policy, and liberal arts, each student may design a program adapted to his or her particular interests.

All students start from a common academic core consisting of statistics, probability and stochastic processes, and optimization. Related courses focus on developing computer skills and exposing students to applications in areas such as finance, operations, transportation, and logistics. Students augment the core program with a coherent sequence of departmental electives. Students may also design specialized programs, which must be reviewed and approved by their academic adviser and the departmental representative. Students often draw on courses from economics, computer science, applied mathematics, civil and environmental engineering, mechanical engineering, and the Woodrow Wilson School of Public and International Affairs. Requirements for study in the department follow the general requirements for the School of Engineering and Applied Science and the University.

Program of Study

The student's program is planned in consultation with the departmental representative and the student's adviser and requires a year-long thesis or a one-semester senior project. With departmental approval, the exceptional student who wishes to go beyond the science and engineering requirements may select other courses to replace some of the required courses in order to add emphasis in another field of engineering or science or to choose more courses in the area of study. Suggested plans of study and areas of concentration are available from the departmental representative.

In addition to the engineering school requirements, there are three components to the curriculum:

1. The core requirements (six courses). These form the intellectual foundation of the field and cover statistics, probability, stochastic processes, and optimization, along with more advanced courses in mathematical modeling.

2. Departmental electives (eight or nine courses). These are courses that either extend and broaden the core, or expose the student to a significant problem area or application closely related to the core program.

3. Senior independent research. A one-semester project or a full-year thesis involving an application of the techniques in the program applied to a topic that the student chooses in consultation with a faculty adviser.

Core requirements (six courses):

ORF 245 Fundamentals of Engineering Statistics
ORF 307 Optimization

http://www.princeton.edu/ua/
ORF 309 Probability and Stochastic Systems  
ORF 335 Introduction to Financial Mathematics  
ORF 405 Regression and Applied Time Series  
ORF 411 Operations and Information Engineering

*Departmental electives* (eight or nine courses, if a one-semester project is selected): the departmental electives represent courses that further develop a student's skills in mathematical modeling either by a more in-depth investigation of core disciplines, applying these skills in specific areas of application, or learning about closely related technologies. Students must choose eight or nine courses, as appropriate, with the following constraints:

1. There must be at least one 300-level math course from the following:
   
   APC 350 Introduction to Differential Equations  
   MAE 305 Mathematics in Engineering I  
   MAE 306 Mathematics in Engineering II  
   MAT 303 Ordinary Differential Equations  
   MAT 304 Introduction to Partial Differential Equations  
   MAT 306 Introduction to Graph Theory  
   MAT 307 Combinatorial Mathematics  
   MAT 308 Theory of Games  
   MAT 314 Introduction to Real Analysis  
   MAT 390 Probability Theory  
   MAT 391 Random Processes

2. There must be at least two courses from the Department of Operations Research and Financial Engineering (ORF).

3. There can be no more than three courses from any one department (excluding ORF).

A list of all other departmental electives may be found in the departmental undergraduate academic guide; see the department website.

Students in the department often participate in the following certificate programs and laboratories:

**Certificate in Finance.** The department cooperates with the Bendheim Center in Finance, which offers a certificate program in finance.

**Certificate Program in Engineering and Management Systems.** The department sponsors a certificate program for students majoring in other departments who complete a significant part of the core of the undergraduate program.

**Certificate in Applied and Computational Mathematics.** Students seeking a strong mathematical foundation can combine courses from the department with supporting courses which develop more fundamental mathematical skills.

The department maintains several research laboratories which may be used as part of undergraduate research projects.

**Computational and Stochastic Transportation and Logistics Engineering Laboratory.** The CASTLE Laboratory works on problems in dynamic resource management with ongoing projects in chemical distribution, railroads, trucking, and the airlift mobility command. Through this lab, students gain access to data and specialized tools to aid them in their research into transportation and logistics.

**Financial Engineering Laboratory.** This facility provides students with access to specialized software packages and to financial data and news services. Research in the laboratory is concerned with the analysis of the various forms of financial risk and the development of new financial instruments intended to control the risk exposure of insurance and reinsurance companies.

**Transportation Information and Decision Engineering Center.** The TIDE Center conducts research on information and decision engineering technologies and on how these technologies can be used to improve transportation-related decision making. Included in TIDE is Princeton Autonomous Vehicle Engineering (PAVE), an extracurricular undergraduate activity focused on the implementation of advanced sensing and control technologies for optimal autonomous decision making in vehicles. The current objective is the development of an autonomous vehicle that can pass the New Jersey State Driving Test.

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**Courses**

**ORF 105 The Science and Technology of Decision Making (also EGR 106)**  
Not offered this year  
QR

An individual makes decisions every day. In addition, other people are making decisions that have an impact on the individual. In this course we will consider both how these decisions are made and how they should be made. In particular, we will focus on the use of advanced computing and information technology in the decision-making process.  
*Staff*

**ORF 245 Fundamentals of Engineering Statistics (also EGR 245)**  
Fall, Spring  
QR

A study of fundamentals of statistical methods and their applications in engineering. Basic concepts of probability, discrete and continuous distributions, sampling and quality control, statistical inference, empirical models, and least squares. Three lectures. Open to freshmen.  
*P. Rigollet*

[http://www.princeton.edu/ua/](http://www.princeton.edu/ua/)
ORF 307 Optimization (also EGR 307)  Spring
Model formulation, analysis, and optimization of deterministic systems. Introduction to quantitative methods: linear programming, duality theory, large-scale mathematical programs, and network analysis. Emphasis will be on applications to problem areas such as allocation of resources, transportation systems, scheduling, capital budgeting, and network problems. Two 90-minute lectures. Prerequisite: MAT 202. A. d'Aspremont

ORF 309 Probability and Stochastic Systems (also EGR 309/MAT 309)  Fall
An introduction to probability and its applications. Random variables, expectation, and independence. Poisson processes, Markov chains, Markov processes, and Brownian motion. Stochastic models of queues, communication systems, random signals, and reliability. Prerequisite: MAT 201, 203, 217, or instructor's permission. E. Çinlar

ORF 311 Optimization under Uncertainty  Fall
A survey of quantitative approaches for making optimal decisions involving uncertainty and complexity including decision trees, Monte Carlo simulation, and stochastic programming. Forecasting and planning systems are integrated. Applications in financial planning. Prerequisites: 307 or MAT 305, and 309. Two 90-minute classes. J. Mulvey

ORF 322 Human-Machine Interaction (see PSY 322)

ORF 335 Introduction to Financial Mathematics (also ECO 364)  Spring QR
Financial engineers design and analyze products that improve the efficiency of markets and create mechanisms for reducing risk. This course introduces the basics of financial mathematics: the notions of arbitrage and risk-neutral probability measure are developed in the case of discrete models; Black-Scholes theory is introduced in continuous-time models, and interest rate derivatives and the term structure of interest rates are discussed. Prerequisites: 309, ECO 100, and MAT 104. R. Sircar

ORF 374 Special Topics in Operations Research and Financial Engineering  Not offered this year
A course covering special topics in operations research or financial engineering. Subjects may vary from year to year. Staff

ORF 375 Independent Research Project  Fall
Independent research or investigation resulting in a report in the student's area of interest under the supervision of a faculty member. Open to sophomores and juniors. A. Kornhauser

ORF 376 Independent Research Project  Spring
Independent research or investigation resulting in a report in the student's area of interest under the supervision of a faculty member. Open to sophomores and juniors. A. Kornhauser

ORF 401 Electronic Commerce  Spring
Electronic commerce is broadly defined as the buying and selling of goods using electronic transaction processing technologies. This course considers the technologies themselves, as well as various economic and financial issues associated with their use. Two 90-minute lectures. A. Kornhauser

ORF 405 Regression and Applied Time Series  Fall
Regression analysis: least squares and robust alternatives, nonparametric techniques (splines, projection pursuit, and neural network). Time-series: trends, seasonal effects, clinical models, state space models. Includes a final project in the form of a realistic forecasting game involving portfolio management and economic time-series data. Prerequisites: 245 and MAT 202. R. Carmona

ORF 406 Statistical Design of Experiments  Not offered this year
Major methods of statistics as applied to the engineering and physical sciences. The central theme is the construction of empirical models, the design of experiments for elucidating models, and the applications of models for forecasting and decision making under uncertainty. Three lectures. Prerequisite: 245 or equivalent. Staff

ORF 407 Fundamentals of Queueing Theory  Spring QR
An introduction to the fundamental results of queueing theory. Topics covered include: the classical traffic; offered load; and loss and delay stochastic models for communication systems. Through concrete examples and motivations, the theory of Markov chains, Poisson processes, and Monte Carlo simulation are discussed. Fundamental queueing results such as the Erlang blocking and delay formulae, Little's law and Lindley's equation are presented. Applications are drawn from communication network systems, inventory management, and optimal staffing. Prerequisite: 309 or equivalent. Two 90-minute lectures. W. Massey

ORF 409 Introduction to Monte Carlo Simulation  Fall
An introduction to the uses of simulation and direct computation in analyzing stochastic models and interpreting real phenomena. Deals with generating discrete and continuous random variables, stochastic ordering, the statistical analysis of simulated data, variance reduction techniques, statistical validation techniques, nonstationary Markov chains, and Markov chain Monte Carlo methods. Applications are drawn from problems in finance, manufacturing, and communication networks. Prerequisite: 309. Two 90-minute classes. W. Massey
ORF 411 Operations and Information Engineering  Fall
The modeling of complex systems under uncertainty through the control of physical, financial, and informational resources. Students learn how to model stochastic, dynamic systems, using the contextual domain of resource allocation arising in settings such as energy, finance, health, and human resource management. Policy optimization is introduced as a mechanism for controlling systems, along with information exchange and efficient collection of new information. Prerequisites: 245, 307 and 309, or equivalents. Two 90 minute lectures. W. Powell

ORF 417 Dynamic Programming  Not offered this year
An introduction to stochastic dynamic programming and stochastic control. The course deals with discrete and continuous-state dynamic programs, finite and infinite horizons, stationary and nonstationary data. Applications drawn from inventory management, sequential games, stochastic shortest path, dynamic resource allocation problems. Solution algorithms include classical policy and value iteration for smaller problems and stochastic approximation methods for large-scale applications. Prerequisites: 307 and 309. Staff

ORF 418 Optimal Learning  QR
Addresses the problem of collecting information used to estimate statistics or fit a model which is then used to make decisions. Of particular interest are sequential problems where decisions adapt to information as it is learned. The course introduces students to a wide range of applications, demonstrates how to express the problem formally, and describes a variety of practical solution strategies. Prerequisite: ORF 245, ORF 309. Two 90-minute lectures. W. Powell

ORF 435 Financial Risk Management  Fall
This course covers the basic concepts of modeling, measuring and managing financial risks. Topics include mean-variance portfolio theory, fixed-income securities, options pricing, Greeks, risk measures, and utility functions. Prerequisites: 245, 335 or ECO 465 (concurrent enrollment is acceptable) or instructor's permission. Two 90-minute lectures. B. Rudloff

ORF 467 Transportation Systems Analysis  Fall
Operations research in transportation and logistics. Vehicle routing and scheduling, warehouse location, network flow models in transportation, set partitioning solutions to vehicle and crew assignment problems, fixed-charge problems and network equilibrium models. Emphasis placed on the theory and implementation of algorithms for large, specially structured problems. Two 90-minute lectures. Prerequisites: linear programming and network algorithms. A. Kornhauser

ORF 474 Special Topics in Operations Research and Financial Engineering  Spring
A course covering one or more advanced topics in operations research and financial engineering. Subjects may vary from year to year. Three classes Staff

ORF 478 Senior Thesis  Spring
A year-long, independent study of a significant problem in operations research or financial engineering. Topic proposals must be submitted during the spring of junior year and must be accepted by the ORFE departmental representative. A written report is required at the end of each term, though enrollment is only in the spring term when a double-credit grade is awarded. Students give an oral presentation at the end of the spring term. Students must make acceptable progress in the fall term in order to continue in the spring. Fulfills the departmental independent work requirement for seniors. A. Kornhauser

ORF 479 Senior Project
A one-semester project that fulfills the departmental independent work requirement for concentrators. Topics are chosen by students in consultation with members of the faculty. A written report is required at the end of the term. A. Kornhauser

ORF 491 High-Tech Entrepreneurship (see ELE 491)
Department of Philosophy

Chair
Daniel Garber

Departmental Representative
John P. Burgess

Director of Graduate Studies
Gilbert H. Harman

Professor
Kwame Anthony Appiah, also University Center for Human Values
John P. Burgess
John M. Cooper
Daniel Garber
Hans Halvorson
Gilbert H. Harman
Mark Johnston
Alexander Nehamas, also Council of the Humanities, Comparative Literature
Gideon A. Rosen
Michael A. Smith

Visiting Professor
John Hawthorne

Associate Professor
Adam Newman Elga
Delia Graff Fara
Elizabeth Harman, also University Center for Human Values
Thomas P. Kelly
Hendrik Lorenz
Benjamin C. A. Morison

Assistant Professor
Shamik Dasgupta
Desmond Hogan
Boris C. Kment
Sarah-Jane Leslie
Sarah E. McGrath

Lecturer with Rank of Professor
Frank C. Jackson

Lecturer
Daniel Cloud
Victoria McGeer

Associated Faculty
Charles R. Beitz, Politics
Robert A. Freidin, Council of the Humanities, Linguistics
Robert P. George, Politics
Simon B. Kochen, Mathematics
Sanjeev R. Kulkarni, Electrical Engineering
Edward Nelson, Mathematics
Alan W. Patten, Politics
Philip N. Pettit, Politics, University Center for Human Values
Peter Singer, University Center for Human Values
Jeffrey L. Stout, Religion
Christian Wildberg, Classics
Edwin S. Williams III, Council of the Humanities, Linguistics

Information and Departmental Plan of Study

Prerequisites

Any course in the philosophy department may serve as prerequisite for concentration. A student who has not satisfied this prerequisite and who, at the end of sophomore year, desires to enter the department must apply to the departmental representative.

Early Concentration

Early concentration is open to spring semester sophomores who have completed the prerequisite for entering the department by the end of the fall semester sophomore year, and allows the student to make an early start on independent work.

General Requirements

Distribution Requirement. Six of the eight courses must be so distributed that there are two in each of three of the four areas into which philosophy courses are divided; there is no such restriction on the remaining two of the eight. The four distribution areas are as follows:

2. Ethics and philosophy of value: 202, 307, 309, 319, 320, 325, 326, 335, 360, 380, 384, 385
3. Logic and philosophy of science: 201, 204, 312, 314, 321, 322, 323, 327, 340, 490

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Undergraduate Announcement

Interdisciplinary Options

Political Philosophy. Senior concentrators doing their theses in political philosophy have the option of substituting for the usual distribution requirement (two courses in each of three areas plus two unrestricted courses) the following: two courses from among those listed under the Department of Politics as courses in political theory; two philosophy courses in the ethics and philosophy of value area; two philosophy courses in one other philosophy distribution area; and two philosophy courses unrestricted as to distribution area.

Philosophy of Science. Senior concentrators doing their theses in philosophy of science have the option of substituting for the usual distribution requirements (two courses in each of three areas plus two unrestricted courses) the following: two upper-division (300-level or higher) courses in one relevant science (such as mathematics, computer science, physics, biology, psychology, economics); two philosophy courses in the logic and philosophy of science area; two philosophy courses in one other philosophy distribution area; and two philosophy courses unrestricted as to distribution area.

Philosophy and Linguistics. Philosophy concentrators participating in the certificate program in linguistics may follow the philosophy of science option just described, taking linguistics as their science. All courses listed under the Program in Linguistics as core, other, or related courses may be considered courses in the science of linguistics for this purpose.

Independent Work

Junior Year. During fall semester of the junior year, independent work normally involves participation in a seminar of up to five students under the supervision of an instructor from the faculty of the department. The seminar provides a transition from course work to fully independent work. A junior seminar meets weekly for an hour or biweekly for two hours to discuss readings selected by the instructor, and each student writes a final paper, normally of at least 5,000 words, on a topic in the area defined by those readings, usually chosen by the student from a list provided by the instructor. (The student's grade for fall semester independent work will be based mainly on this paper, but it is usually based partly on shorter papers and/or oral presentations in the seminar earlier in the term.) During spring semester of the junior year, independent work consists of writing a junior paper--an essay on a philosophical topic, normally of at least 5,000 words--under the supervision of an individual faculty adviser (different from the student's fall seminar instructor).

Senior Year. Senior year independent work consists of the following: writing the senior thesis, an essay or group of related essays on a topic or group of related topics in philosophy, normally of at least 10,000 words (and normally of at most 20,000 words); and preparation for the departmental examination (see below). The thesis is read, the examination is conducted, and both are graded by a committee of two members of the faculty, one primarily for advising the thesis, the other for coordinating the examination. A short thesis proposal is due just after fall recess and an interim thesis draft, normally of at least 5,000 words (not necessarily in final form), is due just after winter recess.

Senior Departmental Examination

The senior departmental examination is a 90-minute oral examination on the general area of philosophy to which the thesis topic belongs. The final syllabus of readings for the departmental examination (agreed upon between the student and his or her examination coordinator and thesis adviser) is due just after spring recess.

Study Abroad

Each year some junior philosophy concentrators spend one or both semesters on foreign study, usually in Britain. The department has generally been flexible in allowing, within the limits of University regulations, departmental credit for work done abroad. If the student is planning to be away for only one semester and has a choice, the department recommends choosing spring so as not to miss the fall junior seminars here. All students planning to study abroad, and especially those planning to be away for the entire junior year, are advised to apply to the department for early concentrator status (see above).

Preparation for Graduate Study

Students contemplating going on to graduate study in philosophy are strongly advised to do more than the minimum required of all majors: to take more than just eight philosophy courses; to do some work in all four areas of philosophy and not just three; to include in their work in the philosophy of value area some in core ethics (at least one of 202, 307, 319, 335) and in their work in the philosophy of science area some in core logic (at least one of 201, 312, 323); to include in their work in the history area some on ancient philosophy (at least one of 205, 300, 301, 335) and some on modern philosophy (at least one of 200, 302-306, 332, 333, 338, 339). Also it is advisable to study at least to the level of the University language requirement one of the following: ancient Greek, Latin, French, or German.

Courses numbered below 300 have no prerequisite and are open to underclass students. Most courses numbered 300 and above are intended for students who have already had some philosophy; others should consult the instructor before enrolling. With rare exceptions, 200-level courses are given every year. Other courses are scheduled on the principle that a student majoring in the department for a two-year period will be able to work out a well-balanced program and satisfy the department's distribution requirements with significant freedom of choice.

Courses
PHI 200 Philosophy and the Modern Mind  Spring EC
An introduction to modern philosophy, from the Renaissance to the present, with careful study of works by Descartes, Hume, Kant, and others. Emphasis is placed upon the complex relations of philosophy to the development of modern science, the social and political history of the West, and man's continuing attempt to achieve a satisfactory worldview. Two lectures, one preceptorial. D. Hogan

PHI 201 Introductory Logic  Spring EC
A study of reasoning and its role in science and everyday life, with special attention to the development of a system of symbolic logic, to probabilistic reasoning, and to problems in decision theory. Two lectures, one preceptorial. S. Dasgupta

PHI 202 Introduction to Moral Philosophy (also CHV 202)  Fall EM
An introductory survey of ethical thought, covering such topics as the demands that morality makes, the justification of these demands, and our reasons for obeying them. Readings from both the historical and contemporary philosophical literature. Two lectures, one preceptorial. G. Harman

PHI 203 Introduction to Metaphysics and Epistemology  Fall EC
An introduction to some of the central questions of pure philosophy through their treatment by traditional and contemporary writers: questions concerning mind and matter; causation and free will; space and time; meaning, truth, and reality; knowledge, perception, belief, and thought. Two lectures, one preceptorial. G. Rosen

PHI 204 Introduction to the Philosophy of Science  Not offered this year EC
An inquiry into the form and function of concepts, laws, and theories, and into the character of explanation and prediction, in the natural and the social sciences; and an examination of some philosophical problems concerning scientific method and scientific knowledge. Two lectures, one preceptorial. Staff

PHI 205 Introduction to Ancient Philosophy (also CLA 205)  Spring EC
Designed to introduce the student to the Greek contribution to the philosophical and scientific ideas of the Western world through study of works of Plato, Aristotle, Epicurus, and Lucretius in English translation. Topics in moral and political philosophy, as well as epistemology and metaphysics, will be included. Attention will be focused on the quality of the arguments presented by the philosophers. Two lectures, one preceptorial. H. Lorenz

PHI 218 Learning Theory and Epistemology (also ELE 218/EGR 218)  Not offered this year EC
An accessible introduction for all students to recent results by logicians, computer scientists, psychologists, engineers, and statisticians concerning the nature and limits of learning. Topics include truth and underdetermination, induction, computability, language learning, pattern recognition, neural networks, and the role of simplicity in theory choice. Two lectures, one preceptorial. G. Harman, S. Kulkarni

PHI 237 The Psychology and Philosophy of Rationality (see PSY 237)

PHI 300 Plato and His Predecessors  Fall EC
Readings in translation from pre-Socratic philosophers and from Plato's dialogues, to provide a broad history of Greek philosophy through Plato. Topics covered will include: Socrates's method of dialectic, his conceptions of moral virtue and human knowledge; Plato's theory of knowledge, metaphysics, and moral and political philosophy. Two lectures, one preceptorial. H. Lorenz

PHI 301 Aristotle and His Successors  Spring EC
Aristotle's most important contributions in the areas of logic, scientific method, philosophy of nature, metaphysics, psychology, ethics, and politics. Several of his major works will be read in translation. Aristotle's successors in the Greco-Roman period will be studied briefly. Two lectures, one preceptorial. B. Morison

PHI 302 British Empiricism  Not offered this year EC
A critical study of the metaphysical and epistemological doctrines of Locke, Berkeley, and Hume. Two lectures, one preceptorial. D. Hogan

PHI 303 Descartes, Spinoza, and Leibniz  Not offered this year EC
Readings in continental philosophy of the early modern period, with intensive study of the works of Descartes, Spinoza, and Leibniz. Topics to be specially considered include: knowledge, understanding, and sense-perception; existence and necessity; the nature of the self and its relation to the physical world. Two 90-minute classes. Staff

PHI 304 The Philosophy of Kant  Fall EC
Analysis of the Critique of Pure Reason, with some attention to other aspects of Kant's philosophy, such as his views on ethics, aesthetics, and teleological judgment. Two lectures, one preceptorial. D. Hogan

PHI 306 Nietzsche (also COM 393)  Fall EM
An examination of various issues raised in, and by, Nietzsche's writings. Apart from discussing views like the eternal recurrence, the overman, and the will to power, this course considers Nietzsche's ambiguous relationship with
philosophy, the literary status of his work, and his influence on contemporary thought. Prerequisite: one philosophy course or equivalent preparation in the history of modern thought or literature. Two lectures, one preceptorial. A. Nehamas

PHI 307 Systematic Ethics (also CHV 311)  Not offered this year EM
A study of important ethical theories with special reference to the problem of the objectivity of morality and to the relation between moral reasoning and reasoning about other subjects. Two lectures, one preceptorial. S. McGrath

PHI 309 Political Philosophy (also CHV 309)  Not offered this year EM
A systematic study of problems and concepts connected with political institutions: sovereignty, law, liberty, and political obligation. Topics may include representation, citizenship, power and authority, revolution, civil disobedience, totalitarianism, and legal and political rights. Two lectures, one preceptorial. K. Appiah

PHI 312 Intermediate Logic  Not offered this year EC
A development of logic from the mathematical viewpoint, including propositional and predicate calculus, consequence and deduction, truth and satisfaction, the Gödel completeness theorem, the Löwenheim-Skolem theorem, and applications to Boolean algebra, axiomatic theories, and the theory of models as time permits. Two lectures, one preceptorial. Prerequisite: 201 or instructor's permission. J. Burgess

PHI 313 Theory of Knowledge  Fall EC
A critical study of important concepts and problems involved in the characterization, analysis, and appraisal of certain types of human knowledge. Such topics as sense perception, knowledge and belief, necessity, memory, and truth will be treated. Writings of contemporary analytic philosophers will be read and discussed. Two lectures, one preceptorial. B. Kment

PHI 314 Philosophy of Mathematics  Not offered this year EC
A study of the nature of mathematics based on a logical and philosophical examination of its fundamental concepts and methods. Two lectures, one preceptorial. Some previous work in mathematics or logic at the college level is highly desirable, but no one particular branch of mathematics is presupposed in the course. Staff

PHI 315 Philosophy of Mind (also CHV 315)  Fall EC
Investigation of some of the following (or similar) topics: the mind-body problem, personal identity, the unity of consciousness, the unconscious, the problem of other minds, action, intention, and the will. Readings primarily from recent sources. Two lectures, one preceptorial. F. Jackson

PHI 317 Philosophy of Language  Spring EC
An examination of the nature of language through the study of such topics as truth, reference, meaning, linguistic structure, how language differs from other symbol systems, relations between thought and language and language and the world, the use of language, and the relevance of theories concerning these to selected philosophical issues. Two 90-minute classes. D. Fara

PHI 318 Metaphysics  Not offered this year EC
An intensive treatment of some of the central problems of metaphysics, such as substance, universals, space and time, causality, and freedom of the will. Two lectures, one preceptorial. B. Kment

PHI 319 Normative Ethics (also CHV 319)  Spring EM
A detailed examination of different theories concerning how we should live our lives. Special emphasis will be placed on the conflict between consequentialist theories (for example, utilitarianism) and nonconsequentialist theories (for example, common sense morality). Two lectures, one preceptorial. G. Harman

PHI 320 Philosophy and Literature  Not offered this year LA
A critical study of works of literature in conjunction with philosophical essays, concentrating on two or three philosophical themes, such as the will, self-identity, self-deception, freedom, and time. Two lectures, one preceptorial. Staff

PHI 321 Philosophy of Science  Not offered this year EC
An intensive examination of selected problems in the methodological and philosophical foundations of the sciences. Topics covered may include scientific explanation, the role of theories in science, and probability and induction. Two 90-minute classes. A. Elga

PHI 322 Philosophy of the Cognitive Sciences  Fall EC
An examination of philosophical problems arising out of the scientific study of cognition. Possible topics include methodological issues in the cognitive sciences; the nature of theories of reasoning, perception, memory, and language; and the philosophical implications of such theories. Two lectures, one preceptorial. S. Leslie

PHI 323 Advanced Logic (also MAT 313)  Fall QR
This course deals with topics chosen from recursion theory, proof theory, and model theory. In recent years the course
has most often given an introduction to recursion theory with applications to formal systems. Two 90-minute classes. Prerequisite: 312 or instructor's permission. *H. Halvorson*

**PHI 325 Philosophy of Religion**  Not offered this year EM

Critical discussion of religious and antireligious interpretations of experience and the world, the grounds and nature of religious beliefs, and of a variety of theistic and atheistic arguments. Readings from contemporary analytical philosophy of religion, and from historical sources in the Western tradition. Two lectures, one preceptorial. *H. Halvorson*

**PHI 326 Philosophy of Art (also HUM 326)**  Spring LA

An examination of concepts involved in the interpretation and evaluation of works of art. Emphasis will be placed on sensuous quality, structure, and expression as aesthetic categories. Illustrative material from music, painting, and literature. Two lectures, one preceptorial. *A. Nehamas*

**PHI 327 Philosophy of Physics**  Not offered this year EC

A discussion of philosophical problems raised by modern physics. Topics will be chosen from the philosophy of relativity theory or more often, quantum mechanics. Two lectures, one preceptorial. *Staff*

**PHI 332 Early Modern Philosophy**  Fall EC

Detailed study of important concerns shared by some modern pre-Kantian philosophers of different schools. Topics may include identity and distinctness, the theory of ideas, substance, the mind/body problem, time, and causation. Philosophers may include Descartes, Spinoza, Hobbes, Hume, or others. One three-hour seminar. *D. Garber*

**PHI 333 Recent Continental Philosophy**  Not offered this year EC

Analysis of some representative 20th-century works drawn from the French and German traditions. The specific content of the course will vary from year to year, but in each case there will be some attempt to contrast differing philosophical approaches. Figures to be treated might include Sartre, Gadamer, Habermas, and Foucault. Two lectures, one preceptorial. *Staff*

**PHI 335 Greek Ethical Theory (also CHV 335)**  Not offered this year EM

The development of moral philosophy in Greece. Intensive study of the moral theories of such philosophers as Socrates, Plato, Aristotle, Epicurus, the early Stoics, and Sextus Empiricus. Two 90-minute lecture-discussion classes. *J. Cooper*

**PHI 338 Philosophical Analysis from 1900 to 1950**  Not offered this year EC

An introduction to classics of philosophical analysis from the first half of the 20th century. Topics include early paradigms of Moore and Russell, logical atomism in Russell and early Wittgenstein, and logical positivism. Changes are traced both in metaphysical, epistemological, and ethical views and in analysis as a philosophical method. Two lectures, one preceptorial. *T. Kelly*

**PHI 340 Philosophical Logic**  Spring EC

An introduction to modal and many-valued logics, with emphasis on philosophical motivation through a study of applications and paradoxes. Prerequisite: 201 or instructor's permission. Two 90-minute classes. *J. Burgess*

**PHI 360 Democratic Theory (see POL 306)**

**PHI 380 Explaining Values**  Not offered this year EM

The course will consider what types of explanations are possible of ordinary moral views. Students will look at philosophical, scientific, and historical explanations and consider how plausible they are, what sort of evidence might be relevant to them, and what their normative implications might be. Two lectures, one preceptorial. *V. McGeer*

**PHI 384 Philosophy of Law**  Not offered this year EM

Conceptual and moral problems in the foundations of law. Topics may include: morality and criminal justice; the justification of punishment; moral and economic problems in private law (torts and contracts); fundamental rights and constitutional interpretation. Two lectures, one preceptorial. *G. Rosen*

**PHI 385 Practical Ethics (see CHV 310)**

**PHI 435 Advanced Semantics (see LIN 435)**

**PHI 490 Perspectives on the Nature and Development of Science (see HIS 490)**

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http://www.princeton.edu/ua/
Department of Physics

Chair
Curtis G. Callan Jr.

Associate Chair
Daniel R. Marlow
Lyman A. Page Jr.

Departmental Representative
Edward J. Groth III

Director of Graduate Studies
Steven S. Gubser

Professor
Michael Aizenman, also Mathematics
Robert H. Austin
William Bialek, also Lewis-Sigler Institute for Integrative Genomics
Frank P. Calaprice
Curtis G. Callan Jr.
Edward J. Groth III
Steven S. Gubser
F. Duncan Haldane
William Happer
David A. Huse
Igor R. Klebanov
Elliott H. Lieb, also Mathematics
Daniel R. Marlow
Kirk T. McDonald
Peter D. Meyers
Chiara R. Nappi
Nai-Phuan Ong
Lyman A. Page Jr.
Alexander M. Polyakov
A. J. Stewart Smith
Shivaji L. Sondhi
Suzanne T. Stuiggs
Paul J. Steinhardt
Christopher G. Tully
Herman L. Verlinde
Ali Yazdani

Associate Professor
Cristiano Galbiati
Zahid Hasan
James D. Olsen
Michael V. Romalis

Assistant Professor
Bogdan A. Bernevig
Joseph W. Fowler
Thomas Gregor, also Lewis-Sigler Institute for Integrative Genomics
Valerie Halyo
Christopher P. Herzog
William C. Jones
Jason R. Petta
Frans Pretorius
Joshua W. Shaevitz, also Lewis-Sigler Institute for Integrative Genomics
Lian-Tao Wang

Associated Faculty
Ravindra N. Bhatt, Electrical Engineering
Roberto Car, Chemistry
Ronald C. Davidson, Astrophysical Sciences
Mansour Shayegan, Electrical Engineering
Yakov G. Sinai, Mathematics
David N. Spergel, Astrophysical Sciences
David W. Tank, Molecular Biology, Princeton Neuroscience Institute
Salvatore Torquato, Chemistry
Ned S. Wingreen, Molecular Biology

Information and Departmental Plan of Study

The physics department offers a comprehensive program with the flexibility to accommodate students with a range of interests. Those students wishing to maximize their preparation for graduate school can choose from a variety of advanced-level courses. The requirements of the core curriculum, however, are such that students with diverse interests can take a considerable course load outside the department. Thus, in addition to those students planning to enter graduate school in physics, the department encourages students with career goals in such areas as engineering physics, biophysics, law, medicine, materials science, and teaching.

Advanced Placement

An A.B. student who receives a score of 5 on the Physics B Advanced Placement Examination qualifies for two units of advanced placement credit. Any admission to advanced courses is contingent upon approval by the department. Advanced placement credit via the Physics B Advanced Placement Examination does not lead to admission to courses higher than 103.

The Physics C Advanced Placement Examination consists of two parts. A student with a 5 in both Parts I and II will receive two units of advanced placement credit and may, if desired, satisfy the B.S.E. physics requirement at entrance. Students with advanced placement credit who wish to enroll in a physics course usually take 105, but under exceptional circumstances may be eligible to enroll in 205 upon permission of the instructor. They are expected to take 106 in the spring.

Prerequisites

http://www.princeton.edu/ua/
Students entering the department are encouraged to complete PHY 203 (or 205 or 207) and 208 as well as linear algebra and multivariable calculus by the end of their sophomore year (MAT 203-204 is preferred, but MAT 201-202 is adequate). This means that students planning to major in physics should take 103-104 or 105-106, (101-102 may work in special cases) in their first year. The only routes into 200-level physics courses are to fulfill the prerequisites by taking the above-mentioned 100-level physics courses, or to pass the appropriate entrance exams offered at the beginning of the term. Students who do not discover their interest in physics until the sophomore year, and hence have only taken the introductory-level courses, can still complete the physics program. Such students should meet with the departmental representative as early as possible.

**Early Concentration**

Early concentration enables the qualified student to exploit upperclass courses and independent work more effectively. Early concentration may be accomplished in any of several ways, depending on the particular abilities and background of the individual student. In certain cases the sophomore may be offered an opportunity to undertake independent work during the spring term by writing the first junior paper.

**Program of Study**

The department expects every student majoring in physics to have a basic knowledge of:

1. Mechanics
2. Electromagnetism and wave phenomena
3. Quantum mechanics and its application in simple atomic physics
4. Kinetic theory, thermodynamics, and statistical mechanics
5. Experimental physics

Proficiency in these areas is indicated by the student's performance in the courses listed below, or their equivalents. A physics major would normally take 103-104 (or 105-106), 203 (or 205 or 207), and 208 in the first two years, and 301, 304, 305, and 312 before graduation. The core curriculum should also include at least two 300-level mathematics courses, one of which should stress complex analysis (MAT 317, MAT 331, or MAE 306). The department also offers a pair of optional sophomore seminars (209-210) that give hands-on experience with modern experimental and computational techniques.

Beyond the basic requirements described above, the only specific course requirement is one 400-level physics course or an appropriate cognate. In principle, any additional course at the 300 level or above can count as a cognate with the permission of the departmental representative. Students who have completed the basic requirements have a wide variety of options from which to choose. The 400-level physics courses include a sampling of many of the important areas of current research in physics. PHY 405 and 406 are frequent choices and provide the student with a good introduction to condensed matter and subatomic physics, respectively. Courses in astrophysics, biophysics, computer science, engineering, geophysical science, materials science, and mathematics are also appropriate areas to be considered depending on the interests of the student. Graduate courses may also be taken with permission from both the instructor and the departmental representative.

Concentrators may not take departmental courses on a pass/D/fail basis except with special permission of the departmental representative.

**Independent Work**

**Junior Year.** In addition to the course work carried out during the junior year, the student is required to complete two junior papers, each of which is on a research topic of current interest. The purpose of the papers is to give students exposure to how physics research is actually performed by immersing them in journal, as opposed to textbook, literature. Each paper is written in close consultation with a faculty adviser, who is typically performing research in the subject area of the paper. A junior paper may serve as a preliminary investigation of a senior thesis topic.

The department feels strongly that experimental work is an essential ingredient of the undergraduate physics program. Experimental Physics (PHY 312) is therefore required for the physics concentrator. This course is normally taken in the spring term of the junior year, but it may be elected by advanced placement sophomores who have already completed two courses at the 200 level. Junior independent work may also be satisfied with a short experimental project.

**Senior Year.** In the senior year, in addition to course work, students write a senior thesis based on their own research. The topic might be chosen from one of the active experimental or theoretical research fields of the physics department, or might be suggested by a faculty member with some subsidiary interest. A student could also choose a topic relating physics and another field, such as biophysics, geophysics, the teaching of physics, history of science, or engineering physics. In fact, almost any area connected to a student's interest in physics can generate a thesis topic. Students working in such areas should seek out two advisers, one from the physics faculty and one from the other department of interest. After the thesis has been read by two faculty members, the student takes an oral examination administered by the readers and a member of the senior committee. This examination also serves the role of senior departmental examination.

**Senior Departmental Examination**

As described above, an oral examination based on the student's senior thesis serves as the senior departmental examination.
Integrated Science Sequence

An alternative path into the department is through the integrated sciences curriculum of the Program in Quantitative and Computational Biology (QCB). ISC/CHM/COS/MOL/PHY 231-234 can be taken in the freshman year, instead of PHY 103-104 or PHY 105-106. For full course descriptions and more information, see the integrated science website.

Certificate Programs in Engineering Physics, Biophysics, Quantitative and Computational Biology. For those students with an interest in such topics as solid-state devices, optics, fluid mechanics, engineering design, control theory, computer applications, or other applied disciplines, the Program in Engineering Physics provides an opportunity for close contact with the School of Engineering and Applied Science. Physics students enrolled in this program must take a coordinated program of at least five engineering courses. Upon completion of these courses with a grade average of at least B-, an engineering physics certificate is awarded at graduation. Further information on this program appears in the Program in Engineering Physics section.

The department also offers the opportunity for concentrators to participate in the biophysics certificate program. Interested students should discuss the program with the director and their departmental representative. Upperclass courses taken in the program count as cognates in the Department of Physics.

The Program in Quantitative and Computational Biology is designed for students with a strong interest in multidisciplinary and systems-level approaches to understanding molecular, cellular, and organismal behavior. The required courses provide a strong background in modern methodologies in data analysis, interpretation, and modeling.

Physics Department Facilities. The research laboratories in Jadwin Hall (the main physics building) are open to undergraduates to conduct supervised research for their junior papers, senior theses, and summer jobs. There is a "student shop" that offers a (noncredit) course in the use of machine tools. Students with an experimental bent are encouraged to take this course and are then able to participate actively in the construction of experimental apparatus. There is a graduate course in electronics (PHY 557) open to undergraduates that prepares students to design and build the sophisticated electronics required in modern experiments.

Courses

PHY 101 Introductory Physics I Fall ST
A course in fundamental physics that covers classical mechanics, fluid mechanics, basic thermodynamics, sounds, and waves. Meets premedical requirements. One lecture, three classes, one three-hour laboratory. S. Staggs

PHY 102 Introductory Physics II Spring ST
Continuation of 101. A course in fundamental physics that covers electricity, magnetism, and an introduction to the quantum world. Meets premedical requirements. Two 90-minute lectures, one preceptorial, and one three-hour laboratory. S. Gubser

PHY 103 General Physics I Fall ST
The physical laws that govern the motion of objects, forces, and forms of energy in mechanical systems are studied at an introductory level. Calculus-based, primarily for engineering and science students, meets premedical requirements. Some preparation in physics and calculus is desirable; calculus may be taken concurrently. One demonstration lecture, three classes, one three-hour laboratory. J. Olsen

PHY 104 General Physics II Spring ST
Continuation of 103. Electromagnetism from electrostatics, DC and AC circuits to optics, and topics of modern physics are treated at an introductory level. Some preparation in physics and calculus is desirable; calculus may be taken concurrently. Calculus-based, primarily for engineering and science students, meets premedical requirements. One demonstration lecture, three classes, one three-hour laboratory. F. Calaprice

PHY 105 Advanced Physics (Mechanics) Fall ST
This course parallels 103 at a level that assumes a good preparation in physics and calculus. The material is treated in more depth and with more mathematical sophistication than in 103. Students interested in 105 should enroll in 103. After three weeks, the course will reorganize with those students who qualify and are interested in entering 105 for the remainder of the term. Either course can lead to a major in physics. One demonstration lecture, three classes, one three-hour laboratory. J. Petta

PHY 106 Advanced Physics (Electromagnetism) Spring ST
Parallels 104 at a more sophisticated level, emphasizing the unification of electric and magnetic forces and electromagnetic radiation. To enter this course, students must have done well in 103 or 105. 103 students must attend the lectures on special relativity given in reading period as part of 105. Three lectures, one class, one three-hour laboratory. D. Huse, J. Fowler

PHY 111 Contemporary Physics Not offered this year ST
Designed for students in the humanities and social sciences, the presentation stresses concepts over formulas and intuition over formalism. However, some proficiency in algebra and trigonometry is assumed. Offered both terms, this
course does not satisfy requirements for science majors, premedical students, architects, or engineers. Two lectures, one class, one three-hour laboratory. **Staff**

**PHY 191 An Integrated Introduction to Engineering, Mathematics, Physics (see EGR 191)**

**PHY 192 An Integrated Introduction to Engineering, Mathematics, Physics (see EGR 192)**

**PHY 193 An Integrated Introduction to Engineering, Mathematics, Physics (see EGR 193)**

**PHY 203 Classical Mechanics A  Not offered this year QR**

Classical mechanics, with emphasis on the Lagrangian method. The underlying physics is Newtonian, but with more sophisticated mathematics introduced as needed to understand more complex phenomena. Topics include the formalism of Lagrangian mechanics, central-force motion, small oscillations, coupled oscillations, and waves. The course differs from 205 in that it assumes less preparation, omitting some material in favor of a more pedagogical treatment of the ideas and techniques needed for 208. Prerequisites: 103-104, or 105-106, or permission of instructor; MAT 201 or 203 recommended. Two 90-minute lectures. **Staff**

**PHY 205 Classical Mechanics B  Fall QR**

Classical mechanics, with emphasis on the Lagrangian method. The underlying physics is Newtonian, but with more sophisticated mathematics introduced as needed to understand more complex phenomena. Topics in this intensive course include the formalism of Lagrangian mechanics, central-force motion and scattering, rigid body motion and noninertial forces, small oscillations, coupled oscillations, and waves. Prerequisite: 103-104, or 105-106 (recommended), or permission of instructor; prior completion of MAT 201 or 203 recommended. Two 90-minute lectures. **W. Jones**

**PHY 207 Mechanics and Waves  Fall QR**

Covers the basics of analytical mechanics, but shifts the emphasis to wave phenomena before moving on to aspects of quantum mechanics and quantum statistical mechanics. Special relativity is given greater weight than it usually is in PHY 205. Offers students a path toward the physics concentration that is less intensive than PHY 205 and more accessible to students with less mathematical background. Prerequisites: PHY103-104, or PHY105-106; one 200-level math course; or permission of instructor. Two 90-minute lectures. **H. Verlinde**

**PHY 208 Principles of Quantum Mechanics  Spring**

An introduction to quantum mechanics, the physics of atoms, electrons, photons, and other elementary particles. Topics include state functions and the probability interpretation, the Schrödinger equation, the uncertainty principle, the eigenvalue problem, operators and their algebras, angular momentum and spin, perturbation theory, and the hydrogen atom. Prerequisites: 106, 203 or 205, and MAT 203 or 217, and 204 or 218 (204/218 can be taken concurrently); or instructor's permission. Two 90-minute lectures. **D. Marlow**

**PHY 209 Computational Physics Seminar  Fall QR**

Introductory course in the application of computers to physics research. Two main themes are numerical analysis methods and the computer-based techniques for implementing them. Methods discussed include least-squares fitting, numerical integration, and Monte Carlo simulation. Techniques include scientific programming, spreadsheets, symbolic-manipulation programs, statistical and plotting packages, and computer graphics. Examples are drawn from various fields of physics, including elementary particle physics and astrophysics. Prerequisites: 104 or 106 or permission of instructor. One 90-minute seminar, one three-hour laboratory. **F. Pretorius**

**PHY 210 Experimental Physics Seminar  Spring ST**

This seminar introduces students to the basic techniques and instrumentation used in experimental physics and then helps them do experiments of their own design. Areas are provided for students to learn vacuum, cryogenic, optical, electronic, and data acquisition techniques. While learning lab practice, students explore areas of interest for experimental projects, which occupy the last six weeks of the term. Prerequisites: 103 and 104 or equivalent. One three-hour seminar. **A. Yazdani**

**PHY 231 An Integrated, Quantitative Introduction to the Natural Sciences I (see ISC 231)**

**PHY 232 An Integrated, Quantitative Introduction to the Natural Sciences I (see ISC 232)**

**PHY 233 An Integrated, Quantitative Introduction to the Natural Sciences II (see ISC 233)**

**PHY 234 An Integrated, Quantitative Introduction to the Natural Sciences II (see ISC 234)**

**PHY 235 An Integrated, Quantitative Introduction to the Natural Sciences III (see ISC 235)**

**PHY 236 An Integrated, Quantitative Introduction to the Natural Sciences IV (see ISC 236)**

**PHY 301 Thermal Physics  Fall**

A unified introduction to the physics of systems with many degrees of freedom: thermodynamics and statistical mechanics, both classical and quantum. Applications will include phase equilibrium, classical and quantum gases, and properties of solids. Three lectures. Prerequisites: any one of 106, 203, 205, or 208, or instructor's permission. **L. Page**

**PHY 304 Advanced Electromagnetism  Spring**

http://www.princeton.edu/ua/
Extensions of electromagnetic theory including some important applications of Maxwell's equations. Solutions to Laplace's equation--boundary value problems. Retarded potentials. Electromagnetic waves and radiation. Special relativity. Mathematical tools developed as required. Two 90-minute lectures. Prerequisites: 104 or 106. P. Meyers

PHY 305 Introduction to the Quantum Theory  Fall

A second course on the basic principles of quantum mechanics with emphasis on applications to problems from atomic and solid-state physics. Two 90-minute lectures. Prerequisites: 208. W. Happer

PHY 312 Experimental Physics  Spring ST

The course offers six different experiments from the advanced laboratory collection. Experiments include Josephson effect, β-decay, holography, Mössbauer spectroscopy, optical pumping. Lectures stress modern experimental methods and devices. One lecture, one laboratory. D. Marlow

PHY 321 General Relativity (see AST 301)

PHY 371 Global Geophysics (see GEO 371)

PHY 401 Cosmology (see AST 401)

PHY 403 Mathematical Methods of Physics (also MAT 407)  Spring

Mathematical methods and techniques that are essential for modern theoretical physics. Topics such as group theory, Lie algebras, and differential geometry are discussed and applied to concrete physical problems. Special attention will be given to mathematical techniques that originated in physics, such as functional integration and current algebras. Three classes. Prerequisite: MAT 317 or instructor's permission. Staff

PHY 405 Modern Physics I: Condensed-Matter Physics  Spring

An introduction to modern condensed-matter physics, this course builds on quantum and statistical mechanics to study the electronic properties of solids, including band theory. Metals, quantum Hall effects, semiconductors, superconductors and magnetism, as well as phase transitions in condensed systems and structure and dynamic of solids and liquid crystals. Two 90-minute lectures. Prerequisites: 208, 301, and 305. J. Petta

PHY 406 Modern Physics II: Nuclear and Elementary Particle Physics  Fall

The basic features of nuclear and elementary particle physics are described and interpreted, primarily in the context of the "Standard Model." Problems of current interest are discussed. Two 90-minute lectures. V. Halyo

PHY 408 Modern Classical Dynamics  Not offered this year

The course discusses some of the most important and beautiful phenomena described by classical dynamics. This includes generalized Hamiltonian systems and variational principles, shock waves propagation, gravitational instabilities, simple solitons and vortices plus elementary exposition of the theories of turbulence and period doubling. Two 90-minute lectures. Prerequisite: 205 or 205. A. Polyakov

PHY 419 The Earth as a Physical System (see GEO 419)

PHY 442 Geodynamics (see GEO 442)
Unraveling the origins of life on Earth and determining whether life exists beyond the Earth will likely be the two of the most significant scientific discoveries in the 21st century. The Program in Planets and Life is an interdepartmental, multidisciplinary plan of study designed for students interested in these two questions. The goal is to provide students with an understanding of the fundamental astrophysical, chemical, biological, and geological principles and engineering challenges that will guide our search for life in extreme environments on Earth and on other planets and satellites in the solar system and among neighboring planetary systems. Research and teaching related to these topics are typically performed under the rubric of astrobiology. The program will equip participating students with the skills they will require to assume a leadership role in discovering the origins of terrestrial and extraterrestrial life over the next decades.

The cooperating departments from which the Program in Planets and Life draws faculty and other resources include astrophysics, chemistry, ecology and evolutionary biology, electrical engineering, geosciences, mechanical and aerospace engineering, operations research and financial engineering, and the Woodrow Wilson School of Public and International Affairs.

**Admission to the Program**

The Program in Planets and Life is open to all A.B. and B.S.E. students. Interested students would normally take AST/CHM/EEB/GEO 255 in the spring semester of their sophomore year.

**Program of Study**

The following requirements are in addition to those of a student's department of concentration. By appropriate choice of courses, a student may satisfy the program and the concentration requirements, as well as University distribution requirements. Core course and cognate courses may not be taken on a pass/D/fail basis.

1. Students must take the spring semester core course AST/CHM/EEB/GEO 255.
2. Students must take an additional four cognate courses. Only two of the cognate courses can be in the student's department of concentration. The cognate courses must be approved by the program director and students are encouraged to discuss their choices with the program director in the early stages of their planning.
3. Junior and seniors are expected to participate in a noncredit Planets and Life Undergraduate Colloquium that is designed to assist students in carrying out their junior independent work and senior thesis research, assist them with identifying resources, support them in their writing, and expose them to senior thesis research related to astrobiology that is being carried out in other departments on campus. Each student will present a report on their junior paper or senior thesis research to their classmates. In any given year the colloquium will be run by the program director or a member of the executive committee.
4. Both the program chairperson and the undergraduate representative in the student's department of concentration should approve independent work in the junior or senior years that involves astrobiology topics relevant to the certificate program. The relevant content of the student's senior thesis will be presented at a special planets and life poster session at the end of their senior year.
5. To qualify for the certificate the student must do at least one of their JP’s on an astrobiology topic, or as part of their senior thesis must devote a chapter to an astrobiology topic, subject to approval by the program chairperson in consultation with executive committee members. Students should also participate in at least one semester of the Planets and Life Undergraduate Colloquium.

**Certificate of Proficiency**

Students who meet the requirements of the program and of their home department will receive a certificate of proficiency in planets and life upon graduation.

**Cognate Courses** (Note: an asterisk indicates a one-time-only course.)

Astrophysical Sciences (AST)

204 Topics in Modern Astronomy
303 Astronomical Methods
301 Thermal Physics
403 Interstellar Medium and Star Formation
514 Stellar structure
541 Seminar in Theoretical Astrophysics (when appropriate)
542 Seminar in Observational Astrophysics

Chemical and Biological Engineering (CBE)

CHE 245 Introduction to Chemical Engineering Principles
CHE 446 Atmospheric Technology
CHE 447 Biochemical Engineering

Chemistry (CHM)

201 General Chemistry I or 202 General Chemistry II
207 Advanced General Chemistry: Materials Chemistry
215 Advanced General Chemistry: Honors Course
303 Organic Chemistry I: Biological Emphasis or 304 Organic Chemistry II: Biological Emphasis
305 The Quantum World
306 Physical Chemistry: Chemical Thermodynamics and Kinetics
405 Advanced Physical Chemistry: Quantum Mechanics
406 Advanced Physical Chemistry: Chemical Dynamics and Thermodynamics
407 Inorganic Chemistry: Structure and Bonding
408 Inorganic Chemistry: Reactions and Mechanisms
515 Biophysical Chemistry I
539 Introduction to Chemical Instrumentation
544 Metals in Biology (also ENV 544)

Computer Science (COS)

323 Computing for the Physical and Social Sciences Ecology and

Evolutionary Biology (EEB)

210 Evolutionary Ecology (also MOL 210)
211 The Biology of Organisms (also MOL 211)
309 Evolutionary Biology
330 Molecular Evolutionary Genetics (also MOL 330)

Electrical Engineering (ELE)

351 Electromagnetic Field Theory and Optics
352 Physical Optics
*455 Mid-Infrared Technologies for Health and the Environment (also CEE/MAE/MSE 455)

Geosciences (GEO)

207 A Guided Tour of the Solar System (also AST 207)
363 Environmental Geochemistry: Natural Systems (also CHM 331, ENV 331)
364 Earth Chemistry: The Major Realms of the Planet (also CHM 364)
371 Global Geophysics (also PHY 371)
372 Earth Materials
374 Planetary Systems: Their Diversity and Evolution (also AST 374)
417 Environmental Microbiology (also CEE 417, EEB 417)
425 Introduction to Physical Oceanography (also MAE 425)
428 Biological Oceanography
442 Geodynamics (also PHY 442)
523 Geomicrobiology

Molecular Biology

214 Introduction to Cellular and Molecular Biology (also EEB 214)
215 Quantitative Principles in Cell and Molecular Biology (also EEB 215)
345 Biochemistry (also CHM 345)
348 Cell and Developmental Biology

Mechanical and Aerospace Engineering (MAE)

341 Space Flight
342 Space System Design
345 Robotics and Intelligent Systems

Courses

GEO 255 Life in the Universe (also AST 255, EEB 255, CHM 255) Spring QR

Introduces students to a new field, astrobiology, where scientists trained in biology, chemistry, astronomy, and geology combine their skills to discover life's origins and seek extraterrestrial life. Topics include: discoveries of microbes in extreme environments on Earth that raise the prospect of life on Mars and Europa, a moon of Jupiter; and extra-solar planets that offer targets for NASA telescopes searching for life. Prerequisites: at least one course in astrophysics, biology, chemistry, physics, or geology. For freshmen, an AP score of 4 or 5 in chemistry, biology, or physics is
required. Two 90-minute lectures.

T. Onstott, E. Turner, L. Landweber
Information and Departmental Plan of Study

Prerequisites

Normally, students entering the department must have successfully completed on a graded basis two courses offered by the Department of Politics, one or both of which should be at the 200 level.

Program of Study

http://www.princeton.edu/ua/
Course Selection. By the end of the senior year, all students in the department must complete, in addition to the prerequisites, eight departmental courses, of which two may be cognates.

Concentrators indicate a prospective primary field when they sign into the department in the spring of their sophomore year, and designate a primary field by the end of the first semester of their junior year. Concentrators take courses in at least three of the fields listed below, designating one as their primary field of study, another as their secondary field, and an additional field. Students take a minimum of three courses in their primary field, two courses in their secondary field, and one course in a third field. One of three courses in the primary field normally is a 200-level course. Prerequisites may be used to satisfy field requirements. A course taken to satisfy the analytical requirement cannot be used to satisfy the field requirement. The department's website lists additional courses that will fulfill field requirements in a given year, including one-time-only courses or topics courses offered by other departments with POL cross-listings.


V. Methods in political science (cannot be the primary field): 345, 346, 347, 350, 450, 451, 452, 453

Analytic Requirement. The department maintains a list of politics courses that have an emphasis on political analysis. Concentrators are required to take a politics course in systematic analysis, normally no later than the first semester of their junior year. Courses in systematic analysis have an emphasis on how social scientists develop and test hypotheses and how various types of analytic investigation further the understanding of political ideals and processes. The course used to fulfill the analytic requirement cannot be used to fulfill primary, secondary, or third field requirements. The analytical requirement may be satisfied by POL 345, POL 347, POL 350, or POL 451. We will also accept ECO 202, ECO 302, ECO 312, ORF 245, PSY 251, SOC 301, or SOC 404 as meeting this requirement.

Cognates. The department maintains a list of all cognates approved by the departmental representatives for each student. The cognates must be approved during the semester in which they are taken (no later than the drop/pass/D/fail deadline). Cognate courses should not be at the introductory level. Cognates cannot be used to satisfy field distribution requirements. Approved cognates will be used in the departmental honors calculation. To seek approval for a cognate, students must complete the Cognate Approval Application.

Graduate Courses. Well-prepared undergraduates may take graduate seminars for full University and departmental credit. To enroll in a graduate seminar, the student must have the signature approval of the instructor in charge of the seminar, the director of undergraduate studies, as well as their residential dean. The graduate course approval form can be picked up from and returned to the student's residential college office.

Independent Work

Junior Year. In the fall, students normally participate in junior research workshops that serve as platforms to write junior papers and that are not counted as a course. In the spring they pursue individual research programs. In workshops, a small group of students does related research projects, with faculty members providing common instructions in research procedures and techniques. In individual research programs, students work on topics they have chosen in consultation with a faculty adviser.

Senior Year. During the senior year, each student writes a thesis and takes a comprehensive examination. Senior theses normally are written on a topic within a student's primary field.

The department encourages students to use the summer between junior and senior year for work on the senior thesis.

Senior Departmental Examination

The senior comprehensive examinations test knowledge in a concentrator's primary field. The senior comprehensive normally involves a one-day, take-home, closed-book examination.

Study Abroad

The department encourages students to consider studying abroad for one semester or even for a full year in conjunction with departmental concentration in politics. If, under a program approved in advance by the dean of the college, a concentrator in politics studies abroad for the equivalent of an academic year at Princeton, the department is willing to credit as departmentals as many as four courses in political science or related fields when they are taken at a foreign university. Normally the department is willing to substitute no more than one cognate and one departmental or two cognates for concentrators studying abroad for one semester.

Programs for Students of High Standing. The department offers a variety of opportunities for students of high standing to select course programs that allow them to do advanced work in politics. Qualified juniors and seniors may participate in departmental seminars and in graduate seminars and may substitute individual work under faculty supervision for some of the required courses.
Program in Political Economy. The Department of Politics offers the Program in Political Economy for students who wish to further their understanding of social phenomena and individual behavior by combining and comparing the perspectives of its two constituent disciplines.

Requirements. To participate in this program, students must complete two politics courses and ECO 100 and 101, and MAT 103 (or a higher level course that subsumes it, such as MAT 104, 200, or 215) before the end of their sophomore year. All five of these courses should be taken on a graded basis (e.g., not pass/D/fail).

It is important for each student to select a combination of economics and politics courses that form a coherent and meaningful program. Before signing up for the first semester of the junior year, the student should work out a tentative course outline for the next two years; this outline must be approved and signed by the political economy adviser.

A student in the political economy program is required to take at least seven upper-level courses in the politics department, at least five of which must be numbered 300 and above, and two upper-level courses in the economics department, plus one course in quantitative methods in either economics or politics. These courses will be counted as departmentals. This 10-course combination fulfills the requirements both for the political economy program and for the major and is used in calculating department honors.

All students must pass Intermediate Macroeconomics (ECO 301 or 311), Microeconomics (ECO 300 or 310), Mathematical Models in the Study of Politics (POL 347), and either Political Economy (POL 349) or Comparative Political Economy (POL 352).

All students must pass at least one course in quantitative methods: either POL 345 or 346 or ECO 202, 302, or 312.

Students in the political economy program must also fulfill the distribution requirement of the department.

Students in the program must write the senior thesis in political economy.

Concentrators who successfully complete the program's requirements will receive a departmental certificate.

Student Departmental Committee. All students in the department have an opportunity to elect five seniors and four juniors to serve as members of the Undergraduate Student Departmental Committee. This committee discusses and makes recommendations on matters affecting the undergraduate program in the department. The committee normally meets with the faculty Committee on the Undergraduate Program, and its members represent all undergraduate students in departmental meetings.

Courses

POL 210 Political Theory  Fall EM
An introduction to political theory that explores the relevance of theory to a critical understanding of political and social problems. The course will examine the major classical and contemporary expressions of liberal, conservative, and socialist theory and relate them to the problems of order, freedom, equality, and justice. Two lectures, one preceptorial. A. Ryan

POL 220 American Politics  Spring SA
An introduction to the national institutions and political processes of American government. Topics include the Constitution, the American political tradition, public opinion, interest groups, political institutions, civil rights, civil liberties, and public policy. Two lectures, one preceptorial. P. Frymer

POL 222 Women in Politics, Media, and Contemporary U.S. (see WOM 202)

POL 230 Introduction to Comparative Politics  Spring SA
This course will focus on the process of democratic transition and consolidation in a comparative and historical manner. In particular, we will analyze the democratic revolution that has swept the globe during the last 30 years by examining the communist and authoritarian backgrounds of newly democratized countries, the factors influencing the emergence of democracy, the problems associated with building stable democratic systems, and finally, the prospects for a regime shift in parts of the world still under autocratic rule. Two lectures, one preceptorial. Staff

POL 231 European Politics  Not offered this year SA
An introduction to the political systems of the major European countries. The course compares and contrasts the development and contemporary functioning of political institutions in several countries, including Britain, France, and Germany. Two lectures, one preceptorial. Staff

POL 240 International Relations  Fall, Spring SA
A comprehensive introduction to the major issues of contemporary international relations. The course presents competing theoretical perspectives and reviews the historical record to explore such puzzles as the causes of war, explanations of cooperation, the behavior of states, and the proper ethical standards for judging international relations. Two lectures, one preceptorial. C. Davis, A. Moravcsik

POL 268 Political and Economic Development of the Middle East (see NES 265)

http://www.princeton.edu/ua/
POL 301 Ancient and Medieval Political Theory (also CLA 301)  Not offered this year EM
This course focuses on classical political theory in ancient Greece and its appropriation and development in the Roman, medieval, and Renaissance periods. It examines Greek democracy, drawing on tragedy, rhetoric, and history; the ethics and politics of Plato and Aristotle; and the Roman republican thought of Cicero and Livy. It considers the influence of Plato on Augustine and More, Aristotle on Aquinas and Marsilius, and Cicero and Livy on Machiavelli. Topics include nature and convention; democracy, oligarchy and tyranny; church and state; consent and representation; and virtue, property, and law. Two lectures, one preceptorial. Staff

POL 302 Continental Political Thought from Rousseau to Nietzsche  Not offered this year EM
An examination of the development of political thought in Europe from the second half of the 18th century to the end of the 19th. The course will focus on Kantian, Hegelian, and Marxist developments in this tradition. Emphasis on the important role played by different conceptions of freedom, human nature, and history in the political thought of the period, with particular attention to issues concerning autonomy and authority, the nature of the state, and the limits to state power. Two lectures, one preceptorial. Staff

POL 303 Modern Political Theory  Spring EM
A study of the writings of some major political theorists from the 17th through the 19th centuries, including Hobbes, Locke, Rousseau, Kant, and J. S. Mill. Two lectures, one preceptorial. L. Wenar

POL 304 Conservative Political Thought  Not offered this year EM
A historical and analytic examination of conservative political theories. Topics include the classical and medieval roots of modern conservatism, the development of conservatism in Europe and America, fascism and the radical right, and the tensions between libertarianism and traditionalism in contemporary conservative thought. Two lectures, one preceptorial. Staff

POL 306 Democratic Theory (also PHI 360/CHV 306)  Not offered this year EM
A study of the intellectual foundations of the modern democratic state. Topics include the meaning and justification of democracy, the rationality of voting, political representation, property rights, civil disobedience, and education. Two lectures, one preceptorial. Staff

POL 307 The Just Society  Spring EM
An introduction to alternative theories of social justice and examination of the implications of those theories in areas of contemporary social and political controversy. Readings and lectures focus on utilitarian, libertarian, liberal egalitarian, communitarian, and feminist conceptions of what it means to live in a just society. Two lectures, one preceptorial. A. Patten

POL 308 Ethics and Public Policy (see WWS 301)

POL 309 Politics and Religion (also REL 309)  Not offered this year EM
Close study of a number of texts that have illuminated the connection between religiosity and politics, and, in particular, the role of religious language and ideas to establish, preserve, reform, and redeem republics. Special attention will be given to the religious dimensions of revolutionary and messianic politics, and to the role that religiosity has played in the development of contemporary social movements and in the moral and political resistance to totalitarian regimes. Two lectures, one preceptorial. J. Müller

POL 310 The Idea of America (see CHV 396)

POL 311 Global Justice  Fall EM
What, if any, norms of justice apply to the institutions and practice of world politics? Topics include "political realism" and skepticism about global morality; just wars and justice in warfare; ethics of humanitarian intervention; the nature and basis of human rights; world poverty and global distributive justice; and democracy and accountability in global institutions. Readings chosen from recent works in political philosophy. Two lectures, one preceptorial. C. Beitz

POL 312 American Constitutional Development  Spring SA
The development of American constitutionalism, considered historically as the product of legal, political, and intellectual currents and crises (e.g., the Founding, the Marshall and Taney eras, the slavery crises, the rise of corporate capitalism, the emergence of the modern state, the New Deal crisis, and new forms of rights and liberties). Topics include the growth of Supreme Court power, the court's relation to the states and the other federal branches, and the influence on constitutional understandings of economic developments, reform movements, wars, party competition, and legal and political thought. Two lectures, one preceptorial. K. Whittington

POL 313 Constitutional Interpretation  Fall SA
A study of the development of the United States Constitution, chiefly through close analysis of selected judicial decisions. One 90-minute lecture, one two-hour preceptorial. R. George

POL 315 Civil Liberties  Not offered this year EM
A study of selected problems concerning civil liberties in contemporary America, with specific focus on privacy and on problems derived from living in a pluralistic society. One 90-minute lecture, one 90-minute class. Staff

http://www.princeton.edu/ua/
POL 317 Discrimination and the Law  Not offered this year EM
How can law change (or reinforce) the ways in which race, gender, and sexual orientation affect status? This course examines the purposes of antidiscrimination law and asks if it is appropriate to extend antidiscrimination protection from race to other categories. Conflicts with tradition, autonomy of community, and liberty are also considered. Two lectures, one preceptorial.  Staff

POL 318 Law and Society  Spring SA
An exploration of the relationships between law and society, using judicial and other materials from the American legal system. Topics considered include the stages of legal development, law and morality, judicial decision making, formal resolution of disputes, social control through law, the political nature of law, and courts. Two lectures, one preceptorial.  S. Staszak

POL 320 Judicial Politics  Fall SA
An introduction to the political science of law and courts. Topics typically include: bargaining and decision making on the U.S. Supreme Court; political struggles over doctrine within the judicial hierarchy; the politics of Supreme Court nominations; juries as political institutions; court packing, jurisdiction stripping, and judicial intimidation; political use of litigation by activists, firms, and interest groups; judicial oversight of the administrative state; judicial activism by state attorneys general; and the social and economic impact of courts. Two lectures, one preceptorial.  J. Kastellec

POL 321 American Political Thought  Not offered this year EM
The origin and development of political ideas and institutions. Drawn from primary sources, the readings feature the ideas and deeds of those who from colonial times to the present have shaped the American concept of free government. Two lectures, one preceptorial.  Staff

POL 322 Public Opinion  Fall SA
An examination of public opinion and mass political behavior, particularly in the American context. Topics include formation of political attitudes and ideology, conflict and consensus on basic issues, political participation and voting, the effects of the media, and the impact of public opinion on governmental policy. Two lectures, one preceptorial or laboratory.  T. Mendelberg

POL 323 Party Politics  Not offered this year SA
An examination of party organization and activities, the forces that shape them, and their consequences. The course is concerned primarily with U.S. party politics in the contemporary period but gives some attention to American political history and foreign party systems. Two lectures, one preceptorial.  Staff

POL 324 Congressional Politics  Fall SA
An examination of the role of Congress in American politics, with a special focus on the political world of individual legislators. The course explores how legislators run their campaigns, interact with their constituents, operate within Congress, and make public policy. One three-hour seminar.  A. Hirsch

POL 325 The Presidency and Executive Power  Not offered this year SA
A study of the place of the presidency in the American political order that stresses tension between power and accountability inherent in the office and the system. Topics include: separation of powers, presidential selection, impeachment, relations with Congress and bureaucracy, emergency powers, presidential character, and leadership. Two lectures, one preceptorial.  Staff

POL 326 Special Topics in Public Affairs (see WWS 452)

POL 329 Public Leadership and Public Policy (see WWS 306)

POL 330 Campaigns and Elections  Fall SA
An examination of how U.S. election campaigns are conducted and how they affect political reasoning and voting behavior. Empirical analyses of public opinion data and campaign communication provide the foundation for studying campaigns. The goal of the course is to offer a broad theoretical understanding of the conduct of campaigns and their effects. Recent elections serve to illustrate key insights. Two lectures, one preceptorial.  M. Prior

POL 331 Urban Politics  Not offered this year SA
A study of the interplay of urbanization and politics in the United States. Particular attention is given to the problems of metropolitan growth and the changing roles of local governments, the states, and the federal government. Assumes a working knowledge of American politics. Two lectures, one preceptorial.  Staff

POL 335 Women, Gender, and Politics (also WOM 337)  Not offered this year SA
An examination of the relationships among women, gender, and political processes and public policies in the United States. Topics include the differing interpretations of women's interests promoted by the feminist and pro-family movements, the gender dimension of contemporary American economic and social policies, and the problem of political equality in the context of biological sex differences and social inequality. Two lectures, one preceptorial.  Staff

POL 336 Race and American Politics (also AAS 336)  Not offered this year SA

http://www.princeton.edu/ua/
Examines how the American political system has arranged itself in response to racial distinctions and how it has influenced these distinctions. Pays primary attention to contemporary developments, but places them in historical perspective. Topics include partisan alignment, racial stereotypes, the civil rights movement, and the problem of interest representation. Two lectures, one preceptorial. **Staff**

**POL 338 Race and the American Legal Process: Emancipation to the Voting Rights Act** (see AAS 362)

**POL 339 The American City** (see WWS 310)

**POL 341 The Politics of Policy Making** (see WWS 322)

**POL 345 Quantitative Analysis and Politics**  Fall QR

What accounts for who votes and their choice of candidate? Do politicians make policy based on constituency interests or their own ideologies? Would universal health insurance improve the health of the poor? Policy makers and academic researchers use statistics to answer these questions. However, the validity of their conclusions depends upon underlying assumptions and correct application of statistical methods. This course introduces the basics of applied statistics to students who have had little previous exposure to the subject. Topics will include causal inference, descriptive inference, survey analysis, and probability. **K. Imai**

**POL 346 Applied Quantitative Analysis**  Spring QR

Develops the use of statistical techniques appropriate for empirical exploration of political topics. Each statistical topic is motivated by a significant question in political science that can be addressed by an available data set. Computers will be used both as part of the lecture and for completing classwork. Emphasis is on hands-on training that will give students the capacity to use these statistical techniques in other courses and independent work. Prerequisites: 345 or instructor's permission. Two lectures, one preceptorial. **X. Pang**

**POL 347 Mathematical Models in the Study of Politics**  Spring QR

An introduction to the use of mathematical models and, especially, game theory in the study of politics. The basics of game theory are presented through applications to a broad range of political phenomena: voting, legislative politics, political campaigns, comparison of electoral systems, the evolution of cooperation, and international relations. Two lectures, one preceptorial. **K. Ramsay**

**POL 349 Political Economy**  Fall SA

This course provides a rigorous introduction to some of the central ideas in political economy. Game theoretic models of voting are used to illustrate the way that democratic institutions filter interests. Topics may include the measurement of income inequality, the median voter theorem, models of income redistribution, political agency, and the link between institutions and economic performance. Two lectures, one preceptorial. **T. Romer**

**POL 350 Research Methods in Political Science**  Fall SA

An introductory undergraduate course in research methods for politics concentrators, designed to help prepare students for junior papers and the senior thesis. The material is chosen to convey an understanding of research design, choice of method, and data analysis. Both qualitative and quantitative methods will be taught, but this is not a statistics course. It provides an introduction to a range of research methodologies as they are applied to political science topics. Two lectures, one preceptorial. **C. Zucco**

**POL 351 Politics in the Developing Countries**  Not offered this year SA

A comparative study of politics in selected developing countries of Asia, Africa, and Latin America. Topics include colonialism, nationalism, class and ethnic conflict, political instability, military coups, revolutionary change, and development strategies such as land reforms, green revolution, import substitution, and management of external dependencies. Two lectures, one preceptorial. **Staff**

**POL 352 Comparative Political Economy**  Spring SA

Explores the dynamic relationship in theory between market-formation and reform on the one hand, and economic ideas and cultural values on the other. The course examines classical and contemporary works in comparative political economy. Two lectures, one preceptorial. **A. Vindigni**

**POL 353 The Politics of Modern Islam** (see NES 269)

**POL 356 Comparative Ethnic Conflict**  Not offered this year SA

This course introduces students to the study of ethnic conflict. It will examine different theories of ethnically based identification and mobilization; cover different types of ethnic conflict such as riots, genocide, hate crime and war; and study past and present cases of ethnic conflict around the world. Two lectures, one preceptorial. **Staff**

**POL 361 Political Economy of East Asia**  Not offered this year SA

Examines the political economy of development in East Asia (Japan, Korea, Taiwan, and China) and the newly industrializing countries of Southeast Asia. Topics include the historical roots of development, competing explanations for rapid growth in the region, the rise of China as an economic power, the Asian Financial Crisis, and the pressures of globalization and democracy. Two lectures, one preceptorial. **Staff**

**POL 362 Chinese Politics**  Not offered this year SA

http://www.princeton.edu/ua/
Traditional politics; the rise of warlords, nationalists, and radicals; causes of the "Liberation," land reform, Hundred Flowers, Great Leap Forward, Cultural Revolution, and Four Modernizations; policies of Mao and Deng for development, health, law, and rights. Two lectures, one preceptorial. Staff

POL 363 Japanese Politics  Not offered this year SA

A study of politics and government in Japan, focusing on the period since World War II. Attention will be given to the development of the party system, the formation of public policy, and the evolution of the national economy. Two lectures, one preceptorial. Staff

POL 364 Politics of the Middle East (also NES 322)  Spring SA

Focuses on social and economic change in the Middle East as reflected in development strategies, political competition and conflict, and state intervention in economic and social life. The emphasis is on domestic and comparative politics in the Middle East rather than its international relations. Two lectures, one preceptorial. A. Jamal

POL 366 Politics in Africa  Spring SA

A comparative approach to African political systems. The meanings of the concepts of modernization, national integration, and development are explored. Topics include the inheritances of colonial rule, independence and the new tasks, political patterns in the postindependence period, prospects for political change, and African interstate relations. Two lectures, one preceptorial. J. Widner

POL 367 Latin American Politics (also LAS 367)  Not offered this year SA

A study of the governments and politics of Latin America. The political systems of the Latin American countries will be examined, as well as the common political problems and processes of the area. Special attention will be given to the role of revolution, military rule, and constitutional democracy in Latin American political development. Two lectures, one preceptorial. Staff

POL 368 Political Economy of Latin America (also LAS 368)  Not offered this year SA

A study of the use of public policy instruments by Latin American governments to promote development. Topics include the structuralist-monetarist controversy, the Alliance for Progress and modernization, dependency in theory and practice, import-substitution and export promotion, the rise of bureaucratic authoritarianism, and alternative strategies for managing the debt crisis. Two lectures, one preceptorial. Staff

POL 372 Political Economy of Western Europe  Not offered this year SA

Different patterns of industrialization produce differences in the political organization of capitalism, i.e., in the position and role of labor and in relations between business and the state. This course explores the historical roots of these differences and their implications for contemporary politics and policy. It focuses on France, West Germany, Britain, and Sweden. Two lectures, one preceptorial. Staff

POL 373 Central and East European Politics  Not offered this year SA

A study of the interaction between economic and political change in selected East European countries, with comparative reference to the experience of other socialist and postsocialist nations. State-society relations are examined in light of the major theoretical approaches to state socialism. Two lectures, one preceptorial. Staff

POL 375 Politics after Communism  Spring SA

An examination of the political and economic change in Russia and some of the former Soviet republics from Gorbachev to the present. After briefly reviewing the main institutions of the Soviet system and theories of its collapse, the course examines specific reforms and the social impact of rapid systemic change. Topics include shock therapy (privatization and economic liberalization), nationalism, crime, and legislative reform among others. The course will also compare the process of change in the former Soviet Union with democratic and market transitions in Latin America and elsewhere. Two lectures, one preceptorial. G. Pop-Eleches

POL 376 Political Islam (see NES 268)

POL 377 Sophomore Seminar  Not offered this year SA

Investigation of a major theme in comparative politics. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. Staff

POL 378 Politics in India  Not offered this year SA

An introduction to politics in the large subcontinental country of India. The course will address themes that are important both to India and to a general study of politics in a developing country. The following questions help organize the course: How does one make sense of democracy in a poor, multiethnic setting? How has democratic politics shaped and been shaped by a society divided along numerous lines, such as caste, class, and linguistic and religious identities? And how well has the democratic state fared in promoting both economic growth and social welfare? Two lectures, one preceptorial. Staff

POL 380 Human Rights  Not offered this year SA

A study of the politics and history of human rights. What are human rights? How can dictatorships be resisted from the inside and the outside? Can we prevent genocide? Is it morally acceptable and politically wise to launch humanitarian military interventions to prevent the slaughter of foreign civilians? What are the laws of war, and how can we punish
the war criminals who violate them? Cases include the Ottoman Empire, Nazi Germany, the Soviet Union, Bosnia, and Rwanda. Two lectures, one preceptorial. *Staff*

**POL 381 Theories of International Relations Fall SA**

Examination of selected theories and issues of international relations including the following: causes of war, theories of imperialism, the issue of order and change, the relationship of morality and statecraft. Course readings drawn from historical and theoretical materials. Two lectures, one preceptorial. *J. Gowa*

**POL 382 War and Peace Not offered this year SA**

An examination of war as a political phenomenon, with a particular emphasis on the period since 1945. Topics to be considered include the cause, character, and consequences of war, the evolution of warfare, the moral justification of war, and the possibility that war is becoming obsolete. Two lectures, one preceptorial. *Staff*

**POL 383 International Cooperation Not offered this year SA**

Examines theories about how international cooperation can be initiated and maintained. Topics include the achievement of cooperation under conditions of anarchy, regimes and norms, international and multilateral organizations, tacit bargaining, formal and informal agreements, and strategies for punishing noncompliance. Two lectures, one preceptorial. *Staff*

**POL 384 European Politics and Society in the 20th Century (see EPS 300)**

**POL 385 International Political Economy Spring SA**

A study of the relationship between political and economic processes in international affairs. Attention will be given to problems that lie on the boundary between politics and economics. Two lectures, one preceptorial. *D. Campello*

**POL 387 Peacemaking (see WWS 313)**

**POL 388 Causes of War Not offered this year SA**

Why do states and peoples go to war? Conversely, how can war be avoided? This course surveys some of the most important explanations--including human nature, the anarchic international system, domestic politics, economics, technology, nationalism, and terrorism--and evaluates them in light of historical wars, and of crises resolved short of war. The course will examine cases ranging from the Peloponnesian War to the ongoing American-led war against terrorism. Two lectures, one preceptorial. *Staff*

**POL 389 Theory and Practice of International Diplomacy (see WWS 321)**

**POL 392 American Foreign Policy Fall SA**

A systematic study of major issues and problems of American foreign policy in the contemporary world. Two lectures, one preceptorial. *A. Friedberg*

**POL 396 International Organization Not offered this year SA**

This course examines the role played by international organizations (IOs)--especially inter-state multilateral institutions--in the international system. It focuses on the effectiveness of IOs in managing global issues in a rapidly changing world and addresses questions such as: Why do IOs exist? What do they do? How do we gauge their success? Are they simply irrelevant? The course begins by covering several theoretical approaches to understanding IOs, their functions, and their shortcomings, then moves on to a critical examination of the work of different types of IOs. Two lectures, one preceptorial. *Staff*

**POL 397 National Security Not offered this year SA**

An introduction to classic texts (for example, Sun Tzu, Clausewitz) and dominant theoretical approaches in the study of national security. Why states fight and how they fight are examined with an emphasis on how they generate and employ military power in combat. The determinants of battlefield effectiveness, the limits of military power, and the historical evolution of warfare are also considered. Attention is paid to alternative conceptions of security (including human security) and warfare, including civil wars, insurgencies, and genocide. Cases are drawn from diverse Western and non-Western historical eras. Two lectures, one preceptorial. *Staff*

**POL 398 Special Topics in Public Affairs (see WWS 457)**

**POL 410 Seminar in Political Theory Spring SA**

Investigation of a major theme in political theory. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. *R. Sagar*

**POL 411 Seminar in Political Theory (also AAS 412/AMS 411) Spring SA**

Investigation of a major theme in political theory. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. *M. Lane*

**POL 412 Seminar in Political Theory Not offered this year EM**

Investigation of a major theme in political theory. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. *Staff*
POL 413 Seminar in Political Theory  Not offered this year SA
Investigation of a major theme in political theory. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. Staff

POL 420 Seminar in American Politics  Fall SA
Investigation of a major theme in American politics. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. C. Cameron

POL 421 Seminar in American Politics  Spring SA
Investigation of a major theme in American politics. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. T. Mendelberg

POL 422 Seminar in American Politics  Not offered this year SA
Investigation of a major theme in American politics. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. Staff

POL 423 Seminar in American Politics  Not offered this year SA
Investigation of a major theme in American politics. Reading and intensive discussion of selected issues in the literature. Staff

POL 424 Topics in African American Religion (see AAS 368)

POL 425 Law and Work (see AMS 305)

POL 430 Seminar in Comparative Politics  Fall SA
Investigation of a major theme in comparative politics. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. Staff

POL 431 Seminar in Comparative Politics (also LAS 431)  Not offered this year SA
Investigation of a major theme in comparative politics. Reading and intensive discussion of selected issues in the literature. Staff

POL 432 Seminar in Comparative Politics (also LAS 432)  Not offered this year SA
Investigation of a major theme in comparative politics. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. Staff

POL 433 Seminar in Comparative Politics  Not offered this year SA
Investigation of a major theme in comparative politics. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. Staff

POL 434 Seminar in Comparative Politics  Not offered this year SA
Investigation of a major theme in comparative politics. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. Staff

POL 440 Seminar in International Relations  Not offered this year SA
Investigation of a major theme in international relations. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. Staff

POL 441 Seminar in International Relations  Not offered this year SA
Investigation of a major theme in international relations. Reading and intensive discussion of selected issues in the literature. Staff

POL 442 Seminar in International Relations  Not offered this year SA
Investigation of a major theme in international relations. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. Staff

POL 443 Seminar in International Relations  Not offered this year SA
Investigation of a major theme in international relations. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. Staff

POL 450 Seminar in Methods in Political Science  Not offered this year QR
Investigation of a major theme in methods of political science. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. Staff

POL 451 Seminar in Methods in Political Science  Not offered this year QR

http://www.princeton.edu/ua/
Investigation of a major theme in methods of political science. Reading and intensive discussion of selected issues in the literature. **Staff**

**POL 452 Seminar in Methods in Political Science  Not offered this year**

Investigation of a major theme in methods of political science. Reading and intensive discussion of selected issues in the literature. One three-hour seminar. **Staff**

**POL 453 Seminar in Methods in Political Science  Not offered this year**

Investigation of a major theme in methods of political science. Reading and intensive discussion of selected issues in the literature. One three-hour seminar **Staff**

**POL 462 Special Topics in Public Affairs (see WWS 462)**

**POL 466 Special Topics in Public Affairs (see WWS 466)**

**POL 475 Special Topics in Public Affairs (see WWS 475)**

**POL 477 Special Topics in Public Affairs (see WWS 477)**
Department of Psychology

Chair
Deborah A. Prentice

Departmental Representative
Daniel N. Osherson

Director of Graduate Studies
Joel Cooper (fall)
Susan T. Fiske (spring)

Professor
Jonathan D. Cohen, also Princeton Neuroscience Institute
Joel Cooper
John M. Darley, also Woodrow Wilson School
Susan T. Fiske
Joan S. Girgus
Elizabeth Gould, also Princeton Neuroscience Institute
Charles G. Gross, also Princeton Neuroscience Institute
Barry L. Jacobs, also Princeton Neuroscience Institute
Philip N. Johnson-Laird
Sabine Kastner, also Princeton Neuroscience Institute
Daniel N. Osherson
Deborah A. Prentice
Eldar B. Shafir, also Woodrow Wilson School
Susan L. Sugarman

Associate Professor
Matthew M. Botvinick, also Princeton Neuroscience Institute
Asif A. Ghazanfar, also Princeton Neuroscience Institute
Michael S. Graziano, also Princeton Neuroscience Institute
Kenneth A. Norman, also Princeton Neuroscience Institute
Daniel M. Oppenheimer, also Woodrow Wilson School
Emily Pronin, also Woodrow Wilson School
J. Nicole Shelton
Stacey Sinclair, also African American Studies
Alexander T. Todorov, also Woodrow Wilson School

Assistant Professor
Uri Hasson, also Princeton Neuroscience Institute
Yael Niv, also Princeton Neuroscience Institute
Elizabeth Levy Paluck, also Woodrow Wilson School
Nicholas B. Turk-Browne

Senior Lecturer
Andrew R. Conway

Lecturer with Continuing Appointment
Ronald J. Comer

Associated Faculty
Adele Goldberg, Council of the Humanities, Linguistics
Sarah-Jane Leslie, Philosophy

Information and Departmental Plan of Study

The Department of Psychology recognizes that students may wish to concentrate in psychology for many reasons. Individual plans of study can be tailored to each student's preparation and interests. Students are urged to develop these plans as early in their careers as possible, even in the freshman year, in consultation with the departmental representative and departmental faculty.

Prerequisites

The prerequisites for entering the Department of Psychology are successful, graded completion of Introduction to Psychology (101) and Quantitative Methods (251). Students may fulfill the quantitative methods prerequisite by taking and passing (with a grade) a preapproved course in another department (for example, ORF 245 or ECO 202) or at another college or university, or by passing an equivalence examination that is administered by the department.

Early Concentration

Sophomores who have fulfilled the prerequisites may apply for early concentration. If accepted, they may engage in independent reading with a faculty adviser and submit a paper at the end of the spring semester. This preparation may qualify them for more advanced independent work in the junior year.

Program of Study

Psychology concentrators must pass at least nine graded departmental courses in addition to the prerequisites. Three of these courses must be at the 200 level. Each student must meet the following distribution requirements:

Foundation Courses. Concentrators must take at least one course from each of the following three groupings:

1. Personality, social, and clinical psychology: 207, 212, 252, 257
2. Developmental and cognitive psychology: 254, 255, 259a, 259b
3. Cognitive and behavioral neuroscience: 208, 256, 258, 259a, 259b

Advanced Courses. Concentrators must take at least three of the following courses, sampled from at least two of the three groupings:

1. Social psychology courses: 312, 313, 314, 326, 329, 400

http://www.princeton.edu/ua/
2. Cognitive psychology courses: 306, 309, 310, 321, 330

In addition to the permanent courses listed above, the department often offers additional, one-time-only courses that may fulfill certain departmental requirements. Each semester the department notifies students of such courses.

**Electives.** Concentrators may count up to three of the following courses toward their departmental nine: 307, 319, 320, 322, 323, 365. Alternatively, they may count up to two preapproved cognate courses (that is, related courses in other departments) toward their departmental nine.

**Independent Work**

**Junior Independent Work.** To satisfy the junior independent work requirement, students must: (1) write three brief analytic reports for separate advisers during the fall semester, and (2) write a 5,000- to 10,000-word paper during the spring semester.

1. **Fall Semester Papers.** In the fall semester, juniors work with three successive tutorial advisers, each one for four weeks. At the beginning of each four-week period, the student is required to meet with the adviser to select a small number of readings pertaining to a particular psychological problem or question. The student then prepares a five- to eight-page report, describing the background and significance of the problem under consideration and the way research has contributed to its solution. The three advisers are selected to acquaint the student with different faculty members and different approaches to his or her areas of interest. The grades on the three junior reports are averaged to yield the fall junior independent work grade.

Some number of students who have definite ideas about a research project and a particular adviser may begin to work with that faculty member in the fall of the junior year (or even during the preceding summer). This single paper option is especially useful for those students wishing to do laboratory research, because it gives them the time to acquire the requisite technical skills. Students wishing to explore this possibility should discuss it with the potential adviser at the end of their sophomore year. For these students, the single paper for fall independent work is due on the first day of reading period. Note: Students pursuing the neuroscience certificate are strongly encouraged to choose this single paper option, though they are equally permitted to opt for the three, short reports.

2. **Spring Semester Paper.** Each junior is assigned a spring semester adviser at the end of the fall semester. In consultation with this adviser, the student conducts independent library or empirical research and describes the results of this research in a typically 5,000- to 10,000-word paper. In most cases, the spring semester independent work lays the groundwork for the senior thesis.

**Senior Independent Work.** In the senior year, each concentrator must prepare a senior thesis, based either on an empirical investigation conducted by the student in a laboratory or field setting, or on a library or theoretical inquiry. In close consultation with a faculty adviser, each student develops, carries out, and writes up his or her own research project. The resulting thesis serves as the basis for the first part of the senior comprehensive exam (see below).

**Senior Departmental Examination**

The senior thesis serves as the basis for the first part of the senior comprehensive exam, a 60-minute oral examination conducted by two members of the faculty. The exam consists of two parts: (1) a defense of the thesis and a discussion of its implications, and (2) some more general questions on the broader field of psychology, based on the courses taken by the student.

**Study Abroad**

The department encourages students to consider studying abroad for one semester, or even for a full year, in conjunction with departmental concentration in psychology. Concentrators may receive credit for up to two courses per semester spent studying abroad, to count toward their departmental course requirements. Courses taken while studying abroad require the prior approval of the departmental representative. To secure approval, students must document the work load and material covered by proposed courses.

**Program in Neuroscience.** The department offers the opportunity for concentrators to participate in the Program in Neuroscience. Interested students should discuss the program with the directors and their departmental representative. Some advanced courses taken in the program count as cognates in the Department of Psychology. Junior concentrators participating in the Program in Neuroscience are strongly encouraged to choose the single paper option for fall junior independent work.

**Facilities.** The laboratories of individual faculty members are open to undergraduates for their independent work. Information about the Department of Psychology can be found online, including a current description of the research being conducted in the laboratories. In addition, the Psychology Library in Green Hall houses both current and back issues of all major psychology journals, many excellent reference books, and facilities for conducting computerized literature searches.

**Courses**

**PSY 101 Introduction to Psychology**  Fall, Spring ST

http://www.princeton.edu/ua/
The scientific study of human thought and behavior with an emphasis on experimental methods. Two lectures, three hours of laboratory assignments. D. Oppenheimer

**PSY 207 Abnormal Psychology  Fall SA**

An examination of the different patterns of abnormal behavior. Each will be examined from the perspective of such models of explanation as the psychoanalytic, behavioristic, humanistic, physiological, and cognitive models. Two lectures, one preceptorial. M. Litchman

**PSY 208 The Brain: A User's Guide  Spring EC**

A survey of brain and mind, emphasizing issues related to human behavior. Topics include: psychoactive drugs, aging and Alzheimer's disease, reengineering the brain, learning and memory, sleep-waking and biological rhythms, and major mental diseases. Two lectures, one preceptorial. B. Jacobs

**PSY 212 The Psychology of Moral Behavior (also CHV 212)  Not offered this year EM**

A survey of the psychological, situational, and cultural determinants of moral thought and action. Topics will include the development of moral reasoning abilities, moral education, the relation between morality and rationality, altruism, and moral transgressions. Precepts will examine methods used in the psychological study of moral behavior. Two lectures, one preceptorial. D. Prentice

**PSY 214 Human Identity in the Age of Neuroscience and Information Technology  Not offered this year EC**

A central challenge for modern society is to construct individual and group identity in the face of technologies that come ever closer to understanding the mechanisms of thought and feeling. We live in a time when cognitive neuroscience is poised to trace the executive functions of the mind to the workings of the brain, and computer science is coming closer to replicating those functions. This course offers a multidisciplinary introduction to the scientific and social issues that underlie the potential cultural impact of advances in self-understanding. Faculty from a wide range of departments provide lectures. Two lectures, one preceptorial. D. Osherson

**PSY 215 Linguistics and Language Acquisition (see LIN 215)**

**PSY 216 Language, Mind, and Brain (see LIN 216)**

**PSY 237 The Psychology and Philosophy of Rationality (also PHI 237)  Not offered this year EC**

The human capacity for rationality is fundamental; however there is ample evidence for irrationality in human affairs--including notions such as hysteria, addiction, lack of self-control, wishful thinking, and self-deception. This course considers both errors and achievements, providing an introduction to a wide array of topics, such as logic, probability, decision theory, relativism, and psychopathology. It provides a background for further study of subjects such as logic, philosophy of mind, cognitive psychology, cognitive science, the psychology of judgment and choice, and the psychology of thinking. One two-hour lecture, one preceptorial. E. Shafir, P. Johnson-Laird, G. Harman

**PSY 251 Quantitative Methods  Spring QR**

A general introduction to statistical techniques, both descriptive and inferential, employed by psychologists. Required for concentrators. Two lectures, one laboratory. A. Conway

**PSY 252 Social Psychology  Fall SA**

The scientific study of social behavior, with an emphasis on social interaction and group influence. Topics covered will include social perception, the formation of attitudes and prejudice, attraction, conformity and obedience, altruism and aggression, and group dynamics. Two lectures, one preceptorial. D. Prentice

**PSY 254 Developmental Psychology  Spring EC**

A survey of human development emphasizing the nature of children's minds and experience and the relation of childhood to adulthood. Two lectures, one preceptorial. Staff

**PSY 255 Cognitive Psychology  Spring EC**

The course will survey the major themes and experimental findings of cognitive psychology and consider their relevance to the cognitive sciences in general. Topics covered will include attention, perception, imagery, memory, language, and reasoning. Two lectures, one preceptorial. D. Osherson

**PSY 257 Personality  Not offered this year SA**

A survey of major approaches to the study of personality, including psychodynamic, social learning, and trait-theory approaches. The focus will be on the assumptions made by each approach, relevant techniques for collecting and analyzing data, and theoretical and practical implications. Two lectures, one preceptorial. Staff

**PSY 258 Fundamentals of Neuroscience (see NEU 258)**

**PSY 259A Introduction to Cognitive Neuroscience (see NEU 259A)**

**PSY 259B Introduction to Cognitive Neuroscience (see NEU 259B)**
PSY 306 Memory and Cognition (also NEU 306)  Spring EC
Empirical facts, theoretical issues, and scientific techniques in the area of human memory. Potential topics include models of memory, eyewitness testimony, comprehension, representation of knowledge, autobiographical memory, reality monitoring, amnesia, and other disorders of memory and cognition. Two lectures, one preceptorial. Prerequisite: 255 or 259, or instructor's permission. K. Norman

PSY 307 Educational Psychology  Fall, Spring EC
Principles of psychology relevant to the theory and practice of education. Through selected readings, discussion, and classroom observations, students study theories of development, learning, cognition (including literacy), and motivation, as well as individual and group differences in these areas; assessment; and the social psychology of the classroom. The course focuses on how learning by children and adolescents at the elementary, middle, and secondary school levels is influenced by their own characteristics and experiences and the various contexts in which they learn: family, school, community, and culture. One three-hour seminar. G. Wilder

PSY 309 Psychology of Language (also LIN 309)  Fall EC
The cognitive and interpersonal processes involved in language use. Topics include speech production and perception, the nature of grammatical and lexical knowledge, semantics and pragmatics, computer systems for natural language understanding, language acquisition, and the social bases of human communication. Two lectures, one preceptorial-laboratory. Prerequisite: 255 or instructor's permission. A. Goldberg

PSY 310 Psychology of Thinking  Spring EC
The study of human problem solving, reasoning, and decision making. Phenomena of interest include thinking in everyday situations and contexts as well as in more specialized areas, such as logic, mathematics, and the sciences. Two lectures, one preceptorial. Prerequisite: 255 or instructor's permission. P. Johnson-Laird

PSY 312 Social Interaction and Influence  Spring SA
Analysis of interpretation processes used to understand complex actions of self and others. Examination of principles governing such interpretations and their use in the analysis of conformity and deviation, self-fulfilling prophecies, the inaction of bystanders in emergencies, and the startling willingness of subjects to harm others. Two lectures, one preceptorial. Prerequisite: 252 or instructor's permission. D. Prentice

PSY 313 Interpersonal Perception  Fall EC
Considers how one infers the motives, dispositions, and abilities of other persons. Next examines how these inferential processes are used to draw inferences about oneself. Students will design an original experiment (with consultation). Two lectures, one preceptorial. Prerequisite: 252 or instructor's permission. E. Pronin

PSY 314 Research Methods in Social Psychology  Not offered this year SA
An examination of the various methods by which social psychologists conduct research, including laboratory and field experiments, quasi-experiments, survey research, and naturalistic observation. Over the course of the semester, students will design and conduct social psychological research using these methods. Although valuable for all psychology majors, this course will be particularly useful for those who anticipate completing a senior thesis based on empirical research. Prerequisites: 251 or permission of instructor. Two lectures, one preceptorial. J. Shelton

PSY 319 Childhood Psychopathology  Fall SA
An examination of the major forms of childhood psychopathology. Causal roles played by individual factors, traumatic events, the family, school, and community as well as the prevention and treatment of childhood disorders will also be examined. One three-hour seminar. Prerequisites: 207 and 254. Offered in alternate years. R. Comer

PSY 320 Theories of Psychotherapy  Spring SA
An examination of the various forms of psychotherapy, including the psychoanalytic, behavioristic, humanistic, and cognitive approaches. The focus will be upon the theoretical basis, format, and empirical support for each approach. The impact of different treatment settings will also be considered. One three-hour seminar, including field-setting preceptorials. Prerequisite: 207 or permission of instructor. R. Comer

PSY 321 The Psychology of Decision Making and Judgment (see WWS 312)

PSY 322 Human-Machine Interaction (also ORF 322)  Not offered this year EC
A multidisciplinary study of the fundamentals of human-machine interactions from both the human psychology/philosophy side and the machine engineering and design side. Philosophical, psychological, and engineering models of the human processor. Functional differences between people and machines, the nature of consciousness and intelligence, massively parallel computing and neural networks, and the concept of resonant synergism in human-machine interactions. Two 90-minute lectures; three laboratories during semester. A. Kornhauser, P. Johnson-Laird, J. Cooper

PSY 323 Experimental Psychopathology  Not offered this year SA
An examination of the relationship between important topics in abnormal psychology and laboratory research conducted in other areas of psychology. Topics will include the ties between laboratory-learned helplessness and mood disorders, human memory research and dissociative disorders, and coping strategies and anxiety disorders. Two 90-minute classes. Prerequisite: 101 and 207, or instructor's permission. R. Comer
PSY 326 Social and Personality Development   Spring SA
Major issues in social and personality psychology examined from a developmental perspective with emphasis on
developmental processes and change. Data on children, adolescents, and adults will be considered. Topics will include:
social attachment, stranger and separation anxiety, self-concept, self-esteem, achievement, sex roles, and antisocial,
prosocial, and moral behavior. Prerequisite: 252 or 254 or 257 or instructor's permission. Two 90-minute seminars. S. Lutz

PSY 329 Psychology of Gender (also WOM 329)   Not offered this year EC
Gender is a topic with which everybody feels intimately familiar. This course holds up to scientific scrutiny the strong
beliefs people have about how women and men are similar to and different from each other, examining major theories
and empirical findings in psychological research on gender. Topics include the development of gender identity,
empirical comparisons of men and women, gender stereotypes and their perpetuation, and the role of gender and
gendered beliefs in achievement, interpersonal relationships, and physical and psychological well-being. Prerequisite:
any course in psychology. Two 90-minute seminars. Staff

PSY 330 Introduction to Connectionist Models: Bridging between Brain and Mind (see NEU 330)

PSY 336 The Diversity of Brains (also NEU 336)   Spring EC
A survey of the unique behaviors of different animal species and how they are mediated by specialized brain circuits.
Topics include, for example, monogamy in voles, face recognition in primates, sex- and role-change in fish, and
predation by bats. The role of evolutionary and developmental constraints on neural circuit construction will be a key
underlying theme. Prerequisites: 258 or 259. One three-hour seminar. A. Ghazanfar

PSY 365 Freud on the Psychological Foundations of the Mind (see HUM 365)

PSY 384 Prejudice: Its Causes, Consequences, and Cures (see AAS 384)

PSY 400 Topics in Social and Personality Psychology   Fall SA
An examination of various topics in social and personality psychology not emphasized in other courses. The topic and
prerequisites will vary from year to year. Staff

PSY 404 Cellular and Systems Neuroscience (see NEU 408)

PSY 410 Depression: From Neuron to Clinic (also NEU 410)   Not offered this year EC
This course focuses on clinical depression as a model topic for scientific discourse. Depression is a subject of growing
individual and societal importance, and it is an ideal topic because it intersects such a broad range of issues. Our work
will emphasize a neurobiological approach, with topics ranging from the molecular to the clinical. Prerequisites: 208 or
258, or EEB 211, or MOL 214, and instructor's permission. One three-hour seminar. B. Jacobs

PSY 437 Computational Neuroscience (see NEU 437)
Program in Quantitative and Computational Biology

Director
Saeed Tavazoie

Program Committee
Michael H. Hecht, Chemistry
Leonid Kruglyak, Ecology and Evolutionary Biology, Lewis-Sigler Institute for Integrative Genomics
Peter D. Meyers, Physics
Mark D. Rose, Molecular Biology
Kenneth Steiglitz, Computer Science
Saeed Tavazoie, Molecular Biology, Lewis-Sigler Institute for Integrative Genomics

The Program in Quantitative and Computational Biology is offered by the Lewis-Sigler Institute for Integrative Genomics and its affiliated departments. It is designed for students with a strong interest in multidisciplinary and systems-level approaches to understanding molecular, cellular, and organismal behavior. The curriculum introduces students to experimental and analytic techniques for acquisition of large-scale quantitative observations, and the interpretation of such data in the context of appropriate models. Strong emphasis is placed on using global genome-wide measurements (e.g., microarray gene expression, sequence, phenotype) to understand physiological and evolutionary processes.

Examples of ongoing research include organizational principles of metabolic networks, quantitative modeling of cell-biological processes, mapping the genetic basis of complex bacterial behavior, comparative genomics analysis of regulatory networks, the genetic basis of quantitative phenotypic variation, and genomic plasticity and mechanisms of phenotypic adaptation.

At the core of the curriculum is the project lab (QCB 301), a double-credit course taken during the fall of junior year, in which students participate in the design, execution, and analysis of experiments. The required courses provide a strong background in modern methodologies in data analysis, interpretation, and modeling. Courses are chosen with the help of advisers in molecular biology, ecology and evolutionary biology, physics, chemistry, computer science, and other related departments. A certificate in quantitative and computational biology is awarded to students who successfully complete the program requirements.

Admission to the Program

Students are admitted to the program after they have chosen a concentration and consulted with the program committee in May of their sophomore year. The program committee will also assist students in selecting a laboratory for their junior independent and thesis work. Admission requires the completion of prerequisites listed below. The course of study is structured upon department concentration, plus junior and senior independent work in genomics or quantitative and computational biology. Electives are chosen in consultation with the adviser.

There are two possible tracks for entry into the QCB certificate program:

1. For those students who have completed the integrated science curriculum ISC/CHM/COS/MOL/PHY 231-234 during their freshman year and ISC/CHM/COS/MOL/PHY 235-236 during their sophomore year. (See Integrated Science Curriculum below.)

2. For those students who have not taken the integrated science series, the following courses are the minimum that must be completed before the end of their sophomore year:

   - COS 126 or higher
   - MOL 342
   - One year of physics as a Princeton undergraduate (PHY 103-104 or higher)
   - One year of chemistry as a Princeton undergraduate (CHM 201-202 or higher)
   - One year of mathematics as a Princeton undergraduate

Applications for program admission must be submitted by May 31 of sophomore year and should include the following information: prerequisite courses, plans for courses in the junior and senior years, and independent work plans. Admission decisions are made by June 30.

Program of Study

1. QCB 301 Experimental Project Laboratory in Quantitative and Computational Biology (taken in the fall of junior year)

2. MOL/COS 455 Introduction to Genomics and Computational Molecular Biology

3. Senior thesis with a strong component of quantitative and computational analysis

Molecular biology concentrators will be required to take eight departmentals:

http://www.princeton.edu/ua/
1. MOL 350 Laboratory in Molecular Biology (taken in spring of sophomore year)
2. MOL 348 Cell and Developmental Biology
3. MOL/COS 455 Introduction to Genomics and Computational Molecular Biology
4. QCB 301 Experimental Project Laboratory in Quantitative and Computational Biology (would count as two departmentals)
5. Three other science or math courses (students are strongly encouraged to take APC/MOL 360 Biological Dynamics or EEB 355 Introduction to Biostatistics)
6. Molecular biology concentrators will do a quantitative or computationally oriented junior paper in the spring of their junior year.
7. Seniors will choose a thesis project under the broad umbrella of quantitative or computational biology and with a faculty member and project approved by the QCB program committee.
8. For students who enter the program without taking the integrated science courses, it is expected that many will also take organic chemistry (CHM 301-302 or CHM 303-304), as well as biochemistry (MOL 345). These will also fulfill the MOL departmental requirement.

**Physics concentrators** may take half of a semester of MOL 350 Laboratory in Molecular Biology and half a semester of PHY 311-312 Experimental Physics in the spring of their junior year. One junior paper and the senior thesis should be QCB related. The normal sequence of required courses in physics can be shifted to accommodate the QCB junior project lab.

**Computer science concentrators** are required to take eight computer science departmentals. The junior paper and senior thesis must be QCB related. Students interested in the QCB certificate should speak with Professor Kenneth Steiglitz (A.B. track) or Professor Brian Kernighan (B.S.E. track) as early as possible to plan their course of study.

**Chemistry concentrators** are required to take four 300-, 400-, or 500-level courses in chemistry (at least one term each of organic, physical, inorganic, and experimental chemistry) plus four science cognates at the 300, 400, or 500 level. MOL 350 Laboratory in Molecular Biology can be substituted for CHM 371 Experimental Chemistry. One junior paper and the senior thesis should be QCB related.

**Ecology and evolutionary biology concentrators** are required to take eight EEB departmentals, at least five of which must normally be upper-level EEB or MOL courses. One junior paper and the senior thesis should be QCB related.

Students interested in a B.S.E. degree should contact Associate Dean Peter Bogucki in the School of Engineering and Applied Science for general information and electrical engineering concentrators should contact Professor Bradley Dickinson.

**Junior and Senior Independent Work.** Junior and senior independent work should be arranged with the help of the program director and committee and supervised by the faculty in the various home departments. The senior thesis should make significant use of computational or quantitative methods.

**Administrative Details.** A minimum of a B average in program courses and junior and senior independent work is required for successful completion of the program. Program courses cannot be taken pass/D/fail.

**Certificate of Proficiency**

Students who fulfill the requirements of the program receive a certificate of proficiency in quantitative and computational biology upon graduation. Students who pursue a certificate in quantitative and computational biology may not also receive a certificate in biophysics.

**Integrated Science Curriculum.** Integrated science is a revolutionary new introductory science curriculum developed at Princeton, intended for students considering a career in science. By breaking down traditional disciplinary barriers, a series of courses taken in the freshman and sophomore years provides students with first-rate preparation for a major in any of the core scientific disciplines, and in such a way that helps retain the connections to the other disciplines. The curriculum is founded on the expectation that much of the most important science of the future, though based on the classical disciplines, will lie in areas that span two or more of them.

The integrated science sequence is suitable for any undergraduate considering concentrating in the sciences or engineering at Princeton. The core training is perfect preparation for a very broad range of careers, both within and outside science. The curriculum is especially valuable for students interested in bridging the traditional barriers between the biological and the physical sciences.

The integrated science sequence provides an alternative path into the Departments of Chemistry, Computer Science, Molecular Biology, and Physics. ISC/CHM/COS/MOL/PHY 231-234 (a double course) can be taken in the freshman year and ISC/CHM/COS/MOL/PHY 235-236 can be taken in the sophomore year. These courses can be substituted for CHM 203-204, PHY 103-104 or 105-106, and COS 126 in the freshman year and MOL 214, 342, and 345 in the sophomore year.

**Courses**
ISC 231 An Integrated, Quantitative Introduction to the Natural Sciences I (also CHM 231/COS 231/MOL 231/PHY 231)  Fall ST
An integrated, mathematically and computationally sophisticated introduction to physics and chemistry, drawing on examples from biological systems. Alternative to the combination of PHY 105-106, CHM 201-202, and COS 126. Students must enroll in 231 and 232 in the fall and 233 and 234 in the spring. Five lectures, one three-hour computational laboratory, one evening problem session. Prerequisites: familiarity with the calculus at the level of MAT 103-104 or Advanced Placement Calculus BC, solid high school physics and chemistry courses. W. Bialek, D. Botstein

ISC 232 An Integrated, Quantitative Introduction to the Natural Sciences I (also CHM 232/COS 232/MOL 232/PHY 232)  Fall QR
An integrated, mathematically and computationally sophisticated introduction to physics and chemistry, drawing on examples from biological systems. Alternative to the combination of PHY 105-106, CHM 201-202, and COS 126. Students must enroll in 231 and 232 in the fall and 233 and 234 in the spring. Five lectures, one three-hour laboratory, one three-hour computational laboratory, one evening problem session. Prerequisites: familiarity with the calculus at the level of MAT 103-104 or Advanced Placement Calculus BC, solid high school physics and chemistry courses. W. Bialek, D. Botstein

ISC 233 An Integrated, Quantitative Introduction to the Natural Sciences II (also CHM 233/COS 233/MOL 233/PHY 233)  Spring ST
An integrated, mathematically and computationally sophisticated introduction to physics and chemistry, drawing on examples from biological systems. Alternative to the combination of PHY 105-106, CHM 201-202, and COS 126. Students must enroll in 231 and 232 in the fall and 233 and 234 in the spring. Five lectures, one three-hour laboratory, one three-hour computational laboratory, one evening problem session. Prerequisites: familiarity with the calculus at the level of MAT 103-104 or Advanced Placement Calculus BC, solid high school physics and chemistry courses. C. Callan, O. Troyanskaya

ISC 234 An Integrated, Quantitative Introduction to the Natural Sciences II (also CHM 234/COS 234/MOL 234/PHY 234)  Spring
An integrated, mathematically and computationally sophisticated introduction to physics and chemistry, drawing on examples from biological systems. Alternative to the combination of PHY 105-106, CHM 201-202, and COS 126. Students must enroll in 231 and 232 in the fall and 233 and 234 in the spring. Five lectures, one three-hour laboratory, one three-hour computational laboratory, one evening problem session. Prerequisites: familiarity with the calculus at the level of MAT 103-104 or Advanced Placement Calculus BC, solid high school physics and chemistry courses. C. Callan, O. Troyanskaya

ISC 235 An Integrated, Quantitative Introduction to the Natural Sciences III (also CHM 235/COS 235/MOL 235/PHY 235)  Fall
An integrated, mathematically and computationally sophisticated introduction to biochemistry, molecular biology, genetics, genomics, and evolution. Students must enroll in 235 in the fall and 236 in the spring. Two lectures, one preceptorial, one evening problem session. Prerequisites: 231-234 or equivalent preparation (MOL 214, COS 126, CHM 201-202 or 203-204, PHY 103-104 or 105-106) or by permission of the instructor. D. Botstein, M. Llinás, J. Rabinowitz

ISC 236 An Integrated, Quantitative Introduction to the Natural Sciences IV (also CHM 236/COS 236/MOL 236/PHY 236)  Spring
An integrated, mathematically and computationally sophisticated introduction to biochemistry, molecular biology, genetics, genomics, and evolution. Students must enroll in 235 in the fall and 236 in the spring. Three lectures, one preceptorial, one evening problem session. Prerequisites: 231-234 or equivalent preparation (MOL 214, COS 126, CHM 201-202 or 203-204, PHY 103-104 or 105-106) or by permission of the instructor. L. Kruglyak, E. Wieschaus

QCB 301 Experimental Project Laboratory in Quantitative and Computational Biology (also MOL 301)  Fall ST
An intensive double-credit course focusing on state-of-the-art experimental design and practice in quantitative biology. Emphasis is placed on functional genomics using global genome-wide measurements (e.g., microarray gene expression, sequence, phenotype) to understand physiological and evolutionary processes. Begins with a short introduction to technology and principles, followed by the design and execution of independent projects done by pairs of students in collaboration, with the continuing guidance and advice of the teaching staff. Prerequisites: ISC 231-234 and ISC 235-236. Four three-hour laboratories. D. Botstein, C. Murphy
Center for the Study of Religion

**Director**
Robert J. Wuthnow

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Esther H. Schor, English
Nigel Smith, English
Jeffrey L. Stout, Religion
Judith L. Weisenfeld, Religion
Muhammad Q. Zaman, Near Eastern Studies, Religion

**Sits with Committee**
Katherine T. Rohrer, Office of the Provost

The Center for the Study of Religion facilitates intellectual exchange and interdisciplinary study of religion among students and faculty. The center is especially interested in encouraging scholarship that examines religion or aspects of religion comparatively and in its diverse historical and contemporary manifestations through the lenses of the various humanities and social science disciplines. It supplements the curriculum of the Department of Religion by drawing students and faculty together from other departments and by fostering studies in which religion or the consequences of religion may be one of several components under investigation. One of the center's activities is to cosponsor freshman seminars and other occasional undergraduate courses. The center also offers two interdisciplinary seminars, Religion and Culture and Religion and Public Life, that are open to upper-level undergraduates with permission of the instructor. The center was founded in recognition of the fact that Princeton University includes among its faculty a number of uniquely qualified specialists throughout an exceptionally wide range of disciplines. It draws to students' attention the fact that more than 50 courses dealing with the historical development of religious traditions and their role in current affairs are regularly offered under the auspices of more than a dozen departments and programs.

The Center for the Study of Religion provides resources to faculty members throughout the University who may be interested in developing new courses or research interests. The center sponsors freshman seminars, lecture courses, and advanced seminars on topics significantly concerned with the study of religion. In addition, the center supports faculty who wish to plan interdisciplinary conferences, symposia, or guest-speaker series focusing on topics related to religion such as ethics and biotechnology, Buddhist death practices, religion and sexuality, poverty and charity, religion and film, religion and neuroscience, and mysticism and modernity. These and other center-sponsored public lectures and conferences promote greater discussion about understanding of religion in higher education and in the wider society.

Through these various activities, students are encouraged to develop a better understanding of the interactions among religions and their social contexts and to pursue junior independent work and senior theses concerned with the ethical, social, and cultural contributions and implications of religion. The center has small amounts of funding available for juniors and seniors undertaking research projects in the study of religion. The center's staff, faculty, and associates are available for students seeking information about courses relevant to the study of religion in other departments and programs.

A list of undergraduate courses relevant to the interdisciplinary study of religion can be found on the center's website.

http://www.princeton.edu/ua/
Information and Departmental Plan of Study

Prerequisites

Any course offered by the department.

Early Concentration

A sophomore may apply for early concentration through consultation with the departmental representative.

Program of Study

Normally, each term juniors and seniors will take two courses offered by the department.

Concentrators are required to complete at least eight religion courses taught by department faculty (including visitors to the Department of Religion) by the end of their senior year. All students are required to complete Religion 222, which is considered one of the eight religion courses. In addition, students are encouraged, but not required, to take two approved cognate courses in other departments. The cognate courses will be calculated into departmental honors. The departmental representative must approve cognate courses.

Students will select at least one course from each of the following three areas:

1. Religions of the Ancient Mediterranean: Judaism and Christianity from Antiquity to the Middle Ages: 230, 231, 244, 245, 251, 252, 340, 350, 351, 352, 353, and occasional courses

2. Religion in America: 258, 319, 320, 357, 358, 360, 361, 367, 371, and occasional courses


Students will select two courses in the following area from two different traditions:

Islam and the Religions of Asia: 225, 226, 228, 229, 235, 236, 240, 322, 326, 328, 334, 335, 336, 338, 382, and occasional courses

Not all courses satisfy area requirements. A course may be counted toward one area requirement only. In any year it is offered, 373 Studies in Religion will be assigned to the appropriate area.

When registering for the first semester of senior year, each student will decide upon a focus of study in consultation with the departmental representative. Possible focuses of study include Japanese religions, Chinese religions, Buddhism, Islam, philosophy of religion, modern Jewish thought, religious and philosophical ethics, social criticism, African American religious movements, Biblical studies, ancient Judaism and Christianity, Rabbinic Judaism, and Gnosticism. Senior independent work will be in the student's focus of study, and two courses must be completed in the
focus of study by the end of the first term of the senior year. All changes to the focus of study must be approved by the departmental representative.

**Independent Work**

**Junior Year.** During the fall term of the junior year, all department juniors will participate in a colloquium (see below for study abroad) with a member or members of the faculty. Students are expected to produce a 10-page research paper at the conclusion of the colloquium. The research paper and colloquium participation constitute 40 percent of the junior independent grade. During the spring term, juniors will do independent reading and write a junior paper under supervision. The departmental representative, in consultation with the director of the colloquium, will assign advisers. The spring junior paper will constitute 60 percent of the junior independent work. At the end of junior year, students will review their work in the department and discuss with a faculty committee their plans for senior independent work.

**Senior Year.** Every senior will prepare a thesis under the supervision of a faculty adviser.

**Senior Departmental Examination**

At the end of the senior year, students will take an oral examination concerning their senior independent work, focus of study, and work in the department generally.

**Study Abroad**

The Department of Religion welcomes study abroad for departmental majors in their junior year. Those juniors who study abroad in their fall semester will be exempt from the colloquium but will be required to write a fall junior paper under the supervision of a religion department faculty member. Juniors who study abroad in the spring semester will write the required spring junior paper under the supervision of a religion department faculty member. Normally, students are expected to have junior year independent work completed before the start of the senior year. Students must consult with the departmental representative before leaving for their study abroad program.

**Preparation for Graduate Study**

Those students considering graduate work in religion are strongly advised to develop a reading knowledge of languages most appropriate to their focus of study, for example, Hebrew, Greek, Latin, Arabic, Chinese, Japanese, German, and French.

**Religion and Special Programs.** Students who wish to combine the study of religion with work in programs should consult the departmental representative. In recent years, religion majors have received certificates in African American studies, African studies, American studies, dance, East Asian studies, European cultural studies, Hellenic studies, Judaic studies, Near Eastern studies, theater, visual arts, and women and gender studies.

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**Courses**

REL 202 Great Books of the Jewish Tradition (see JDS 202)

REL 221 Choral Music (see MUS 221)

REL 222 Religion in Modern Thought and Film (also HUM 222)  Not offered this year EC

This course critically examines influential conceptions of religion, including those of Plato, Augustine, Pascal, Hume, Marx, Freud, Eliade, Durkheim, and Weber. Films by such directors as Hitchcock and Von Trier illustrate the issues covered. Two lectures, one preceptorial, one film screening. *J. Stout*

REL 223 Introduction to Judaism: Religion, History, Ethics (see JDS 201)

REL 225 The Buddhist World of Thought and Practice  Fall HA

An introduction to the thought and history of Buddhism. Emphasis is upon the beginnings of the religion in India, the interaction between Buddhism and the various cultures of Asia, basic schools of Buddhist religious philosophy, the relationship between thought and practice, and the place of Buddhism in the modern world. Two lectures, one preceptorial. *J. Stone*

REL 226 The Religions of China (also EAS 226)  Spring EM

A thematic introduction to the history of Chinese religion. Topics include: cosmology, family, shamanism, divination, mortuary ritual, and women. Readings are drawn from a wide range of sources, including sacred scriptures, popular literature, and modern ethnography. Two lectures, one preceptorial. *S. Teiser*

REL 228 Religion in Japanese Culture (also EAS 228)  Not offered this year HA

An introduction to Japanese religion from ancient to modern times, focusing on its role in culture and history. Representative aspects of Shinto, Buddhist, Confucian, and other traditions will be studied, as well as such topics as
myth, ritual, shamanism, and ancestor worship. Two 90-minute classes. J. Stone

REL 229 Great Books in Buddhism (also HUM 229) Not offered this year LA
Close reading of great stories in the formative period of Buddhism, 50 BC to 400 AD. Examines Buddhist literature against the background of religious doctrine and cultural history. Explores themes such as: previous lifetimes, rebirth and cosmology, genres of Buddhist narrative, parables, personal quests versus social justice, emptiness, and changing conceptions of the Buddha. Two lectures, one preceptorial. S. Teiser

REL 230 Hebrew Bible and Ancient Israel (also JDS 230) Fall HA
The history of the religion of Israel through the Babylonian exile as it emerges through the study of the Torah, historical writings, and prophets, by means of modern critical methods. The ancient Near Eastern background of the Hebrew Bible, source criticism and the documentary hypothesis, and the beginnings of the editorial process. Two lectures, one preceptorial. N. Meshel

REL 231 Hebrew Bible and Earliest Judaism (also JDS 231) Not offered this year HA
Wisdom literature and the history of the religion of Israel through the Maccabean revolt as known through biblical and extra-biblical sources. Topics to be studied include post-exilic prophecy, historical writings, the biblical and apocryphal novella, the impact of Hellenistic culture, the rise of apocalyptic literature, and the sources for the Maccabean revolt. Two 90-minute classes. N. Meshel

REL 235 In the Shadow of Swords: Martyrdom and Holy War in Islam (also NES 235) EM
This course is an examination of the changing concepts of martyrdom, holy war, and suicide in both Sunni and Shi'i Islam. How are war and martyrdom presented in the sacred texts of these traditions? Historically, how have Sunni and Shi'i Islam constructed, idealized, and also questioned the concept of the Islamic martyr and/or the holy warrior? In what ways have modern religious revivalism, revolutionary movements, and struggles for nationhood created a new and still contested understanding of the Islamic martyr? Course materials include sources in translation, films, Internet sites, and journals. Two lectures, one preceptorial. S. Marmon

REL 236 Introduction to Islam (also NES 236) Spring SA
The doctrines and practices of Islamic communities from the Prophet Muhammad up to and including the modern period. Topics covered include the Qur'an; Sunnis and Shi'is; Islamic law and philosophy; Sufism; Islamic art and architecture; Islamic understandings of physical space and time; the structure of Muslim households; gender issues; Islamic education; modern Islamic "fundamentalist" movements. Materials include sources in translation, films, modern novels. Guest speakers representing diverse Muslim perspectives will be an important component. Two lectures, one preceptorial. S. Marmon

REL 240 Muslims and the Qur'an (see NES 240)

REL 242 Jewish Thought and Modern Society (also JDS 242) EM
What is the relation of Judaism and the individual Jew to the modern world? Is Judaism a religion, a nationality, an ethnicity, or a combination of these? This course explores various answers to these questions by examining various historical and cultural formations of Jewish identity in Europe, America, and Israel from the 18th century to the present, and by engaging particular issues, such as Judaism's relation to technology, the environment, biomedical ethics, feminism, and democracy. Two lectures, one preceptorial. L. Bainitzky

REL 244 Rabbinic Judaism: Literature, History, and Beliefs (also JDS 244) Not offered this year HA
Introduction to the world of the Talmudic rabbis, who created the classical and normative literature of Judaism. The course will deal with the historical background of Rabbinic Judaism, the concept of the written and the oral Torah, and rabbinic literature proper (Midrash, Mishna, Talmud, and so on) as well as with some major rabbinic concepts (God, creation, election of Israel, repentance, redemption). It course will focus on the analysis and discussion of primary sources. Two 90-minute classes. P. Schäfer

REL 245 Jewish Mysticism: From the Bible to Kabbala (also JDS 245) Not offered this year HA
One of the most revolutionary innovations within the history of the Jewish religion is the Kabbala, the summit of Jewish mysticism. It transforms the single, static (and essentially male) God of biblical and Rabbinic Judaism into a dynamic and multifaceted God whose rich inner life can be explored, and influenced, by human beings. The course follows the historical development of Jewish mysticism and examines its major topics, such as God, creation, good and evil, redemption. Two lectures, one preceptorial. P. Schäfer

The birth of Christianity in the cultural environment of Judaism and the Roman Empire. Primary emphasis will be given to a critical reading of the New Testament. Particular topics will include the dialogue between Judaism and Christianity, figure of Jesus, diversity and conflict within the early churches, and the sociopolitical aspects of the new religion. Two lectures, one preceptorial. Staff

REL 252 The Early Christian Movement Not offered this year HA
Investigation of gnostic gospels and other writings and their significance for understandings of the origin of Christianity. Topics include: conflicting interpretations of Jesus and Paul and their messages; human nature; the origin of the universe; religious experience; sexuality; and organizational politics. Two lectures, one preceptorial. E. Pagels

http://www.princeton.edu/ua/
REL 258 Religion in American Society  SA
The United States as a religiously plural nation, including denominational traditions, sects, cults, social groups, and civic piety. Discussion of theoretical literature on religion and society. Attention to particular topics such as migration, ethnicity, and religion among minority groups, development of religious roles and institutions in the cultures. Two lectures, one preceptorial. Staff

REL 261 Christian Ethics and Modern Society (also CHV 261)  Fall EM
An examination of the meaning of Christian ethics through a study of selected contemporary moral issues: sex and marriage, medical-ethical problems, politics, and the morality of warfare. Two lectures, one preceptorial. E. Gregory

REL 309 Politics and Religion (see POL 309)

REL 311 Religious Existentialism  EC
An in-depth study of existentialist philosophies of, among others, Søren Kierkegaard, Martin Buber, Martin Heidegger, Jean-Paul Sartre, and Emmanuel Levinas. The course will focus on their respective arguments about the relations between philosophy and existence, reason and revelation, divine law and love, philosophy, religion and politics, and Judaism and Christianity. One three-hour seminar. L. Batnitzky

REL 313 Pragmatism and Religion: James and Dewey  Not offered this year EC
Examines the works of two important classical pragmatists, William James and John Dewey, and their views about religion. Focuses on questions such as: How do James and Dewey understand and respond to evil and death? Is a conception of God important to their thoughts about religion? Attention given throughout the course to the concepts of nature, experience, and piety. One three-hour seminar. E. Glaude

REL 316 Public Intellectuals and Religious Traditions: Erasmus, Hume, Arnold, and Said  Not offered this year EM
The course aims to map the emergence of modern public spheres, principally owing to the invention of print and the creation of new social formations, to highlight the plight of the humanist traditions in the face of the forces of modern professionalization and specialization, and to probe the complex role of modern intellectuals in light of the growing role of the academy. The course begins with the Christian humanist Erasmus, then turns to the skeptical humanist David Hume, and ends with two exemplary secular humanists, Matthew Arnold and Edward Said. Two lectures, one preceptorial. C. West

REL 317 Recent Jewish and Christian Thought (also JDS 317)  EM
Explores recent Jewish, Christian, and postmodern thought, all of which seek to criticize universalist conceptions of reason and ethics while defending a view of Jewish, Christian, or philosophical particularity. Examines the historical reasons for and philosophical contents of these arguments and also their philosophical, ethical, and political implications. Seminar. L. Batnitzky

REL 318 Black Women and Spiritual Narrative (see AAS 318)

REL 319 Religious Encounters in the Colonial Atlantic World  Spring HA
The encounter of Europeans, Africans, and Native Americans in the world of the colonial Atlantic from the mid-15th to the 18th centuries constituted "America." This course will examine the religious dimensions of the encounter of these different peoples across time and space. Two 90-minute classes. A. Raboteau

REL 320 African American Religious History (also AAS 320)  Not offered this year HA
The religious life, ecclesial and extra-ecclesial, of African Americans from the period of slavery to the present. Topics include African religions in America; religion of the slaves; folk beliefs; independent black churches; the relationships of religion and culture, religion and politics in black American history. Two lectures, one preceptorial. A. Raboteau

REL 321 Black Power and Its Theology of Liberation (see AAS 321)

REL 322 Buddhism in Japan (also EAS 322)  Spring HA
An examination of representative aspects of Buddhist thought and practice in Japan from the sixth century to the present. Possible topics include: major Buddhist traditions (Lotus, Pure Land, Zen, and Tantrism), meditation, ritual, cosmology, ethics, influence on literature, and interaction with other religions. Two 90-minute seminars. J. Stone

REL 326 Buddhist Literature  Not offered this year HA
An intensive reading and discussion of selected Buddhist texts from various cultures, from ancient times to the present. Readings may represent a range of genres, such as Buddhist scriptures, philosophical writings, sacred biography, narrative, sermons, poetry, drama, and fiction. Prerequisite: 225 or equivalent recommended. One three-hour seminar. J. Stone

REL 328 Women and Gender in Islamic Societies (also WOM 328)  Fall SA
This seminar focuses on issues of gender and sexuality in Islamic societies, past and present. Topics include women's lives, women's writings, changing perceptions of male vs. female piety, marriage and divorce, motherhood and fatherhood, sexuality and the body, and the feminist movement in the Middle East. Course materials include a wide range of texts in translation, including novels and poetry, as well as contemporary films. One three-hour seminar. S.
REL 334 Modern Islamic Political Thought (see NES 334)

REL 335 Moses and Jesus in the Islamic Tradition (also NES 335) HA

Focuses on the changing representations of the prophets Musa (Moses) and 'Isa (Jesus) within the Islamic tradition. Course materials include readings in translation from the Qur'an, hadith, Sufi poetry, "Tales of the Prophets," as well as modern Islamic texts on social justice. Examines the ways in which these prophets, recognized by Muslims as foundational figures in Christianity and Judaism, played and continue to play a prominent role as monotheistic prophets and as religious exemplars in many diverse aspects of Islamic thought and practice. One three-hour seminar. E. Pagels

REL 336 Pilgrimage, Travel, and Sacred Space: Muslims, Christians, and Jews in the Land of Islam (also NES 336) Not offered this year HA

Muslim, Christian, and Jewish travelers and pilgrims in the lands of Islam before the period of European dominance in the Middle East. The course uses original accounts (in translation) along with a range of contemporary scholarly literature drawn from history, religious studies, and anthropology. One three-hour seminar. S. Marmon

REL 338 Muslim South Asia (see NES 340)

REL 339 Introduction to Islamic Theology (see NES 339)

REL 340 Ancient Judaism and the Dead Sea Scrolls (also JDS 340) Fall HA

A study of the history of Judaism in ancient Palestine from the emergence of the Torah as an authoritative document under Persian rule in the middle of the fifth century BCE through the destruction of the Second Temple in 70 CE, with an emphasis on the critical reading of primary sources. Much of the second half of the course is devoted to the Dead Sea Scrolls and their implications for our understanding of ancient Judaism. Other texts to be studied include 1 Enoch, the Wisdom of Ben Sirâ, 1 and 2 Maccabees, Daniel, Jübiâles, and 4 Ezra. Two 90-minute classes. M. Himmelfarb

REL 346 Reason and Revelation in Jewish Thought (also JDS 346) EC

A critical introduction to some of the classics of medieval and modern thought. Specific topics include prophecy, miracles, and the possibility of knowing the divine, with particular attention to the relation between modern and premodern conceptions of reason and Moslem, Christian, and secular philosophical influences on Jewish thought. Two 90-minute classes. L. Batnitzky

REL 347 Religion and Law (also JDS 347) EM

A critical examination of the relation between the concepts of "religion" and "law" as they figure in the development of Jewish and Christian law, as well as in contemporary legal theory. Particular attention to the ways in which, historically, theological debates play out in contemporary secular legal arguments about the value underlying law. Two 90-minute classes. L. Batnitzky

REL 350 Demons and Angels, "the gods," God and Satan Not offered this year HA

The seminar will investigate sources ranging from the Babylonian creation story and Homer's Iliad to passages from Genesis, Exodus, Job, the Hebrew prophets, the Dead Sea Scrolls, and the New Testament to see how stories of invisible beings (gods, demons, angels) construct group identity (who "we" are, and who are the "others"--and what characterizes each) and express group values. One three-hour seminar. E. Pagels

REL 351 Golem: The Creation of an Artificial Man (also JDS 351) Not offered this year HA

The seminar will follow the Golem tradition within Judaism throughout history up to its modern ramifications. It will deal with its origin in the Hebrew Bible, its manifestations in mysticism and magic, in literature, in film and on stage, in art, children's books, and the history of science (computer, Internet). The goal will be to uncover the religious roots of these traditions about the creation of an artificial human being, to explore the variety of reactions it aroused, and to determine what have been considered to be responsible Jewish answers to the ethical problems involved. One three-hour seminar. P. Schäfer

REL 352 Jesus: From Earliest Sources to Contemporary Interpretations Not offered this year HA

This seminar investigates the earliest sources about Jesus--New Testament gospels, "gnostic" gospels, and Jewish and Roman historical accounts--to explore various views of Jesus in historical context, as well as contemporary interpretations in poetry, fiction, and film. One three-hour seminar. E. Pagels

REL 353 Spiritual Autobiography and Biography Not offered this year LA

Exploration of some of the classics of religious experience from ancient through contemporary times, using where possible comparison of Eastern and Western sources. Sources range from Western writers as diverse as Augustine, Teresa of Avila, Thomas Merton, Simone Weil to the life of the Tibetan monk Milarepa, and the Hindu Ramakrishna. One three-hour seminar. E. Pagels

REL 357 Religion in Colonial America and the New Nation Fall HA

Intellectual and cultural aspects of American religion from the 17th century through the early republic. Special attention to early Protestant traditions (Anglican, Puritan, Quaker, and Methodist, among others), the Great Awakening, the Enlightenment, and the transformation of religion through the Revolution and its shape in the new

http://www.princeton.edu/ua/
REL 358 Religion in American Culture since 1830  Not offered this year HA

The relationship between religion and society in the U.S. in the 19th and 20th centuries. Attention will be paid to Transcendentalism, the Civil War, the social gospel, Fundamentalism, New Thought, Pentecostalism, civil rights, immigration, and recent religious movements. Two 90-minute classes. Staff

REL 360 Women and American Religion (also WOM 360)  Not offered this year SA

An exploration of women's roles and experiences, and constructions of gender in diverse settings within North American religion. The seminar will examine female religious leaders and participants in such subcultures as Puritanism, evangelicalism, Catholicism, Judaism, African American Protestantism, native traditions, and American Islam. Emphasis on the dilemmas faced by women in religious institutions as well as the creative uses women have made of their social and religious "place." One three-hour seminar. Staff

REL 361 Festival, Celebration, and Ritual in American Culture (also AMS 361)  Not offered this year SA

An examination of a variety of festivals and rituals in American history and culture, including carnival traditions, evangelical camp meetings, Christmas and Chanukah, African American emancipation celebrations, and Roman Catholic Marian festivals. A range of questions about ritual and tradition, gender and race, pluralism and ethnicity, are broached through topical focus on holidays. One three-hour seminar. Staff

REL 362 Migration and the Literary Imagination (see AAS 365)

REL 363 Religion and Ethical Theory  Not offered this year EM

This seminar will examine philosophical accounts of what it means to live well, focusing mainly on works written in the last half century that are relevant to issues in religious ethics: whether morality requires a religious foundation, the ethical significance of divine commandments, and the concepts of virtue, goodness, evil, horror, holiness, sainthood, faith, and the sacred. Among the philosophers to be discussed are Richard Rorty, John Finnis, Alasdair MacIntyre, Iris Murdoch, Stanley Cavell, and Robert Merrihew Adams. One three-hour seminar. J. Stout

REL 364 Love and Justice  Spring EM

Analysis of philosophical and theological accounts of love and justice, with emphasis on how they interrelate. Is love indiscriminate and therefore antithetical to justice, or can love take the shape of justice? What are the implications for moral, political, and legal theory? The seminar also considers recent efforts to revive a tradition of political theology in which love's relation to justice is a prominent theme. One three-hour seminar. E. Gregory

REL 366 The American Jeremiad and Social Criticism in the United States (also AAS 346)  Not offered this year HA

An examination of the religious and philosophical roots of prophecy as a form of social criticism in American intellectual and religious history. Particular attention is given to what is called the American Jeremiad, a mode of public exhortation that joins social criticism to spiritual renewal. Michael Walzer, Sacvan Bercovitch, and Edward Said serve as key points of departure in assessing prophetic criticism's insights and limitations. Attention is also given to the role of black prophetic critics, such as James Baldwin, Martin Luther King Jr., and Cornel West. One three-hour seminar. E. Glaude

REL 368 Topics in African American Religion (see AAS 368)

REL 370 Re-Enchanting the World: Religion and the Literature of Fantasy  Fall LA

This course will look at the role of story, in the forms of folktale, legend, and myth, in depicting the world as an enchanted place. We will read and discuss several works of modern fantasy literature that attempt by adapting or imitating older tales, legends, or myths to re-enchant the world. One three-hour seminar. A. Raboteau

REL 371 Religious Radicals  Not offered this year HA

Offers students an opportunity to reflect upon the lives and writings of several 20th-century American religious figures whose socially radical visions were based upon religious experiences and ideals. Examines the interrelationship and cross influences among biographical, historical, social, intellectual, and religious factors in the lives of these figures. One three-hour seminar. A. Raboteau

REL 373 Studies in Religion  EM

A study of a selected topic such as mysticism, scriptures of the world religions, or of particular religious movements, leaders, and thinkers. Staff

REL 382 Death and the Afterlife in Buddhist Cultures  Not offered this year HA

A study of Buddhist approaches to death, dying, and the afterlife with a focus on South Asia, Tibet, and East Asia. Topics may include: anthropological studies of mortuary rites; Buddhist cosmology and doctrines of karmic causality; Buddhism, the family, and rites for ancestors; Buddhist deathbed and funeral practices; accounts of afterlife journeys; placation of ghosts; and changes in contemporary Buddhist funerals. Buddhist doctrinal teachings and social roles with respect to death and the afterlife as well as interactions of Buddhism with local religious cultures are considered. Two 90-minute classes. J. Stone

REL 412 Anthropological Approaches to the Study of Religion (see ANT 412)
REL 435 The Madrasa: Islam, Education, and Politics in the Modern World (see NES 435)
Committee for Renaissance Studies

Chair
Marina S. Brownlee

Executive Committee
Leonard Barkan, Comparative Literature
Marina S. Brownlee, Spanish and Portuguese Languages and Cultures, Comparative Literature
Pietro Frassica, French and Italian
Anthony T. Grafton, History

Wendy Heller, Music
Christopher Petty Heuer, Art and Archaeology
Eileen A. Reeves, Comparative Literature
François P. Rigolot, French and Italian
Gideon A. Rosen, Philosophy, ex officio
Nigel Smith, English

The Committee for Renaissance Studies, under the general direction of the Council of the Humanities, seeks to foster interdisciplinary discussion and cooperation among members of the University engaged in the study of Renaissance culture in Western Europe, the Mediterranean area, and Latin America. The committee includes specialists in fields such as history, English and continental literatures, and the arts. There is also a wider representation from other fields among those related to Renaissance studies in order to provide a forum for discussion of research in progress by faculty members, students, members of the Institute for Advanced Study, and visiting scholars. In addition to a program of public lectures, designed in collaboration with other departments and programs, the committee gives logistic support to the Renaissance and Early Modern Colloquium, an informal discussion group organized by faculty and graduate students across disciplines at Princeton. Interested faculty and students are invited to consult members of the committee, who will assist them in obtaining further information. Each spring the committee also sponsors a symposium on a topic of general interest. Interested faculty and students are invited to consult members of the committee, who will assist them in obtaining further information. For information about enrollment in courses, students should consult individual instructors. (See also Program in Medieval Studies.)

A list of undergraduate courses in Renaissance studies may be found on the committee's website.

http://www.princeton.edu/ua/
Program in Robotics and Intelligent Systems

**Director**
Robert F. Stengel

**Executive Committee**
Jonathan D. Cohen, Psychology and Princeton Neuroscience Institute
Bradley W. Dickinson, Electrical Engineering
Gilbert H. Harman, Philosophy
Yannis G. Kevrekidis, Chemical and Biological Engineering
Alain L. Kornhauser, Operations Research and Financial Engineering
Sanjeev R. Kulkarni, Electrical Engineering
Michael G. Littman, Mechanical and Aerospace Engineering
Stephen A. Lyon, Electrical Engineering
Daniel M. Nosenchuck, Mechanical and Aerospace Engineering
Daniel N. Osherson, Psychology
Szymon Rusinkiewicz, Computer Science
Robert E. Schapire, Computer Science
Robert F. Stengel, Mechanical and Aerospace Engineering
Erik H. VanMarcke, Civil and Environmental Engineering

The Program in Robotics and Intelligent Systems is designed for undergraduate students who are interested in pursuing careers or graduate education in three general areas:

1. The analysis, design, and development of systems that automate manufacturing, transportation, health care, environmental stewardship, scientific research, and other activities,
2. The creation of systems for learning, adaptation, decision making, identification, estimation, and control using concepts drawn from cognitive and biological sciences, and
3. The understanding of human intelligence from the perspective of neuroscience and computation.

New industries and organizations depend increasingly on the interplay between engineering, computing, and the life sciences. Innovations and inventions require multidisciplinary approaches and entrepreneurship, as well as grounding in theory and practice, in topics that may not be covered by a single department. The program offers an integrated set of core and elective courses, introducing students to fundamental concepts, providing depth in specific fields of interest, and setting the stage for further achievement. Students are encouraged to expand their experience through summer internships with companies, government agencies, and university laboratories.

**Admission to the Program**

The program is open to juniors and seniors who have a satisfactory background in mathematics, science, and computing. Students should have successfully completed:

1. Mathematics through MAT 202 or 204.
2. The A.B. science and technology distributional requirement or the B.S.E. freshman science requirement.
3. COS 126 or ORF 201, or an equivalent computing course.

A student planning to earn the program certificate should contact the program director as early as possible and no later than the mid-point of the fall term of his or her senior year.

**Program of Study**

A student in this program must satisfy both program and departmental requirements. The program for each student is worked out by the student and his or her departmental adviser. The program requirements are as follows:

1. All students must take six courses, including three core courses and three electives. To qualify for the certificate, a minimum grade average of B- in the six program courses is required. In some cases, a course can fulfill both a certificate program requirement and a regular departmental requirement (contact program director for details).

**Core Courses** (one from each group):

**Laboratory (1)**
ELE 201 Introduction to Electrical Systems and Signals
ELE 203 Electronic Circuits
ELE 206 Introduction to Logic Design
MAE 224 Integrated Engineering Science Laboratory
PHY 210 Experimental Physics Seminar

**Control Systems (1)**
CBE 445 Process Control
ELE 483 Feedback Systems
MAE 345 Robotics and Intelligent Systems
MAE 433 Automatic Control Systems
MAE 434 Modern Control

Cognition, Language, and Decision Making (1)

PSY 255 Cognitive Psychology
PSY 322 Human-Machine Interaction
NEU 258 Fundamentals of Neuroscience (also PSY 258)
NEU 259 Introduction to Cognitive Neuroscience (also PSY 259)
NEU 330 Introduction to Connectionist Models: Bridging between Brain and Mind (also PSY 330)
WWS 312 The Psychology of Decision Making and Judgment (also PSY 321)

Elective Courses (maximum of two from the same department to satisfy the requirement): an up-to-date list of approved elective courses may be found on the program website.

2. A senior independent work project or thesis must be completed and presented to the program committee on a topic relevant to the program and acceptable to the program committee.

3. Close collaboration with faculty is expected. Program students are expected to demonstrate strong academic performance. Program courses may not be taken on a pass/D/fail basis, unless that is the only grading alternative for the course.

4. Program students must fill out the student profile form at the beginning of each year in which they are members of the program. This is especially important during the senior year to assure that requirements for the certificate will be met by the end of the year.

Certificate of Proficiency

Students who fulfill all program requirements will receive a certificate of proficiency in robotics and intelligent systems upon graduation.
Program in Russian and Eurasian Studies

Director
Michael D. Gordin

Executive Committee
Mark R. Beissinger, Politics
Ellen B. Chances, Slavic Languages and Literatures
Caryl G. Emerson, Slavic Languages and Literatures, Comparative Literature
Michael D. Gordin, History
Jan T. Gross, History
Stephen M. Kotkin, History, Woodrow Wilson School
Michael A. Reynolds, Near Eastern Studies
Gilbert F. Rozman, Sociology
Michael A. Wachtel, Slavic Languages and Literatures

Associated Faculty
Leonard H. Babby, Slavic Languages and Literatures
Devin A. Fore, German
M. Şükrü Hanioğlu, Near Eastern Studies

Olga P. Hasty, Slavic Languages and Literatures
Simon A. Morrison, Music
Serguei Oushakine, Slavic Languages and Literatures
Petre M. Petrov, Slavic Languages and Literatures
Grigore Pop-Eleches, Woodrow Wilson School, Politics
Ekaterina Pravilova, History
Kim Lane Schepple, Woodrow Wilson School, University Center for Human Values, Sociology
Frank Von Hippel, Woodrow Wilson School

Sits with Committee
Margaret H. Beissinger, Slavic Languages and Literatures
Ksana Blank, Slavic Languages and Literatures
Erika H. Gilson, Near Eastern Studies
Irena Grudzinska Gross, Slavic Languages and Literatures
Peter H. Quimby, Dean of the College
Nina Gorky Shapiro, Slavic Languages and Literatures
Stanislav Shvabrin, Slavic Languages and Literatures

The Program in Russian and Eurasian Studies, an affiliate of the Princeton Institute for International and Regional Studies, is an interdepartmental plan of study focused on the languages, cultures, societies, politics, and histories of the many countries, including Russia, located between Central Europe and East Asia, north of the Middle East. Russian and Eurasian studies is combined with and subsidiary to the program of study for a concentration in a department including but not limited to anthropology, art and archaeology, comparative literature, economics, history, music, Near Eastern studies, politics, religion, Slavic languages and literatures, sociology, and the Woodrow Wilson School of Public and International Affairs. Russian and Eurasian studies may also be combined with a major in engineering or the natural sciences.

The program's purpose is to provide undergraduates with expertise in a core language of Eurasia--for most students, that would be Russian--and a scholarly grounding in the study of the region. Other languages applicable toward the certificate include Polish, the languages of Southeastern Europe (Romanian, Bulgarian, and Bosnian-Croatian-Serbian), and Turkish, the latter being the basis for most Central Asian languages as well as some in the Caucasus and in Russia.

Russian and Eurasian studies offers preparation for government service, international business and finance, law, media, science, teaching, nongovernmental organizations, and other aspects of global affairs. As such, courses from many departments count toward the certificate. The program is compatible with all majors.

Program of Study

Course Requirements. A student choosing to pursue a certificate in Russian and Eurasian studies must complete the normal requirements in their department as well as the following requirements of the program (see below). The proposed course of study must be approved each term by the program director.

History. One upper-level course on the history of the Russian empire, the Soviet Union, or Eurasia.

Literature. One 200-, 300- or 400-level course in the literatures of Russia and/or Eurasia.

Social Sciences. One course in the anthropology, sociology, politics, and/or economics of Russia and/or Eurasia.

One additional course from the three main subject areas or from a list of pre-approved specialty courses.

Language. Advanced proficiency in the target language of study (Russian, Turkish, Polish, Romanian, Bulgarian, or Bosnian-Croatian-Serbian).

Independent Work. Senior thesis or junior paper in the student's home department related to Russian and Eurasian studies.

Independent Work. When feasible, students will submit senior theses on a Russian or Eurasian topic within their departmental concentration using original language materials from the region. Alternatively, the topic may fall under comparative studies relating to Eurasia. Students majoring in one of the sciences, mathematics, or engineering whose senior thesis does not deal with a Russian or Eurasian subject may complete the independent work requirement of the program either by submitting an original piece of research dealing with Russia or Eurasia, or by writing a junior paper on a topic dealing with Russia or Eurasia. Students should consult with the director of the Program in Russian and Eurasian Studies for approval of their independent work plans.
Languages

Expertise in a core language of Eurasia is central to the program. Applicable languages include Russian, Turkish, Polish, Romanian, Bulgarian, and Bosnian-Croatian-Serbian. Students whose primary language is Russian must successfully complete one Russian language course beyond 207, or otherwise achieve this level of competence. Students in the program whose focus is Turkish, Polish, or the Southeastern European languages must complete the equivalent of the second year in that language. Native speakers and students with previous training in any of the languages of Eurasia can fulfill the language requirement by demonstrating intermediate proficiency on a placement examination.

Study and Work Abroad

Students pursuing the Russian and Eurasian studies certificate are expected to combine classwork with study abroad for a semester or a summer to sharpen their language skills, conduct independent research, and, in general, gain a better appreciation of at least one country and culture in Eurasia. Summer internships abroad, partly subsidized by the program or the University, are also highly encouraged.

Certificate of Proficiency

Students who fulfill the requirements of the program receive a certificate of proficiency in Russian and Eurasian studies upon graduation.
Information and Departmental Plan of Study

Advanced Placement

The department gives its own placement test to all incoming students who have studied Russian and, on the basis of this test and background, the students are placed in an appropriate course. Successful completion of RUS 107 or immediate assignment to a higher course satisfies the A.B. foreign language requirement.

Program of Study

A minimum of eight departmental courses is required. Four upper-level courses must be within the department; the other four courses may be from cognate areas depending on the student's particular interests. For example, if the major field of concentration is 19th-century prose, the program might include courses from French or German literature. If the student's primary interests lie in languages and linguistics, the program might include courses from theoretical or cognitive linguistics and from other cognate areas (psychology, computer science, history). Students with a strong interest in Russian and Soviet studies might take area courses in the Program in Russian and Eurasian Studies such as Russian history, politics, sociology, or economics. These are only sample suggestions. The program is flexible and strives to satisfy as wide a range of interests as possible.

Concentrators are required to complete RUS 207 and one or more advanced language course (RUS 208, 405, 406, 407, or 408).

Concentrators are urged to take three literature survey courses (SLA 219, 220, 221) and one course on poetry (SLA 413, SLA 419) in preparation for the departmental examination. Concentrators in the linguistic track are required to complete RUS 207 and one course beyond (RUS 208, 405, 406, 407, or 408), and one of the language series (Bosnian-Croatian-Serbian, Polish).

Independent Work

Junior Independent Work. Junior independent work consists of a short essay (about 2,000 words) written in Russian and a longer paper in English (5,000 to 6,000 words). For students in the language study track, this work consists of a longer paper (5,000 to 6,000 words) that will incorporate linguistic analysis of a specific language issue (e.g., comparison of a particular form in two languages; meaning and use of a set of expressions in one or more languages; analysis of idioms.)

Senior Independent Work. In the senior year, the student's independent work, written under departmental supervision, consists of a thesis of about 20,000 words to be submitted two weeks before the first day of the spring term reading period.

Senior Departmental Examination

Graduating seniors are required to take an examination in Russian literature. Together with the thesis and departmental grades, this examination is one of three factors that determine departmental honors. Graduating seniors in the language studies track are required to take an examination in Slavic linguistics, which will be tailored to their individual interests and course selection.

http://www.princeton.edu/ua/
Study Abroad

For students who begin Russian at Princeton, the department has organized a second-year course (RUS 105R-107R) for credit in St. Petersburg that may be taken the summer immediately following the completion of RUS 102. This course is taught by Princeton faculty as well as the instructors of the Nevsky Institute of Languages and Culture. The department is able to provide financial assistance to students enrolling in the summer course. More advanced students are urged to spend either a summer or semester in Russia.

Certificate in Language and Culture

The certificate program in Russian language and culture offers two options: the first weighted toward language study, and the second weighted toward literary study.

Course Work. For the language track, students must complete RUS 207 and take at least two of the language courses listed below and at least one Russian literature course conducted in Russian. For the literature track, students must complete RUS 207 and take at least one of the language courses listed below and at least two literature courses conducted in Russian.

Language courses: RUS 208, RUS 405, RUS 406, RUS 407, RUS 408

Literature courses: SLA 308 (Short Story), SLA 312 (Russian Drama), SLA 413 (Pushkin and His Time), most topics courses (e.g., Lermontov, Russian poetry), most graduate literature courses

Independent Work. Students must complete a paper in Russian of approximately 2,000 words. The paper ordinarily will be devoted to a close analysis of a literary text of about 10 to 20 pages. However, a student with strong related interests could write on questions of linguistics or a topic of broader cultural significance (e.g., Russian art, Russian film). In any case, readings in Russian will be a mandatory component of the paper. All topics must be cleared in advance with the departmental representative, who will decide on their appropriateness in consultation with other department members.

Note: Students may obtain the certificate in Russian language and culture in addition to the certificate in Russian and Eurasian studies. However, they may not apply the same courses toward both certificates (with the necessary exception of RUS 207).

Preparation for Graduate Study

Departmental concentrators who are considering pursuing graduate studies in Slavic are reminded that most graduate schools require a reading knowledge of a second modern foreign language. French and German are important for Russian literature, and German is valuable for Slavic linguistics. Graduate programs in Russian literature often require another Slavic language, and programs in Slavic linguistics often require two. Students should think about preparing themselves while still undergraduates to meet these requirements.

Courses

**BCS 101 Beginning Bosnian-Croatian-Serbian I** Fall

An introduction to the Bosnian-Croatian-Serbian (also called Serbo-Croatian) language that develops the four major language skills: speaking, listening comprehension, reading, and writing. Class time is devoted to mastering conversational skills, grammar explanations, oral drills, and reading a variety of texts--popular writing, fiction, poetry, and expository prose. Covers the fundamentals of BCS grammar (verbal conjugations, aspect, the primary verbal tenses, and all cases); high-frequency vocabulary will be progressively learned and reinforced. Knowledge of another Slavic language is not required. Five classes. M. Beissinger

**BCS 102 Beginning Bosnian-Croatian-Serbian II** Spring

A continuation of BCS 101. This course continues to develop and refine the four language skills (speaking, listening, reading, and writing), concentrating on conversational practice, advanced grammar points, oral drilling, increased reading (BCS literature, folklore, and expository prose, including works chosen according to students' interests), and viewing films. Prerequisite: BCS 101. Five classes. M. Beissinger

**CZE 101 Beginning Czech I** Not offered this year

Introductory course designed to teach the basic aspects of Czech grammar, vocabulary, and communication in a variety of situations. The course aims to teach all four language skills: reading, writing, listening comprehension, and speaking. Five classes. M. Fried

**CZE 102 Beginning Czech II** Not offered this year

A continuation CZE 101. This course continues to develop and refine the four language skills (speaking, listening, reading, and writing), teaching all fundamental aspects of Czech grammar and basic communication skills in a variety of situations. As the course progresses, the rich Central European culture of Bohemia and Moravia will be sampled through poetry, film, and fictional as well as expository prose. Prerequisite: CZE 101. Five classes. Staff

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CZE 105 Intermediate Czech I  Not offered this year
Advanced grammar topics, building of vocabulary through studying Czech word formation and reading challenging samples of Czech literature (prose, poetry, drama). Continuing practice in oral communication. Prerequisite: CZE 102 or instructor's permission. Three classes supplemented by required discussion sections, tutorials, and language lab. Staff

CZE 107 Intermediate Czech II  Not offered this year
Advanced grammar topics, building of vocabulary through the study of Czech word formation and reading challenging samples of Czech literature. Continuing practice in oral communication. Prerequisite: CZE 105. Three classes supplemented by required discussion sections, tutorials, and language lab. Staff

PLS 101 Beginning Polish I  Fall
A beginner's course that introduces the student to four areas of competence in Polish: speaking, grammatical knowledge, listening and reading comprehension, and writing. Emphasizes active language targeted at concrete practical contexts and communicative situations. Previous knowledge of other Slavic languages is advantageous, but not mandatory. Classes combine lectures, recitation, and drill formats. Five classes. P. Petrv

PLS 102 Beginning Polish II  Spring
A continuation of PLS 101. This course continues to develop and refine the four language skills (speaking, grammatical knowledge, listening and reading comprehension, and writing). Emphasize active language targeted at concrete practical contexts and communicative situations. Classes combine lectures, recitation, and drill formats. Prerequisite: PLS 101. Five classes. I. Gross

RUS 101 Beginner's Russian I  Fall
Introduction to the essentials of Russian grammar. Presentation of grammar reinforced by oral practice of grammatical patterns. One hour per week devoted specifically to development of oral skills. Five classes, one one-hour laboratory. S. Shvabrin

RUS 102 Beginner's Russian II  Spring
A continuation of 101. Introduction to the essentials of Russian grammar. Presentation of grammar reinforced by oral practice of grammatical patterns. One hour per week devoted specifically to development of oral skills. Five classes, one one-hour laboratory. S. Shvabrin

RUS 105 Intermediate Russian I  Fall
Grammar review; advanced grammar; introduction to word formation; expansion of vocabulary through readings of classical and modern fiction and history. One hour per week of translation and discussion of readings. Prerequisite: successful completion of 102 or placement test at Princeton. Five classes, one one-hour laboratory. S. Shvabrin

RUS 105R Intermediate Russian I in St. Petersburg
A special offering of third-semester Russian taught during the summer in St. Petersburg, Russia. Students take part in a four-week intensive language course at the Nevsky Institute and receive supplemental instruction from a Princeton faculty member. Grammar review; advanced grammar; conversation skills; analytic reading. Students are chosen by application from 102 in the spring. Ten two-hour classes. S. Shvabrin

RUS 107 Intermediate Russian II  Spring
A continuation of 105. Grammar review; advanced grammar; introduction to word formation; expansion of vocabulary through readings of classical and modern fiction and history. One hour per week of translation and discussion of readings. Prerequisite: 105. Five classes, one one-hour laboratory. S. Shvabrin

RUS 107R Intermediate Russian II in St. Petersburg
Continuation of 105R taught during the summer in St. Petersburg, Russia. Students take part in a four-week intensive language course at the Nevsky Institute and receive supplemental instruction from a Princeton faculty member. Grammar review; advanced grammar; conversation skills; module on Dostoevsky's Crime and Punishment. Prerequisite: 105R. Ten two-hour classes. K. Blank

RUS 207 Advanced Russian Reading and Conversation I  Fall
Selected texts (19th- and 20th-century poetry and prose, contemporary journalistic prose) with discussion and analysis in Russian. Four classes. K. Blank

RUS 208 Advanced Russian Reading and Conversation II  Spring
A continuation of 207. Selected texts (19th- and 20th-century poetry and prose, contemporary journalistic prose) with discussion and analysis in Russian. Four classes. K. Blank

RUS 405 Advanced Russian Grammar through Reading  Fall
A practical approach to advanced Russian grammar and structure through reading and translation of Russian prose texts with special focus on difficult grammatical constructions. Two 90-minute classes. Prerequisite: 207 or 208. L. Babby
RUS 406 Russian Sentence Structure through Reading  Spring
A basic introduction to Russian sentence structure with special emphasis on word order, use of participles and gerunds, impersonal sentences, negation, voice, and long/short form adjectives. The course includes substantive readings of Russian texts and their syntactic analysis. Two 90-minute classes. Prerequisite: 207 or 208. L. Babby

RUS 407 Advanced Russian through Film  Fall
A language course based on Russian films and designed to develop a more sophisticated level of spoken and written Russian. Discussions of life in Russia. Compositions, exercises, short texts for reading comprehension, oral presentations. Two 90-minute classes. Prerequisite: 207 or instructor's permission. K. Blank

RUS 408 Advanced Russian through History and Culture  Spring
The course aims to improve students' proficiency in idiomatic Russian by using materials on historical and cultural topics. The materials cover Russian history from the days of Kievan Rus' to the post-Soviet era. Weekly reading and compositions. Two 90-minute classes. Prerequisite: instructor's permission. K. Blank

SLA 219 History of Russian Literature before 1860  Fall LA
A survey in English of Russian literature up to 1860. The course concentrates on master prose writers of the first half of the 19th century: Pushkin, Gogol, Lermontov, the early Dostoevsky, and the early Tolstoy. Two lectures, one preceptorial. Knowledge of Russian not required. D. Solodkaia

SLA 220 The Great Russian Novel and Beyond: Dostoevsky, Tolstoy, Chekhov, and Others  Spring LA
A survey in English of Russian literature from mid-19th century to Soviet literature. Authors read include, among others, Dostoevsky, Tolstoy, Chekhov, Nabokov, and Bely. Two lectures, one preceptorial. Knowledge of Russian not required. E. Chances

SLA 221 Soviet Literature, 1917-1965  Not offered this year LA
A survey in English of Soviet literature from 1917 to 1965 against the background of major social and political developments. Readings include works by Zamyatin, Babel, Bulgakov, Solzhenitsyn, and other representative authors. Two lectures and preceptorial. Knowledge of Russian not required. P. Petrov

SLA 308 The Russian Short Story  LA
The Russian short story from the 1830s to the present. Readings include stories by Pushkin, Dostoevsky, Chekhov, Gorky, Bunin, Solzhenitsyn, Petrushevskaya, Tolstaya, and others. Special emphasis on the active use of the language. Readings, discussions, oral and written reports in Russian. Two 90-minute classes. Prerequisite: RUS 207 or instructor's permission. K. Blank

SLA 311 Russian Music (see MUS 339)

SLA 312 Russian Drama  Spring LA
Introduction to major dramatic works of the 19th and 20th centuries, including Pushkin, Gogol, Chekhov, Shvarts, and Vampilov. Readings, discussions, oral and written reports in Russian. Two 90-minute seminars. Prerequisite: RUS 207 or instructor's permission. O. Hasty

SLA 316 Ethical Dimensions of Contemporary Russian Cinema  Not offered this year EM
Exploration of the quest for moral values in Soviet and post-Soviet Russian cinema of the 1960s to the present. Topics include, among others, the effects of Stalinism; the struggle for freedom of individual conscience under totalitarianism; the artist's moral dilemmas in Soviet and post-Soviet society; materialism versus spirituality. Films of Andrei Tarkovsky, Nikita Mikhalkov, and others. One three-hour seminar. Knowledge of Russian not required. E. Chances

SLA 410 Bakhtin, the Russian Formalists, and Cultural Semiotics (see COM 410)

SLA 411 Selected Topics in Russian Literature and Culture  Fall SA
Topics include: Russian literature and the city; Russian literature and the intellectual; the search for moral value in post-Communist literature; satire; Russian literature and music; 20th-century Russian poetry, Russian emigré literature. D. Solodkaia

SLA 412 Selected Topics in Russian Literature and Culture  Spring LA
Topics include: Russian literature and the city; Russian literature and the intellectual; the search for moral value in post-Communist literature; satire; Russian literature and music; 20th-century Russian poetry, Russian emigré literature. O. Hasty

SLA 413 Pushkin and His Time  Fall, Spring LA
An introduction to Pushkin's works with attention to a number of genres (lyric, long poem, drama, short story). Readings in Russian with discussions in Russian or English, depending on students' preference. Two 90-minute classes. Prerequisite: RUS 207 or instructor's permission. M. Wachtel

SLA 415 Leo Tolstoy, War and Peace, and the Tasks of Literature (see COM 415)

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SLA 416 Dostoevsky  Fall LA
A consideration of Dostoevsky's major works with particular emphasis upon their relation to the political, social, religious, and literary currents of his time. Knowledge of Russian not required. One three-hour seminar. E. Chances

SLA 417 Vladimir Nabokov (also COM 418)  LA
An examination of Nabokov's major accomplishments as a Russian/American novelist in the context of the Russian literary tradition and the cultural climate of emigration. Two lectures, one preceptorial. O. Hasty

SLA 419 19th- and 20th-Century Russian Poetry  LA
An introduction to major Russian poets from Pushkin to the present. No prior knowledge of Russian literature is assumed. The focus of the course will be on close readings of individual poems, but the intention is, by generalization, to reach an understanding of the development of Russian literature as a whole. Readings in Russian, with discussion in English, and an optional hour for discussion in Russian. Prerequisites: RUS 207 (may be taken concurrently) or permission of instructor. Two 90-minute seminars. M. Wachtel
Information and Departmental Plan of Study

Sociology at Princeton offers a cutting edge undergraduate concentration for people interested in the social dimensions of politics, economics, history, psychology, and demography. In this sense, the concentration encourages students to engage in cross-disciplinary thinking even as it provides a thorough grounding in a single field. Both quantitative and qualitative approaches to social science can be found among our students and faculty.

Princeton sociology graduates are admitted to the leading medical, law, and business schools, and they take jobs from Wall Street to social activism. Students concentrating in sociology are in increasing demand as corporations and governments want more and more graduates who have the conceptual and/or statistical tools to make sense of the recent explosion of digital data generated by the Web.

Department faculty do research and teaching on important topics of concern in the "real world" from social networks, immigration, and inequality to globalization, politics, and economic sociology.

Prerequisites

Students are normally encouraged to complete one or more courses in sociology by the end of the sophomore year.

Program of Study

Students are required to take a minimum of nine courses in sociology, including cognates. Many students take more than the required number. All departmental courses must be taken for a grade and cannot be taken pass/D/fail. SOC 101 is a requirement for the major. In addition, three required courses in research methods and sociological theory (300, 301, and 302) are designed to help students carry out their junior and senior independent work. These courses expose students to the nature of sociological problems and theory, the logic of inquiry, the techniques of empirical investigation, and the elements of statistics. SOC 300 and 301 are usually taken in the fall of the junior year and are offered at that time to facilitate students who wish to study abroad in the spring. SOC 302 is normally offered in the spring and can be taken at any time.

Independent Work

Junior Independent Work. Juniors begin their independent work in the fall of their junior year, but the work is due at the end of the spring semester.

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The junior paper is written under faculty supervision, with SOC 300 and 301 providing the basic research tools to formulate the project. Junior papers may require original data collection, but usually involve secondary data analysis using historical, ethnographic, or quantitative analysis. In some cases, the junior paper becomes the foundation for the student's senior thesis. All junior papers are graded by a second reader, in addition to the major adviser.

**Senior Independent Work.** Senior independent work consists of completing a thesis that (a) explores the various theoretical approaches that have been used to explain a particular social phenomenon and (b) examines that phenomenon through secondary analysis of existing data and/or primary analysis of data collected by the student. Students whose thesis topics require advanced quantitative skills may acquire the necessary competence by enrolling in suitable statistics courses. Students who are contemplating collecting their own data may need the prior approval of the University's Institutional Review Board for Human Subjects.

**Senior Departmental Examination**

Each senior takes an oral examination based on the senior thesis and the broader subfield to which it contributes. A departmental committee conducts this examination in May.

**Study Abroad**

Sociology welcomes students with international interests who wish to study abroad for one or two semesters. The department makes every effort to accommodate these students by coordinating special arrangements for advising on independent work and by permitting them to take required courses out of sequence, either before or after the period of foreign study. Normally, two courses taken during a semester or a year abroad count as departmentals. Such courses will need preapproval from the departmental representative.

**Undergraduate Departmental Committee.** At the beginning of every year, an Undergraduate Student Advisory Committee is selected. This committee, consisting of equal numbers of junior and senior majors, advises the department on matters pertaining to curriculum, staffing, and requirements.

**Research Facilities.** The Social Science Reference Center, the Data and Statistical Services unit, and the Stokes Library provide facilities for study and research in the form of collections of books, journal articles, reports, microfilm, and electronic data. Staff members in these units are available to majors who are completing their independent work, looking for appropriate data sets to analyze, or seeking advice on where to find literature relevant to their research topics.

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**Courses**

**SOC 101 Introduction to Sociology   Fall SA**

Orientation to basic sociological concepts as analytical tools for the study of continuities and change in social and individual behavior. Influence of family, school, and the market. Social construction of the self and selected aspects of the life course including childhood, love, and death. Two lectures, one preceptorial. *M. Duneier, P. Starr*

**SOC 201 American Society and Politics   Not offered this year SA**

An introduction to changing patterns of family structure, community life, economic relations, voluntary associations, moral beliefs and values, social and political movements, and other aspects of civil society and politics in the United States. Two lectures, one preceptorial. *P. Starr*

**SOC 202 Introductory Research Methods in African American Studies (see AAS 202)**

**SOC 203 Introduction to Urban Studies (see URB 201)**

**SOC 210 Urban Sociology: The City and Social Change in the Americas (also LAS 210)   Not offered this year SA**

By taking a comparative approach, this course examines the role of social, economic, and political factors in the emergence and transformation of modern cities in the United States and selected areas of Latin America. The class considers the city in its dual image: both as a center of progress and as a reduct of social problems, especially poverty. Special attention is given to spatial processes that have resulted in the aggregation and desegregation of populations differentiated by social class and race. Two lectures, one preceptorial. *P. Fernández-Kelly*

**SOC 214 Creativity, Innovation, and Society   Not offered this year SA**

An exploration of how creative activities are shaped by larger social configurations. The course first decodes the culture of creativity by examining how society thinks about creativity (and its opposite). How do the varying cultural meanings related to creativity reflect social change? Then it examines the social processes and consequences of innovation from a sociological point of view. Under what social conditions does innovation emerge? How do innovations reshape society and culture? Two lectures, one preceptorial. *K. Yeung*

**SOC 221 Inequality: Class, Race, and Gender (also AAS 221/WOM 221)   Not offered this year SA**

Inequalities in property, power, and prestige examined for their effects on life chances and lifestyles. Primary focus on

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socioeconomic classes in modern societies. Special attention to the role of religious, racial, and ethnic factors. Comparisons of different systems of stratification in the world today.

**SOC 222 The Sociology of Crime and Punishment  Spring SA**

This course seeks to provide a sociological account of crime and punishment. Why do people commit crime? How should we respond to crime? How has crime policy changed over the past several decades? What are the consequences of recent crime policy? Through classic and contemporary sociological research, policy analysis, and media coverage, the themes of crime and punishment in contemporary society are explored. Two lectures, one preceptorial. **Staff**

**SOC 225 Sex, Sexuality, and Gender (also WOM 225)  Not offered this year SA**

This course focuses on the many ways gender differences are created, diminished, and reinforced in society. Students will learn how sexuality and gender categories are socially constructed concepts that vary across the life course (childhood, adolescence, adulthood) and different social settings (media and public discourse, schools, work, family, other countries, the policy arena, and the scientific academy). A variety of theoretical perspectives will be examined including sociobiological, micro- and social-psychological, and social-structural. Two lectures, one preceptorial. **L. Chancer**

**SOC 227 Race and Ethnicity  Fall SA**

An introduction to the sociological study of race and ethnicity which begins by encouraging students to exercise some critical distance from the core concepts of race and ethnicity. Topics will include comparative racism, immigration, the experiences of the second generation, whiteness, the culture of poverty debate, slums and ghettos, and the debate over the "underclass." Two lectures, one preceptorial. **P. Fernández-Kelly**

**SOC 226 Modern Mexican Society (also LAS 248)  Not offered this year SA**

An introduction to the social, political, and economic organization of modern Mexico. The course traces the evolution of Mexico's fundamental institutions from their birth after the Mexican Revolution of 1910, through their flowering during the 1950s and 1960s, to changes in the neoliberal era of the 1980s and 1990s. The course ends with a consideration of Mexico's current position as a partner in the North American Free Trade Agreement. Two lectures, one preceptorial. **D. Massey**

**SOC 250 The Western Way of War  Spring HA**

A historical and analytical overview of war focusing on the origins and consequences of organized violence, the experience of battle, the creation and behavior of warriors, and the future of such conflicts. Two lectures, one preceptorial. **M. Centeno**

**SOC 277 Technology and Society (see EGR 277)**

**SOC 300 Claims and Evidence in Sociology  Fall SA**

This mandatory course for concentrators is intended to provide the groundwork for understanding sociological arguments, evidence, research, and writing. It provides students with the opportunity to try their hand at interpreting and evaluating arguments in the sociological literature and constructing their own arguments for a sociological study. One 90-minute lecture, one 90-minute preceptorial. **K. Yeung**

**SOC 301 Sociological Research Methods  Fall QR**

An overview of the research process in social science, including techniques of sampling, methods of data collection, principles of measurement, problems of inference and proof, basic methods of data analysis, and ethical considerations. Two lectures, one preceptorial. **S. Lynch**

**SOC 302 Sociological Theory  Spring SA**

Systematic survey of the principal concepts underlying all sociological description and explanation-prediction, with special attention to the different ways these concepts are employed in the four currently leading groups of theories, namely, structural functionalism, exchange theory, conflict theory, and symbolic interactionism. Two lectures, one preceptorial. **P. Fernández-Kelly**

http://www.princeton.edu/ua/
SOC 303 Strategic Asia (also EAS 303)  Spring SA

An analysis of the recent evolution of strategic thinking in Northeast Asia with coverage linked to Southeast Asia, Central Asia, and South Asia. Comparative responses to common challenges: division on the Korean peninsula; the rise of China; the post-Soviet space; competition over new inter-regional ties; and a search for regionalism. The course takes an interdisciplinary approach to the historical roots of ideas about security, as well as cultural assumptions behind strategic views, social networks and interests, clashing perspectives in political divisions, and evolving international relations. Two lectures, one preceptorial. G. Rozman

SOC 306 East Asian Region  Not offered this year SA

Comparisons center on China and Japan and examine the impact of their Confucian traditions on recent development. Attention focuses on family life, the status of women, the role of the state, types of firms, and attitudes related to achievement. Some coverage of Korea, Hong Kong, Taiwan, and Singapore and changing regional ties. Two lectures, one preceptorial. G. Rozman

SOC 307 National Identities and Great Powers  Not offered this year SA

Analysis of the components and evolution of national identities, with a focus on the U.S., Russia, China, and Japan. Review of the impact of identities on the principal bilateral relations of our times: causes and consequences of misperceptions, linkages of domestic policies to international relations, treatment of how images of one's own society shape debates on other societies, ideas for bridging gaps between conflicting worldviews. Two lectures, one preceptorial. G. Rozman

SOC 308 Communism and Beyond: China and Russia  Spring SA

A review of the stages of communism, including reform and dismantling. Comparisons of social classes and ethnic groups under the old system and their readiness for recent changes. Treatment of workers, farmers, intellectuals, officials, and new entrepreneurs. Comparative approach to China, Russia, and other countries formed from the Soviet Union. Two lectures, one preceptorial. D. Kaple

SOC 309 Topics in the Sociology of Latin America (also LAS 309)  Not offered this year SA

A study of selected topics of current interest in the sociology of Latin America. The specific subject matter will vary from year to year, reflecting the changing interests of both faculty and students. Two lectures, one preceptorial. A. Portes

SOC 310 Gender and Development in the Americas (also LAS 310/WOM 312)  Fall SA

An examination of gender as an integral component of socioeconomic development in advanced and less-developed countries, with a focus on the United States and selected areas of Latin America. Special attention will be given to processes of industrial restructuring on a global scale that have increased the participation of women in the formal labor force. An understanding of the relationship between gender inequality and social order will be a central object of inquiry. Two lectures, one preceptorial. A. Goldani

SOC 311 Gender, Crime, Media, and Culture (see WOM 311)

SOC 312 Race and Public Policy (see WWS 317)

SOC 313 Media and Public Policy (see WWS 309)

SOC 322 Elites, Leadership, and Society  Not offered this year SA

The social characteristics and mode of access of elite groups in industrial, preindustrial, and postindustrial societies; leadership and social structure; theories of elites as contained in the works of Plato, Mandeville, Marx, Mosca, Pareto, Schumpeter, C. Wright Mills, and others. The basic question: Who gets to the top, how, and why? Two lectures, one preceptorial. Staff

SOC 334 Educating a New Majority (see AAS 334)

SOC 336 The Sociology of Poverty  Not offered this year SA

An examination of the nature and causes of poverty in the United States. Special attention is given to the role of labor markets, family structure, and culture in determining the level and distribution of poverty. Recent anti-poverty policies are analyzed from a historical and comparative perspective. Two lectures, one preceptorial. S. McLanahan

SOC 338 The Sociology of Latinos in the U.S. (also LAS 338)  Not offered this year SA

Using detailed studies of four major centers (San Antonio, Los Angeles, Miami, and New York), this course will analyze the historical and contemporary experience of several Spanish-speaking populations. Discussion will focus on two questions: (a) Are there common experiences or characteristics that justify the categorization of these varied groups under a single ethnicity? and (b) What racial, class, and gender divisions exist within these groups? Two lectures, one preceptorial. M. Tienda

SOC 341 Latinos in American Life and Culture (see LAO 200)

SOC 342 Organizations: Management, Bureaucracy, and Work  Spring SA

Classical and contemporary theories of organizations as collective tools, as cultural systems, and as actors in changing environments. Research on problems of innovation and survival, authority, and control in business firms, public
bureaucracies, and voluntary associations. Special emphasis on the historical development of managerial ideologies in the U.S. Two lectures, one preceptorial. M. Ruef

SOC 344 Communications, Culture, and Society Not offered this year SA

An introduction to the study of communications media. Topics include: growth and impact of literacy, printing, telecommunications, and broadcasting; communications and the modern state (for example, secrecy, surveillance, intelligence); organization, control, and effects of the media; cross-national differences in communications policy and institutions; impact of computers and electronic communication. Two lectures, one preceptorial. P. Starr

SOC 345 Money, Work, and Social Life Not offered this year SA

The course offers a sociological account of production, consumption, distribution, and transfer of assets. Examining different sectors of the economy from corporations and finance to households, immigrants, welfare, and illegal markets, we explore how in all areas of economic life people are creating, maintaining, symbolizing, and transforming meaningful social relations. Economic life, from this perspective, is as social as religion, family, or education. Two lectures, one preceptorial. V. Zelizer

SOC 351 Introduction to Population Problems (see ECO 339)

SOC 360 Education and Society Not offered this year SA

Education as an agent of cultural transmission and innovation, stability and change. Influences governing the discovery, recruitment, training, and reward of talent. The school and classroom as social systems. Issues of educational policy in social perspective. Two lectures, one preceptorial. Staff

SOC 361 Culture, Power, and Inequality Spring SA

An introduction to theories of symbolism, ideology, and belief. Approaches to the analysis and comparison of cultural patterns. Emphasis on the social sources of new idea systems, the role of ideology in social movements, and the social effects of cultural change. Comparisons of competing idea systems in contemporary culture. Two lectures, one preceptorial. A. Ghaziani

SOC 362 Sociology of Religion Spring SA

Classical and contemporary theories of the relations between religion and society, with emphasis on the dynamics of religious traditions in modern societies: secularization, religion and political legitimation, sources of individual meaning and transcendence, rituals and moral obligations, religious movements, and contemporary trends in American religion. Two lectures, one preceptorial. R. Massengill

SOC 363 Religion in the United States Not offered this year SA

Sociological investigations of religion in the United States since 1950. Patterns and variations in religious organization and expression. Social scientific methods of conducting research on religion, including surveys, interviews, and participant observation. Topics include demographics of religious involvement, trends, individual religious orientations, ethnicity and religion, and religious diversity. Two lectures, one preceptorial. R. Wuthnow

SOC 364 Sociology of Medicine (also CHV 364) Spring SA

This course uses "the sociological imagination" to explore the role and meaning of medicine in modern U.S. society. Topics include sociocultural definitions of health and illness, the sick role, the doctor–patient relationship, the social determinants of health, the role of medicine in keeping society healthy, the education and socialization of health care professionals, and the social control function of medicine. Consideration of current bioethical dilemmas from a sociological perspective. Two lectures, one preceptorial. E. Armstrong

SOC 365 Health, Society, and Politics Not offered this year SA

Introduction to the sociology, history, and politics of health care. Topics include the social response to disease (including epidemics); the development and organization of the medical profession, hospitals, public health, and health insurance; and the contemporary politics of health policy in comparative perspective. Two lectures, one preceptorial. P. Starr

SOC 368 Special Topics in Sociology Not offered this year SA

The subject matter of this course varies from year to year. Typical topics are sociology of the environment and sociology of law. Two lectures, one preceptorial. Staff

SOC 391 Race, Class, and Intelligence in America (see AAS 391)

SOC 404 Social Statistics Not offered this year QR

An introduction to quantitative methods used in sociology, beginning with the two basic objectives of statistical methods--data reduction and statistical inference. The course considers these objectives in studying relationships among variables culminating with an analysis of the linear model. Course material is explored through the analysis of real sociological data sets using the statistical package, STATA. One two-hour class, one laboratory. A. Harris

SOC 420 Born in the U.S.A.: Culture and Reproduction in Modern America (see WOM 420)
Program in South Asian Studies

**Director**
Isabelle Clark-Decès

**Executive Committee**
Isabelle Clark-Decès, Anthropology
Ben Conisbee Baer, Comparative Literature
Jonathan C. Gold, Religion
Atul Kohli, Woodrow Wilson School, Politics

Gyan Prakash, History
Bhavani Raman, History
Muhammad Q. Zaman, Near Eastern Studies, Religion

**Sits with Committee**
David Magier, Firestone Library
Karen McGuinness, Woodrow Wilson School
Zia Mian, Woodrow Wilson School

The Program in South Asian Studies, under the auspices of the Princeton Institute for International and Regional Studies, offers students the methodological and theoretical tools to study the political, economic, social, religious, literary, and cultural institutions of the region with particular focus on the modern history of India and Pakistan.

**Hindi.** The Program in South Asian Studies offers a four-term sequence of language instruction in Hindi. Completion of all four terms of the sequence will satisfy the University language requirement. The program emphasizes the skills of speaking, reading, and writing Hindi, as well as the cultural context of South Asia. The program encourages students to take advantage of intensive summer language programs and of the numerous opportunities to study or travel in South Asia, including a semester or year abroad. For more information, contact the Program in South Asian Studies.

**Admission to the Program**

Students concentrating in any department may enter the certificate program with permission from the director. A student normally enters the program at the end of the sophomore year, although entrance in the fall of the junior year is not precluded. Students in the departments of anthropology, history, politics, religion, sociology, comparative literature, or the Woodrow Wilson School of Public and International Affairs may find that their studies mesh particularly well with the requirements of the program. Concentrators in the Woodrow Wilson School will select South Asia as a field of concentration.

**Program of Study**

To obtain a certificate of proficiency, students must complete the normal requirements in their department of concentration as well as the following requirements of the program:

1. Four semesters of Hindi, or demonstrated proficiency in Hindi or another South Asian language through a program examination. See the program director to discuss using a language other than Hindi to fulfill the program's language requirement.

2. At least one history course on South Asia in the Department of History.

3. At least two courses on South Asia in the Departments of Anthropology, Economics, or Politics, or the Woodrow Wilson School of Public and International Affairs.

4. At least one relevant course on South Asia in the Departments of Comparative Literature or Religion.

5. A senior thesis written in the student's department of concentration with a significant South Asian component. If there is no possibility for South Asian content in the senior thesis, students must write a separate piece of independent work focusing on South Asia; please consult with the program director.

**Certificate of Proficiency**

Students who complete the requirements of the program with satisfactory standing receive a certificate of proficiency in South Asian studies upon graduation.

**Courses**

**HIN 101 Elementary Hindi I  Fall**

An introduction to the skills of understanding, speaking, reading, and writing Hindi. Classroom activities include comprehension, grammar exercises, and conversation. Some attention to the cultural context of northern India. Depending on interest, Urdu script will also be taught. *M. Natavar*

**HIN 102 Elementary Hindi II  Spring**

http://www.princeton.edu/ua/
Provides the second semester of training in spoken and written Hindi. The primary objective is to continue to increase understanding, speaking, reading, and writing Hindi. Classroom activities include comprehension, grammar exercises, role-plays, and conversation. Some attention to the cultural context of northern India. Depending on interest, Urdu script will also be taught. Four classes. M. Natavar

**HIN 105 Intermediate Hindi  Fall**

Begins the second year of training in spoken and written Hindi. The primary objective is to continue to increase speaking, listening, reading, and writing proficiency of the language. Classroom activities include comprehension, grammar exercises, role-plays, songs, conversation, video viewing and production. Some attention to the cultural context of northern India. Depending on interest, Urdu script will also be taught. Three 90-minute classes. M. Natavar

**HIN 107 Intermediate Hindi II  Spring**

A continuation of the second year of intermediate Hindi language training, this course focuses on improving skills in the following areas: reading expository texts and extended narratives, writing descriptive informative texts of three to four page lengths, verbal communication on a range of topics, and expanding analytical understanding of the structure of the Hindi language. Quite a bit of attention to the cultural context of South Asia is given. M. Natavar

**SAS 337 Social Change in Contemporary India (see ANT 337)**
Department of Spanish and Portuguese Languages and Cultures

Chair
Gabriela Nouzeilles

Departmental Representative
Pedro Meira Monteiro

Director of Graduate Studies
Marina S. Brownlee

Professor
Marina S. Brownlee, also Comparative Literature
Rubén Gallo
Angel G. Loureiro
Gabriela Nouzeilles
Ricardo E. Piglia
Ronald E. Surtz

Associate Professor
Pedro Meira Monteiro

Assistant Professor
Bruno M. Carvalho
Germán Labrador Méndez
Rachel L. Price

Senior Lecturer
Antonio F. Calvo
Nicola T. Cooney

Associated Faculty
Jeremy I. Adelman, History
João G. Biehl, Anthropology
Michael G. Wood, English, Comparative Literature

Information and Departmental Plan of Study

The Department of Spanish and Portuguese Languages and Cultures offers a liberal arts major designed to give students a thorough grounding in the languages, literatures, and cultures of the subjects it teaches, seen as independent disciplines or in combination with other languages and cognate subjects. Students are encouraged to complement their courses in Spanish and/or Portuguese with related and varied courses in other literatures, as well as in art history, history, anthropology, sociology, comparative literature, and other humanities subjects.

In addition to serving as the focus for an education in liberal arts, the Spanish and Portuguese concentration can be the basis for graduate or professional study. In mostly small classes and seminars, allowing extensive student/teacher interaction, students become equipped to take up careers in many walks of life, including journalism, business, law, government service, and international affairs, as well as teaching and research careers. For nonconcentrators, the department offers a broad range of language and literature courses, from introductory to very advanced. It also offers a certificate program, allowing the study of Spanish or Portuguese to be combined with any concentration available at Princeton.

Advanced Placement

A language Advanced Placement score of 5 or SAT Subject Test score of 760 is required to satisfy the A.B. foreign language requirement at entrance, or for admission to a 200-level course.

Prerequisites

The normal requirement for admission to the department is successful completion of two 200-level courses in Spanish or one 200-level course in Portuguese.

Early Concentration

Qualified students are encouraged to begin departmental concentration in the sophomore year. This has the advantage of a longer period for independent work and preparation of the senior thesis; it also facilitates spending a semester or junior year abroad.

Program of Study

All students are strongly advised to include one advanced language course (SPA 207 or SPA 307 for Spanish; POR 208 or POR 209 for Portuguese) in their subject(s) of concentration. All majors must take one course in pre-1800 literature. University regulations limit to 12 the number of departmental courses allowed to each student in his or her concentration.

Tracks. Departmental courses cover a wide array of literary, cultural, social, historical, and political topics. Students are, therefore, able to pursue courses of study that are almost tailor-made to their own individual interests.

The concentration offers two possible tracks of study:

http://www.princeton.edu/ua/
1. Concentration in literature and culture (Spanish or Portuguese). This track requires a minimum of eight upper-division courses, at least five of which must be in the language of concentration. With the approval of the departmental representative, up to three cognate courses in other departments can be counted toward the concentration in this track. Up to three courses taken during a semester abroad may be approved toward the concentration. Freshman seminars on Hispanic topics may be counted toward the eight upper-division courses required for the concentration.

2. Concentration in translation theory and practice. This track requires SPA 307 and at least seven more upper-division courses in Spanish. At least three of the seven upper-division SPA courses must focus on translation, taken from among 309, 380, 381, 382, or 384. With the approval of the departmental representative, up to three courses related to translation taught in other departments can be counted toward concentration in this track. Students enrolled in this track can count TRA 200 as one of the two 200-level courses required as prerequisites for the concentration. Up to three courses taken during a semester abroad may be approved toward the concentration. Freshman seminars on Hispanic topics may be counted toward the eight upper-division courses required for the concentration.

In both tracks, students have the option of combining two languages in the concentration. The two-language option requires five courses in Spanish or Portuguese, and three courses in any other language.

Language Programs. Students who wish to continue a language begun in secondary school must have their proficiency measured either by a College Board score for admission (see Advanced Placement above) or by our department's placement test administered online during the summer before course registration. Placement will depend on previous training and proficiency.

Spanish Language Program. The normal program for beginners seeking a basic mastery of Spanish is the sequence 101, 102, 107, which satisfies the University's language requirement.

Students with advanced placement in Spanish will be placed in either 103 or 105, and will proceed respectively to 107 or 108 to satisfy the University language requirement. They may also be placed directly into 108. Students who have successfully completed 107 may not take 108.

Course credit in 107 or 108 is also available through approved summer courses abroad (see Study and Work Abroad below). To satisfy the language requirement, students must take the departmental placement test. Funding may be available for selected and committed students.

All questions concerning placement and summer study are dealt with by the senior lecturer.

Portuguese Language Program. The normal sequence for students seeking a mastery of Portuguese is currently 108, 109, which satisfies the University's language requirement. POR 108 is designed for, but not limited to, students who have already fulfilled the language requirement in Spanish, French, or Italian. Students are encouraged to contact an instructor of Portuguese to find out whether they qualify to take 108. POR 110 is an intensive one-semester course and may not be used to fulfill the language requirement.

For questions concerning placement and summer study, please contact the senior lecturer.

Independent Work

Junior Papers. At the time of entering the department, students should discuss their likely area of interest with the departmental representative in order to facilitate the assignment of faculty advisers for independent work. By early October, all juniors should have contacted their advisers and have a plan of work and a schedule of meetings.

The first junior paper, written in the fall semester, should be about 4,000 words. The second junior paper, written in the spring semester, should be between 5,000 and 8,000 words. Both junior papers may be written in English, in which case a three-page summary in the language of concentration must be provided, or they may be written in the language of concentration, in which case a three-page summary in English is required.

Students following track 2 generally would write their longer junior paper in their primary language of concentration.

Senior Thesis. As the culmination of their independent work, in the senior year students write a thesis, normally in English, on an approved topic. Topics chosen in the past have ranged over the whole field of Spanish and Portuguese studies, from linguistic problems and literary techniques through close textual analysis to thematic and ideological studies. Students primarily interested in culture and civilization have written on art, political and economic issues, education, and a variety of social questions. The senior thesis is a major commitment of a student's time and energy, and the most important yardstick for choosing a topic is willingness to spend many hours on a particular set of texts or problems.

Resources are available to assist students with the costs of senior thesis research including, when appropriate, foreign travel. The best time to use them is the summer preceding the senior year.

Senior theses should be between 15,000 words and 20,000 words long.

Senior Departmental Examination

The senior departmental examination, taken in May of the senior year, is designed to test aspects of the student's entire program of study in the department. A list of required and recommended readings is provided for each of the languages and literatures taught in the department and guides students in preparing for the written examination. The format of the examination is as follows: Part I: Essays in the language(s) of concentration (three hours). Part II: Literary commentaries (two hours). Students are asked to identify and comment upon five out of eight passages excerpted from the relevant reading list. Answers in Part II may be in English or in the language of concentration.
Study and Work Abroad

The department strongly encourages its concentrators and certificate students to spend as much time as they can in any country where the language(s) they study is (are) widely spoken. There are several ways of doing this within the four-year undergraduate degree: by study abroad for one or two semesters, by summer study abroad, and by obtaining summer work or an internship abroad.

Junior Semester/Junior Year Abroad. Students planning to spend a semester or their whole junior year abroad should seek advice from the departmental representative and from relevant faculty in choosing a suitable program of study. Further assistance is available from the Office of International Programs. Departmental and University approval is required.

Grades awarded by foreign institutions for courses that are recognized in lieu of Princeton courses are not included in the computation of departmental honors.

Students studying abroad for one or two semesters are not exempted from independent work requirements. In conjunction with the Study Abroad Program, the department has always been successful at finding advisers for JPs in the foreign towns where concentrators are studying. The responsibility for consulting with advisers, as well as for meeting all deadlines, lies with the student.

An approved one-semester course of study abroad normally counts for two departmental course credits. Students must complete the program abroad to the standard required by the foreign institution.

Summer Language Study. All students interested in languages are encouraged to study abroad during the summer in one of the programs recommended by our department and the Study Abroad Program. The Department of Spanish and Portuguese Languages and Cultures has a summer program in Toledo, Spain, for students with intermediate and advanced knowledge of Spanish. The department offers a number of scholarships to attend that program, as well as other language programs in Spanish- and Portuguese-speaking countries. For more information, visit the department's website.

Summer Work Abroad. Information about placements and internships abroad may also be obtained from the Office of International Programs.

Certificate in Language and Culture

Admission. The program is open to all undergraduates in all departments. Ordinarily, students concentrating in language and literature departments, including comparative literature, will be eligible for the certificate in language and culture provided that: (a) the linguistic base for the language and culture certificate is different from the linguistic base of the concentration; and (b) the work required for the language and culture certificate does not duplicate the requirements of the major. Students pursuing area studies certificates may earn the certificate in language and culture provided that (a) the courses they elect to satisfy the requirements of the area studies program are different from those they elect to satisfy the requirements of the language and culture certificate program; and (b) they submit a piece of independent work in addition to the independent work that satisfies the requirements of the area studies program and the home department.

Application forms are available on the department's Web page. Completed forms are submitted during the senior year. A separate application must be completed for each language in which a certificate will be pursued.

Plan of Study. The certificate in language and culture is available in Spanish and Portuguese and involves satisfactory completion of the following course requirements:

Spanish:
1. Four 300-level (or higher) departmental courses in the Spanish language, literature, or culture. At the discretion of the departmental representative, students who study abroad during the academic year may count one pre-approved course per semester abroad toward the certificate. Also, two pre-approved courses taken in the summer can count for one course toward the certificate. In no case, however, can more than two courses taken abroad count toward the certificate. Any 300- or 400-level Spanish or Portuguese course taught in English will require all written work to be completed in the target language in order to count toward a certificate.

2. Independent work. Students must write a paper on a topic agreed upon with the departmental representative. The paper must be written in Spanish and be approximately 6,000 words in length. This paper must be an extension of a paper written for one of the 300-level courses used toward the certificate. Please contact the departmental representative by e-mail in the fall semester of your senior year.

3. Students interested in earning a certificate in another department's program and in Spanish or Portuguese may earn both certificates provided that: (a) different courses are used to fulfill the requirements for each certificate* and; (b) the student produces two different pieces of independent work.

Portuguese:
1. Three 300-level (or higher) departmental courses in the Portuguese language, literature, or culture. At the discretion of the departmental representative, students who study abroad during the academic year may count one pre-approved course per semester abroad toward the certificate. Also, two pre-approved courses in a summer program abroad can count for one course toward the certificate. In no case, however, can more than two courses taken abroad count toward the certificate. Any 300- or 400-level Spanish or Portuguese course taught in English will require all written work to be completed in the target language in order to count toward a certificate. With the approval of the departmental representative, two 200-level courses in Portuguese literature or culture may count as one departmental.

2. Independent work. During their senior year, students must write a new paper on a topic agreed upon with the departmental representative. The paper must be written in Portuguese and be approximately 6,000 words in length.
length. This paper must be an extension of a paper written for one of the courses used toward the certificate. Please contact the departmental representative in the fall semester of your senior year.

3. Students interested in earning a certificate in another department's program and in Spanish or Portuguese may earn both certificates provided that: (a) different courses are used to fulfill the requirements for each certificate* and; (b) the student produces two different pieces of independent work.

* In agreement with the Program in Latin American Studies, one course can be used toward both a certificate in SPA and PLAS.

Courses

POR 108 Introductory Portuguese for Spanish Speakers  Fall, Spring
Normally open to students already proficient in Spanish, French, or Italian, this course uses that knowledge as a basis for the accelerated learning of Brazilian Portuguese. Emphasis on the concurrent development of understanding, speaking, reading, and writing skills. Three classes. Prerequisite: Spanish 107 or equivalent, or instructor's permission.  
_N. Cooney_

POR 109 Intermediate Portuguese  Fall, Spring
Students will continue to develop their language skills, especially those of comprehension and written and oral expression through grammar study, readings, film, music, and other activities. Students will read and discuss one novel in Portuguese and will gain further exposure to the cultures of the Portuguese-speaking world. Three classes. Prerequisite: POR 108 or instructor's permission.  
_N. Cooney_

POR 110 Intensive Portuguese  Fall, Spring
An intensive course designed for students who have fulfilled the language requirement in Spanish or another Romance language. Knowledge of one of these languages provides the basis for the accelerated learning of Portuguese. This intensive one-semester course teaches fundamental communication skills of comprehension, speaking, reading, and writing and provides some exposure to cultural aspects of the Portuguese-speaking world. Two 90-minute classes.  
_N. Cooney_

POR 208 Portuguese in Context: Studies in Language and Style  Fall, Spring
Students will increase their fluency and accuracy in both written and spoken Portuguese, broadening their vocabulary and mastery of syntax through textual analysis, discussions, oral presentations, and grammar review. Designed as a journey through the Lusophone world, this course seeks to present the Portuguese language in context by exploring historical, social, political, and cultural aspects of Brazil, Portugal, and Lusophone Africa through the media, literature, film, music, and other activities. Three classes. Prerequisite: 109 or instructor's permission.  
_N. Cooney_

POR 209 Portuguese Language and Culture through Cinema  Spring
An advanced language and culture course looking at a variety of themes pertaining to the contemporary Portuguese-speaking world through cinema. Discussions and compositions expand knowledge of grammar and increase fluency in written and spoken Portuguese, providing a solid foundation for further study of literature and culture. Prerequisite: POR 109 or instructor's permission. Two 90-minute classes.  
_N. Cooney_

POR 221 Introduction to the Literature and Culture of the Portuguese-Speaking World (also LAS 223)  Not offered this year LA
Through readings of selected texts and audiovisual materials, this course introduces students to the diverse cultures of the Portuguese-speaking world. Discussions focus on Portugal's expansion during early modern times, and the spread of the Portuguese language in the Americas, Asia, and Africa. Contemporary issues in several geographic areas will be approached comparatively. Prerequisite: POR 208 or instructor's permission. Two 90-minute classes.  
_Staff_

POR 300 Luso-Afro-Brazilian Literary Traditions (also LAS 315)  Spring LA
This course focuses on works that have been key for shaping the literary tradition of the Portuguese language, from colonial to postcolonial times. Discussions will focus on the intersections between literature, social change, identity, and history in Brazil, Portugal, and Lusophone Africa. Prerequisite: POR 208 or instructor's permission. Two 90-minute classes.  
_P. Meira Monteiro_

POR 301 Modern Brazilian Literature and Culture (also LAS 303)  Spring LA
A study of 19th- to 21st-century Brazilian texts with the aim of defining the place of Brazilian literature and culture within the context of Latin America and beyond. To include writers like Machado de Assis, Oswald de Andrade, Guimarães Rosa, Drummond, João Cabral, Clarice Lispector, and Caetano Veloso. Prerequisite: POR 208 or instructor's permission. Two 90-minute classes.  
_P. Meira Monteiro_

POR 304 Topics in Brazilian Cultural and Social History (also LAS 311)  Spring LA
Through the analysis of literary texts, films, and music, the course will consider cultural responses to the construction of a Brazilian national identity. Possible topics include the Brazilian modernist tradition; contemporary culture and media; the city and literature; poetry and song. Prerequisites: POR 208 or instructor's permission. Two 90-minute
classes. B. Carvalho

POR 319 Brazilian Cinema (also LAS 319/VIS 346) Fall LA

An introduction to the richness of Brazilian film, this course explores major cinematic movements: from the Cinema Novo, to critically acclaimed documentaries and more recent commercial successes like City of God. Recurrent and emerging trends will be discussed (e.g., the destruction of the Amazon, urban violence, literary adaptation, musical expressions). Prerequisite: POR 208 or instructor's permission. One three-hour class. B. Carvalho

POR 409 Latin American Studies Seminar (see LAS 404)

POR 410 Latin American Studies Seminar (see LAS 402)

SPA 101 Beginner's Spanish I Fall

An integrated approach to develop the skills of listening, speaking, reading, and writing Spanish in a cultural context to foster cultural awareness of the Spanish-speaking world. Class activities are devoted to acquiring and developing communicative and cultural competence through aural/oral practice, reading strategies, vocabulary acquisition, and language production. Audiovisual and other media resources are included. Five classes. No credit is given for 101 unless followed by 102. A. Calvo

SPA 102 Beginner's Spanish II Spring

A continuation of 101. The course continues to stress oral/aural practice with added emphasis on reading and communicative writing strategies. Students will read and analyze literary and cultural texts. Increased expression will be fostered through composition editing, videos, music, and film commentaries. Audiovisual and other media resources are included. Five classes. Prerequisite: 101. Students who pass 102 normally place into 107. A. Calvo

SPA 103 Intensive Beginner's and Intermediate Spanish Fall

An intensive course that combines 101 and 102 in one semester. Designed for students who have previously studied Spanish. An integrated approach that emphasizes developing and reinforcing language skills focusing on cultural readings. Students will be introduced to various cultural aspects of the Spanish-speaking world through literary readings, videos, music, and films. Audiovisual and other media resources are included. Five classes. Prerequisites: satisfactory score on Princeton Spanish placement test and instructor's permission. Normally followed by 107. L. Albert-Ferrando

SPA 105 Intermediate Spanish Fall

Specially designed for students with a good foundation in Spanish. Class activities reinforce language skills through aural/oral practice, grammar review, vocabulary acquisition, reading, editing, composition, oral presentations, and discussion of contemporary Spanish short stories, music, and films. Three classes. Prerequisites: a satisfactory score on the Princeton Spanish placement test. Normally followed by 108. P. Moscardó-Vallés

SPA 107 Intermediate/Advanced Spanish Fall, Spring

Designed for students who have successfully completed 102 or 103. An integrated approach to increase comprehension and oral and reading expression. Class activities reinforce language skills through aural/oral practice, grammar review, vocabulary acquisition, reading, editing composition, oral presentations, and discussion of contemporary Spanish short stories, music, and films. Students will develop their reading comprehension, oral proficiency, and writing skills through various multimedia activities. Five classes. M. Bores Martinez

SPA 108 Advanced Spanish Fall, Spring

An intensive course designed to prepare students to enter 200-level courses, with an emphasis on reading, speaking, and writing. The course is aimed at developing advanced language skills through frequent writing exercises, oral presentations, discussions of contemporary Spanish literary texts, music, and film. Three classes. Prerequisite: 105 or satisfactory score on the Princeton Spanish placement test. A. Calvo

SPA 207 Studies in Spanish Language and Style Fall, Spring

An advanced course in Spanish composition and conversation designed to give students increased fluency and expertise in written and oral Spanish skills. Extensive review of grammar and vocabulary through written and oral exercises. Course material includes literary texts, news-related publications, and films. Three classes. Prerequisite: 107 or 108 or instructor's permission. A. Bruzos Moro

SPA 209 Spanish Language and Culture through Cinema Fall, Spring

Designed to enhance oral and written skills in Spanish while increasing familiarity with Hispanic cultures through cinema. Grammar exercises related to the content of films will be combined with oral discussion of cultural topics and writing of compositions. Two 90-minute classes, one film screening. Prerequisite: 108. A. Bruzos Moro

SPA 221 Introduction to Medieval and Early Modern Spanish Cultures LA

Major developments in Spanish literature and civilization from the Muslim conquest to the 17th century. Beliefs and attitudes underlying the rise of the Spanish empire and the ways in which the interaction (convivencia) of Christians, Jews, and Muslims brought about the cultural differentiation of Spain within the European context. Two lectures, one preceptorial. Prerequisites: 207 or higher, or instructor's permission. M. Brownlee

SPA 222 Introduction to Latin American Cultures (also LAS 222/LAO 222) Fall LA
Introduction to modern Latin American literature including authors such as Juan Rulfo, Pablo Neruda, Gabriela Mistral, Borges, García Márquez, and Bolaño. The quest for Latin American expression and the shaping of cultural values with specific focus on cultural memory, social and political frontiers, the relationship between fiction and history, and the incorporation of popular and mass culture into the literary tradition. Also explores the conflict between the modern and the local, and its manifestations in Latin American cultures. Prerequisite: 207 or higher, or instructor's permission. R. Price

SPA 224 Hispanic Literatures: Approaches to Literary Texts  Fall LA

An introduction to textual analysis and interpretation of Hispanic literatures. The course will be organized on discussions of various genre (narrative, poetry, drama, essay). Readings will include authors from early and modern periods from Spain and Latin America, such as Garcilaso de la Vega, Cervantes, Calderón de la Barca, Miguel de Unamuno, García Lorca, Sor Juana, José Hernández, Rubén Dario, Jorge Luis Borges, Mario Vargas Llosa, and Margo Glantz. Popular music and film will also be studied. Three classes. Prerequisite: 107 or 108, or instructor's permission. M. Loureiro

SPA 300 The Literature and Culture of Spain and Colonial Latin America: Medieval, Renaissance, and Baroque (also LAS 300)  Not offered this year LA

Through selected texts from Spain and colonial Latin America, the course will explore the formation of a literary tradition in Spanish. The main objective is to foster comparative studies within literatures and cultures of the Spanish-speaking world so as to identify points of contact and differentiation currently defining this field of studies. Two lectures, one preceptorial. Prerequisite: one 200-level Spanish course. R. Surtz

SPA 301 Topics in Spanish Literature of the Golden Age  Not offered this year LA

Poetry, prose, and drama of the Golden Age. Readings might include the works of authors such as Garcilaso, Saint Theresa, Saint John of the Cross, Góngora, Quevedo, Lope de Vega, and Calderón. Two lectures, one preceptorial. Prerequisite: a 200-level Spanish course or instructor's permission. R. Surtz

SPA 302 Medieval Spanish Literature   LA

Spanish literature and culture from the early Middle Ages to the beginning of the 16th century. Emphasis on both literary works (most read in modernized versions) and original documents. Special attention will be given to medieval Spain's pluralistic society of Christians, Muslims, and Jews. Prerequisite: a 200-level course in Spanish or instructor's permission. Two 90-minute seminars. R. Surtz

SPA 303 Spanish Literature and Culture: Modern Spain 1700-2000  Spring LA

Key literary works are analyzed in relation to main cultural, political, and social currents in Spain in the last three centuries. The course combines analysis of specific texts with a panoramic view of the complex articulation of cultural forces that have led to the present configuration of contemporary Spain. Prerequisite: one 200-level Spanish course or instructor's permission. Two 90-minute classes. G. Labrador Méndez

SPA 305 Topics in Spanish Civilization of the Golden Age  Fall LA

Selected literary forms and themes in relation to the major historical, social, and cultural currents of the Golden Age. Possible topics include the function of the theater in the absolutist state; the Inquisition and the literature of alienation; the impact of the Counter-Reformation on artistic activity; the image of woman in literature. Two lectures, one preceptorial. Prerequisite: a 200-level Spanish course or equivalent. R. Surtz

SPA 306 Cervantes and His Age (also COM 315)  Not offered this year LA

Since 1605, Don Quixote has elicited passionate reactions: Faulkner read it once a year, as some read the Bible, while Malraux saw it as the most meaningful book for survivors of concentration camps. Quixote has been construed in disparate ways, from debating good and bad reading and writing, to mocking the medieval world view; from exploring the serious impact of the printing press, to benevolently satirizing the conquistadors; from being a study of deviant social behavior and the nature of madness, to a meditation on human sexuality and ageing. Two lectures, one preceptorial. Prerequisite: a 200-level Spanish course or equivalent. M. Brownlee

SPA 307 Advanced Spanish Language and Style  Fall, Spring LA

An advanced language and culture course designed to develop proficiency in writing Spanish. Emphasis on close reading and discussion of texts and written activities. Other textual and audiovisual materials are used to set the texts in specific social, cultural, and historical contexts. In addition to studying specific literary selection of great Spanish and Latin American writers, the goal is to provide the ability to approach other kinds of "texts" (paintings, movies, songs, and a play) to broaden their perspective and knowledge of the Spanish-speaking world. Three classes. Prerequisite: a 200-level Spanish course or instructor's permission. A. Calvo

SPA 309 Translation: Cultures in Context  Spring LA

An introduction to the study and practice of translation, this course provides students with an awareness of the complex tasks involved in translating written materials from one cultural context to another. The cultural encounter between the Hispanic and the Anglo-Saxon will be explored through the translation of increasingly difficult texts—newspaper articles, interviews, economic reports, and scientific articles. Through the examination of the students' own translations, the course will study the process of cultural exchange between Spanish and English. Prerequisite: 307. One three-hour seminar. A. Calvo

SPA 312 The Dramatic Expression of the Golden Age   LA

http://www.princeton.edu/ua/
A survey of the major forms of Spanish drama of the Golden Age, including plays by Lope de Vega, Tirso de Molina, and Calderón. Emphasis on the development of the theater in relation to the rise of the absolutist state, the Counter-Reformation, and the impact of the Inquisition on Spanish society. Prerequisite: a 200-level Spanish course. Two lectures, one preceptorial. 

M. Brownlee, R. Surtz

SPA 317 Topics in the Cultural Expression of Protest and Dissent in Spain  Not offered this year LA

Topics may include the literature of non-Castilian cultures in the Peninsula; the nonconformist drama of Galdós, Unamuno, Valle-Inclán, and García Lorca; the artist against the state (poets, essayists, and novelists under the Franco regime); the commitments of the avant-garde. Two 90-minute classes. Prerequisite: a 200-level Spanish course or instructor's permission. 

G. Labrador Méndez

SPA 319 Topics in Cinema and Culture  Not offered this year LA

Major cinematic movements in Latin America and/or Spain: their influence and their relationship to literary and cultural issues. Possible topics include: the art of adaptation of narrative to film or Spanish surrealism. One lecture, one two-hour precept, one film screening. Prerequisite: 207 or instructor's permission. 

M. Loureiro

SPA 320 Modern Spanish Fiction  Spring LA

The development of the novel and short story, as art forms, from 19th-century realism to the avant-garde of the 1920s and 1930s. An analysis of literary problems and their historical background, drawing on the works of Galdós, Clarín, Unamuno, Baroja, Valle-Inclán, Miró, and others. Prerequisite: a 200-level Spanish course or equivalent. 

M. Loureiro

SPA 321 Topics in the Intellectual History of Modern and Contemporary Spain  Not offered this year LA

Special attention to its European context. Course may focus on a few important essayists (such as Ortega, Unamuno, d'Ors, and Zambrano) or may trace the development of an influential idea (such as the function of art, the individual and the masses) or map the characteristics of a certain period. One three-hour seminar. Prerequisite: a 200-level Spanish course or equivalent. 

M. Loureiro

SPA 326 Modern Spanish Poetry  Spring LA

Poetry from the late 19th century to the Spanish Civil War, considering modernismo and the generations of '98 and '27 in relation to European symbolism and the avant-garde. Two lectures, one preceptorial. Prerequisite: a 200-level Spanish course or equivalent. 

G. Labrador Méndez

SPA 331 Modern Latin American Fiction (also LAS 331)  Fall LA

Major themes, forms, and techniques in Latin American novels and short stories. Close analysis of texts by Borges, Rulfo, García Márquez, Bolaño, Vallejo, and others. Consideration will be given to historical contexts and contemporary ideological currents. Two lectures, one preceptorial. Prerequisite: a 200-level Spanish course or instructor's permission. 

G. Nouzeilles

SPA 332 Modern Latin American Poetry (also LAS 332)  Not offered this year LA

An introduction to the major poets and poetic trends in modern Latin America and the Caribbean, with emphasis on Martí, Dario, Huidobro, Vallejo, Neruda, Palés Matos, Borges, and Saer. Special attention also to the rich oral traditions represented by popular genres such as boleros, tango, nueva canción and rock, and particularly the work of Silva Rodríguez, Violeta Parra, Rubén Blades, Tite Curet Alonso, and Charly García available in audio recordings or videos. Two 90-minute seminars. Prerequisite: a 200-level Spanish course or equivalent. 

G. Labrador Méndez

SPA 342 Topics in Latin American Modernity (also LAS 342)  Fall LA

The development of cultural patterns and literary forms in Spanish America since the late 19th century. Topics may include: the importance of oral traditions and popular music in forging identities; the literary and ideological import of modernismo, travel literature in the 19th century; and the avant-garde movements of the 1920s. Two 90-minute seminars. Prerequisite: a 200-level Spanish course or instructor's permission. 

Staff

SPA 343 The Invention of Latin American Traditions (also LAS 343)  Spring LA

Fundamental texts of Spanish American literature from colonial times to the present. In a given semester the course could focus on works by Garcilaso, Sor Juana Inés de la Cruz, Sarmiento, José Hernandez, Martí, Borges, Mariátegui, Palés Matos, Henríquez Ureña, or Lezama Lima. Two 90-minute seminars. Prerequisite: a 200-level Spanish course or instructor's permission. 

Staff

SPA 344 Literature and Society in Early Latin America (also LAS 344)  Not offered this year LA

This seminar studies literary, legal, and historical writings in relation to such topics as imperialism and colonialism, the image of the "Indian," cultural identities, and rhetoric and politics, from the writings of Columbus and the cartographic imagination to the formation of the new criollo culture in the vice-regal city. Texts from the following authors will be carefully analyzed: Cortés, Cabeza de Vaca, Las Casas, Garcilaso de la Vega, Huaman Poma, and Sor Juana Inés de la Cruz. Two 90-minute seminars. Prerequisite: a 200-level Spanish course or instructor's permission. 

Staff

SPA 345 Topics in Latin American Literature and Ideology (also LAS 345)  LA

Latin American and Caribbean thought from 1800 to the present, focusing on the conflicting cultural and ideological assumptions of liberalism and nationalism. Topics might include slavery and literature, the writing of history, the intellectuals and power, or the writings of some major figures such as Bolívar, Hostos, Martí, Mariátegui, Fernando
SPA 346 Modern Latin American Fiction in Translation (also COM 346) Not offered this year LA
Readings and discussion of authors such as Machado de Assis, Cortázar, Lisperctor, García Márquez, Vargas Llosa, and Puig, considered in relation to the cultures of Latin America and to trends of modern European and American fiction. Does not count as a departmental course for Spanish majors unless readings and papers are done in Spanish. Two 90-minute seminars. Prerequisite: a 200-level Spanish course or instructor's permission. R. Gallo

SPA 348 Fictions and Communities in the Andes (also LAS 348) Not offered this year LA
How is the complexity of the Andes imagined or resolved in its literatures? This seminar will study the plurality of narrations and communities that constitute the Andean world, focusing primarily on Peru and two of its major intellectual movements in the 20th century: the indigenismo and the criollo urban literature. Aspects of the Afro-Peruvian narratives will also be studied. Major authors discussed include: Ricardo Palma, Clorinda Matto, González Prada, Mariátegui, Arguedas, Vargas Llosa, Bryce, Ribeyro, Gregorio Martínez. Conducted in Spanish. Two 90-minute seminars. Prerequisite: a 200-level Spanish course or instructor's permission. Staff

SPA 349 The Lyric (see COM 309)

SPA 350 Topics in Latin American Cultural Studies (also LAS 349) Spring LA
A course focusing on elements of Latin American culture that left a strong mark on the history, literature, and arts of the region. Recent topics include the representation of Che Guevara in novels, film, and photography; the literary response to Tango in Argentina; the impact of the invention of radio in avant-garde poetry. The course will emphasize the connections between history, literature, arts, and visual culture of the region. Two 90-minute classes. Prerequisite: a 200-level Spanish course or instructor's permission. G. Nouzeilles

SPA 351 Topics in the Culture of Cities Fall LA
An overview of the cultural production and history of major cities in the Spanish- and Portuguese-speaking worlds. Possible topics include Mexico City, Barcelona, São Paolo, Buenos Aires, Havana, and Madrid. The course will examine the representation of the city in literature (poetry and prose), film, painting, photography, and music. Discussions will focus on how historical events determine the possibilities of representation. Two 90-minute classes. Prerequisite: a 200-level Spanish course or instructor's permission. R. Gallo, M. Loureiro

SPA 352 Topics in the Politics of Writing and Difference (also LAS 356/AAS 363) LA
A course analyzing various Latin American literary and written traditions produced by, in dialogue with, or on behalf of subjects who have an ambiguous relationship with dominant forms of written expression, for example: indigenous people, black people, and women. Special attention will be given to slave narratives, testimonio, autobiography, and the indigenista novel. Two 90-minute classes. Prerequisite: a 200-level Spanish course or instructor's permission. R. Price, G. Nouzeilles

SPA 353 Topics in Gender and Representation (also COM 354/LAS 353) Not offered this year LA
An examination of the relationship between gender and genre, between the author's experience as a gendered subject, and experiments with literary form. Topics might include women's writing, gay literature, and the aesthetics of camp. Discussions will emphasize the link between experimental forms of writing and the experience of history as a gendered subject. Two 90-minute classes. Prerequisite: a 200-level Spanish course or instructor's permission. R. Gallo

SPA 360 Special Topics in Creative Writing (see CWR 345)

SPA 380 Translation Workshop: Spanish to English Fall LA
This workshop-style course will focus on developing the student's skills in translating short texts from Spanish into English. Each week one or two students will present their translations from a selection of poems and short stories by writers like Octavio Paz, Carlos Fuentes, Elena Poniatowska, Julio Cortázar, and many others. Students will also read theoretical texts about translation. Several professional translators will visit the class during the semester and present examples from their own work to the class. Prerequisite: reading knowledge of Spanish. One three-hour seminar. Staff

SPA 381 Topics in the Theory of Translation Not offered this year LA
An overview of recent debates about the practice of translation with special emphasis on how these ideas have been applied in translations of literary works by poets, novelists, and thinkers like Octavio Paz, Alfonso Reyes, Jorge Luis Borges, José Lzama Lima, and José Ortega y Gasset. Readings include essays on translation by Walter Benjamin, Vladimir Nabokov, Georges Steiner, and Lawrence Venuti. Students will be asked to translate a literary text from Spanish to English. Prerequisite: 307. One three-hour seminar. R. Gallo

SPA 401 Topics in Hispanic Culture (Europe and America) (also HIS 409/LAS 428) Spring LA
Possible topics might include: modernity, empire, and colonialism, European travel literature in Latin America, the encounter of Latin America, and North American cultural traditions. One three-hour seminar. Prerequisite: a 300-level Spanish course or instructor's permission. Staff

SPA 406 Latin American Studies Seminar (see LAS 406)

SPA 407 Latin American Studies Seminar (see LAS 403)

http://www.princeton.edu/ua/
SPA 409 Latin American Studies Seminar (see LAS 404)

SPA 410 Latin American Studies Seminar (see LAS 401)

SPA 1027 Intensive Intermediate and Advanced Spanish   Not offered this year

An intensive, double-credit course designed to accelerate students’ progress and command in the language, and to consolidate and expand oral comprehension, speaking, reading, and writing through grammar review, writing assignments, reading of Spanish texts, and other exercises in listening and speaking. Emphasis also is placed on idiomatic usage of the language. Students will be introduced to various cultural aspects of the Spanish-speaking world through literary readings, videos, music, and films. Five 90-minute classes. Prerequisite: 101 and instructor's permission. P. Moscardó-Vallés
The Committee for Statistical Studies seeks to encourage the cross-disciplinary study of statistics through its application to a diverse set of substantive problem areas in the natural sciences, engineering, the social sciences, and the humanities. The committee coordinates courses in departments and programs that make extensive use of statistical techniques; it also coordinates colloquia and lectures on topics of statistics. Interested students are invited to consult with the chair of the committee, who will assist them in obtaining information about course offerings, programs of study, and faculty members in various departments who can guide them in research projects.

A complete list of undergraduate and graduate courses may be found on the committee's website.
# Program in Sustainable Energy

**Director**
Yiguang Ju

**Executive Committee**
Craig B. Arnold, Mechanical and Aerospace Engineering
Jay B. Benziger, Chemical and Biological Engineering
Andrew B. Bocarsly, Chemistry
Emily A. Carter, Mechanical and Aerospace Engineering, Applied and Computational Mathematics
Michael A. Celia, Civil and Environmental Engineering
Frederick L. Dryer, Mechanical and Aerospace Engineering
Alexander Glaser, Woodrow Wilson School, Mechanical and Aerospace Engineering
Robert J. Goldston, Astrophysical Sciences/Princeton Plasma Physics Lab
Yiguang Ju, Mechanical and Aerospace Engineering
Chung K. Law, Mechanical and Aerospace Engineering
Luigi Martinelli, Mechanical and Aerospace Engineering
Richard B. Miles, Mechanical and Aerospace Engineering
Tullis C. Onstott, Geosciences
Michael Oppenheimer, Woodrow Wilson School, Geosciences
Stephen W. Pacala, Ecology and Evolutionary Biology
Catherine A. Peters, Civil and Environmental Engineering
S. George H. Philander, Geosciences
Daniel M. Sigman, Geosciences
Robert H. Socolow, Mechanical and Aerospace Engineering
Sigurd Wagner, Electrical Engineering
Bess B. Ward, Geosciences
David S. Wilcove, Woodrow Wilson School, Ecology and Evolutionary Biology
Gerard Wysocki, Electrical Engineering

**Sits with Committee**
Katherine B. Hackett, Princeton Environmental Institute

The Program in Sustainable Energy is designed for Princeton undergraduate students who are interested in pursuing careers or graduate education in the area of sustainable energy science and technology to achieve:

1. An understanding of current energy resources, carriers, end users, technologies, and their impact on climate and environment.

2. The ability to quantitatively analyze, design, and develop innovative energy systems and technologies that support sustainable economic growth, energy security, biological diversity, and environmental harmony for life on Earth.

3. An understanding of Earth, global climate, and environmental change from the perspective of engineering, technology, and policy.

The future of societies, the global economy, and the global environment depend on collaborative research into renewable energy, alternative fuels, advanced energy conversion and storage systems, technology transfer to developing countries, and prudent judgment on policies to support sustainable energy technology. Innovations and inventions require multidisciplinary approaches and entrepreneurship, as well as grounding in theory and practice, in topics that are not covered by a single department. This certificate program offers an integrated set of core and elective courses, introducing students to fundamental concepts, providing depth in specific fields of interest, gaining laboratory and site visit experiences, and setting the stage for further work in the field. Students are encouraged to expand their experience through summer internships with companies, government agencies, and university laboratories.

**Admission to the Program**

The program is open to sophomores, juniors, and seniors who have a satisfactory background in engineering and science. Normally, students should have successfully completed MAT 103, MAT 104, PHY 103, and PHY 104 (or their equivalents, including AP equivalents). Students who have slightly different preparation should consult with the program director to discuss eligibility. A student planning to earn the program certificate should complete the Student Profile as early as possible, and no later than the mid-point of the fall term of his or her junior year. Application for admission is made to the Program Committee. Upon acceptance to the program, the program director will assign a program adviser to the student to assist in planning a program of study, research, and off-campus internship.

**Program of Study**

A concentrator in this program must satisfy both program and departmental requirements. The program for each student is worked out by the student and his or her departmental adviser. The program requirements are as follows:

1. All students must take six courses, including two core courses and four elective courses. The two core courses must be taken by choosing one from the Introduction to Energy Technology category (A1) and the other one from the Introduction to Climate Change and Geo-environmental Science category (A2), respectively. Depending on the student's interest and background, the four elective courses should be taken with at least one from a different energy subject area listed below (B1 and B2). To qualify for the certificate, a minimum grade average of B- in the six program courses, independent work, and senior thesis is required. In some cases, an elective course that fulfills this certificate program requirement can also meet a regular departmental requirement.

**Core Courses** (one from each category--A1 and A2)

Note: An asterisk indicates a one-time only course or topic.

http://www.princeton.edu/ua/
A1. Introduction to Energy Technology

Students who have completed Thermodynamics (MAE 221 or CBE 246) are encouraged to take MAE 328. Students who do not have a Thermodynamics background should choose MAE 228.

MAE 228 Energy Solutions for the Next Century (also CBE/ EGR 228)
MAE 328 Energy for a Greenhouse-Constrained World (also EGR/ENV 328)

A2. Introduction to Climate Change and Geo-environmental Science

CEE 303 Introduction to Environmental Engineering (also ENV 303/URB 303)
CEE 334 Global Environmental Issues (also ENV 334/WWS 334)
EEB 417A, 417B Ecosystems and Global Change (also ENV 417A, 417B)
GEO 297 Environmental Decision Making (also ENV 399)
GEO 366 Climate Change: Scientific Basis, Policy Implications (also ENV 339/WWS 335)

Elective Courses and Subject Areas (four courses with at least one from a different subject area--B1 and B2)

B1. Energy Science and Technology (Fossil energy, non-fossil and renewable energy, energy conversion and storage systems and technologies)

*AST 309 Science and Technology of Nuclear Energy: Fission and Fusion (also MAE 309/PHY 309)
CEE 477 Engineering Design for Sustainable Development
CBE 341 Mass, Momentum, and Energy Transport or MAE 423 Heat Transfer
CBE 342 Fluid Mechanics, CEE 306 Hydrology, or MAE 335 Fluid Dynamics
CBE 421 Catalytic Chemistry (also CHM 421)
CBE 441 Chemical Reaction Engineering
*ELE 431 Solar Energy Conversion (also ENV/MAE 431)
ELE 441/442 Solid State Physics I, II
MAE 426 Rocket and Air-Breathing Propulsion
MAE 427 Energy Conversion and the Environment: Transportation Applications
MAE 531 Combustion
*MAE 570 Advanced Topics in Materials and Mechanical Systems II: Materials for Energy Storage and Conversion Processes

B2. Environmental Science and Geoscience (Earth science, climate, environment, ecosystems, policy and economic assessments of carbon capture and storage technology)

CEE 471 Introduction to Water Pollution (also GEO/URB 471)
CEE 599 Special Topics in Environmental Engineering
CHM 333 Oil to Ozone: Chemistry of the Environment (also ENV 333)
EEB 417A, B Ecosystems and Global Change (also ENV 417A, B)
ENV 201A, B Fundamentals of Environmental Studies: Population, Land Use, Biodiversity, and Energy
ENV 531 Topics in Energy and the Environment (also CEE 583/GEO 531)
GEO 203 Geology (also CEE 235)
GEO 297 Environmental Decision Making (also ENV 399)
GEO 322 Biogeochemical Cycles and Global Change (also ENV 322)
GEO 366 Climate Change: Scientific Basis, Policy Implications (also ENV 339/WWS 335)
GEO 424 Introductory Seismology and Oil Exploration (also CEE 424)
GEO 425 Introduction to Physical Oceanography (also MAE 425)
*NES 368/POL 437 Oil Politics in the Middle East

2. A senior independent work project or thesis whose topic is relevant to the program and acceptable to the Program Committee must be completed and presented to the committee. A minimum grade of B- for the project or thesis is required to qualify for the certificate.

3. Close collaboration with faculty is expected. Program students are expected to demonstrate strong academic performance. Program courses may not be taken on a pass/D/fail basis unless that is the only grading alternative for the course.

4. Program students must fill out the Student Profile form at the beginning of each year in which they are members of the program. This is especially important during the senior year to assure that requirements for the certificate will be met by the end of the year.

Certificate of Proficiency

Students who fulfill all program requirements will receive a certificate of proficiency in sustainable energy upon graduation.

Seminars on Energy and the Environment. Seminars on energy and environment are announced to all students registered in this program. Advanced students are encouraged to attend regularly scheduled departmental and Princeton Environmental Institute seminars to further enrich their understanding of the field.

Undergraduate Independent Research Projects. Undergraduate projects usually are undertaken for independent work or senior thesis credit, and opportunities exist for summer and work-study projects. These projects typically last for one or two academic terms, although they may extend over greater periods of time. Students work closely with faculty and staff members in academic departments and University-associated laboratories such as the Princeton Plasma Physics Laboratory (PPPL), and they have access to sophisticated computers and experimental facilities while conducting their independent research.
Undergraduate Off-Campus Experiences and Internships. Students are encouraged to expand their experience through site visits and to summer internships with companies, government agencies, and university laboratories (e.g., PPPL). The energy-technology core course will provide several off-campus site visit experiences to power generation stations, a fusion laboratory, and fuel refinery stations.
Program in Teacher Preparation

**Director**
Christopher Campisano

**Associate Director**
Todd W. Kent

**Executive Committee**
William Bialek, Physics, Lewis-Sigler Institute for Integrative Genomics
Daphne A. Brooks, English, African American Studies
Miguel A. Centeno, Sociology, Woodrow Wilson School
Joel Cooper, Psychology
Joan S. Girogus, Psychology
Stanley N. Katz, Woodrow Wilson School
Daniel I. Rubenstein, Ecology and Evolutionary Biology

**Program Administrator**
Anne N. Catena
Michael D. Hannon
Jason R. Klugman
Helen H. Martinson
Torey T. Wilson

The Program in Teacher Preparation is an interdepartmental course of study for undergraduates composed of a unique mix of course work, seminars, laboratory experience, field work, and practice teaching. The program, approved by the New Jersey State Department of Education and nationally accredited by the Teacher Education Accreditation Council, allows students to explore teaching as a career option and to become fully prepared and certified to teach successfully at the middle and secondary levels within the regular framework of a Princeton A.B. or B.S.E. degree. Participants can earn certification in art, music, English, mathematics, sciences, social sciences, and world languages.

Upon completion of the program, students receive a certificate in teacher preparation from the University and may apply for a Certificate of Eligibility with Advanced Standing for teaching in public schools. That certificate is transferable to other states through reciprocity agreements. Independent schools, as a rule, do not require certification in order to secure a teaching position. However, independent school heads have become increasingly interested in teacher candidates who are fully prepared and certified within a liberal arts curriculum.

In accordance with Title II Federal Regulations for reporting pass rates in teacher licensing examinations, the Program in Teacher Preparation reported a 100 percent pass rate in the 2008-09 cohort.

**Admission to the Program**

Students are encouraged to apply during the freshman or sophomore year to allow adequate time for scheduling required courses, but applications also are accepted from upperclassmen and alumni. Admission is based on academic standing and evidence of interest in teaching.

**Program Requirements**

**General Education Requirements.** The New Jersey State Department of Education requires that students preparing to teach take courses in a variety of academic disciplines within the liberal arts curriculum. A course is required in each of the following areas: fine arts, humanities, mathematics, science, technology, and social science. Courses taken to fulfill the University distribution requirements will cover most, if not all, of these areas.

**Teaching Area Requirements.** Teaching area requirements normally correspond to departmental concentration requirements. Eight courses in, or related to, the teaching field are required. With careful choice of elective courses it is possible to be certified in one field while concentrating in another.

**Professional Education Requirements.** In addition to the general education and teaching area requirements, the professional education sequence includes the following:

*Introductory Practicum.* A six-hour observation in a school and participation in two seminar sessions. Three brief written assignments and selected readings are also required.

*Educational Psychology* (PSY 307) or an approved alternate, usually completed during the year prior to practice teaching.

*Seminar on Learning and Teaching* (TPP 301). TPP 301 is usually completed the semester prior to practice teaching.

*Site-Based Field Experience.* A 30-hour observation in a school and the preparation of two lessons done in cooperation with a classroom teacher. (The field experience is completed concurrently with PSY 307 or alternate, and TPP 301.)

*Seminar on Education* (TPP 401). TPP 401 is taken concurrently with Practice Teaching (TPP 402).

*Practice Teaching* (TPP 402). TPP 402 is a 12-week assignment as a student teacher completed during the senior year (see Reduced Course Load Option below) or during an additional ninth semester (see The Practice Teaching Option below).

**Program Options**

[http://www.princeton.edu/ua/]
The Reduced Course Load Option. Students who choose to do their practice teaching in a semester of their senior year have the option of reducing by one the number of courses taken in that semester so as to devote full time to TPP 401 and TPP 402. This option requires that students complete 26 courses prior to the senior year. The arrangement does not alter distribution, departmental, or language requirements, nor does it reduce the total number of courses required for graduation. Students wishing to select this option must secure the approval of a program staff member and the appropriate academic dean.

The Practice Teaching Option (PTO). Program participants who find that they are unable to schedule TPP 401 and TPP 402 into a semester of their senior year can take those courses in a term after graduating or in a term during a one-year leave of absence between junior and senior year. There is a modest tuition charge for the extra semester, and students are responsible for their own room and board. Students considering this option should discuss their plans with a member of the program staff, since special arrangements are required. A limited amount of financial aid is available to eligible students.

Preparation for Independent School Teaching. Students not enrolled in the program who are seeking preparation for teaching in independent schools may enroll in PSY 307 or TPP 301 provided space is available. Students considering this option should contact the program office and schedule an appointment with a staff member prior to registration.

Certificate of Proficiency

Students who fulfill all program requirements receive a certificate of proficiency in teacher preparation upon graduation.

Placement. The program also provides placement services to all Princeton students and alumni seeking teaching and administrative positions in elementary and secondary schools, both public and private.

Courses

TPP 301 Seminar on Student Learning and Methods for Teaching   Fall, Spring SA
A study of essential dimensions of learning and teaching, including learner characteristics and needs, organization and structure of educational institutions, development of curriculum and instructional goals, preparation of evaluation and assessment, and design of subject/level specific methodologies and classroom management techniques. Required course work includes 18 hours of site-based field experience and an evening laboratory session. T. Kent, A. Catena

TPP 401 Seminar on Education   Fall, Spring
Students investigate the processes of curriculum development and implementation, develop learning goals and rubrics for assessment, study national and local issues in education and their impact on schools, examine current philosophies and effective practices, reflect on their work and evaluate their performance as practice teachers, and conduct action research relevant to the teaching/learning process. Prerequisite: program director's permission. J. Klugman, S. Grey

TPP 402 Practice Teaching   Fall, Spring
Supervised practice teaching (a minimum of 10 weeks for seniors, and 12 weeks for PTO and graduate students) in secondary or elementary school. Teaching is done under the supervision of a master teacher and a program staff member who regularly observe and discuss the student's practice teaching. Students gain firsthand experience in developing teaching strategies, planning and differentiating instruction, assessing student learning, and classroom management. Must be taken concurrently with 401. A. Catena, T. Wilson, J. Klugman
Program in Theater

**Director**
Michael W. Cadden

**Acting Director**
Timothy K. Vasen (spring)

**Executive Committee**
Jill S. Dolan, English, Lewis Center for the Arts
Jeffrey Eugenides, Lewis Center for the Arts, Creative Writing
Su Friedrich, Lewis Center for the Arts, Visual Arts
Chang-rae Lee, Lewis Center for the Arts, Creative Writing
Susan Marshall, Lewis Center for the Arts, Dance
Paul B. Muldoon, Lewis Center for the Arts, Creative Writing
Joyce Carol Oates, Lewis Center for the Arts, Creative Writing
James Richardson, English, Lewis Center for the Arts, Creative Writing
Joseph S. Scanlan, Lewis Center for the Arts, Visual Arts
P. Adams Sitney, Lewis Center for the Arts, Visual Arts
Susan Wheeler, Lewis Center for the Arts, Creative Writing
Edmund V. White, Lewis Center for the Arts, Creative Writing
Stacy W. Wolf, Lewis Center for the Arts

**Professor**
Jill S. Dolan, also English, Lewis Center for the Arts

**Associate Professor**
Stacy E. Wolf, also Lewis Center for the Arts

**Senior Lecturer**
Michael W. Cadden, also Lewis Center for the Arts

**Lecturer**
Timothy K. Vasen
Robert N. Sandberg

**Hodder Fellow**
Ellen M. Lewis

The Program in Theater, part of the Lewis Center for the Arts, allows students to work with professional artists and critics, as well as with scholars in the area of performance studies, to familiarize themselves with the nature of practical work in theater and the role theater has played and continues to play in various cultures at various times. The program offers courses in playwriting, acting, directing, design, dramaturgy, performance history, and criticism. The program also offers a full season of theatrical productions, under the supervision of professional artists and technicians, in order to allow students to bring the kinds of talents they develop in class to a wider audience. Visiting guest artists often offer workshops in their specialties, as well as directing students in productions or designing program shows. Program courses are open to all undergraduates interested in exploring the art of theater, but the program also offers the kinds of courses and co-curricular activities that will allow the student, upon graduation, to move into the best graduate conservatories to pursue advanced training.

Students looking for an opportunity to incorporate their theatrical studies into their concentrations might want to consider the Theater and Performance Studies track in the Department of English or Area D in the Department of Comparative Literature, but certificate students usually come from the full range of concentrations the University has to offer.

**Admission to the Program**

Courses are open to students pursuing work in any department, whether or not the student plans to earn the certificate. Introductory courses in the program, whether at the 200 or 300 level, usually have no prerequisites and fulfill the distribution requirement in Literature and the Arts (LA). Other 300- or 400-level courses require applications and/or interviews. All courses in the program are letter-graded.

**Program of Study**

Students with a particular interest in and commitment to theater may want to obtain the program certificate. Believing that the best training for a career in the theater is a broad-based liberal arts education, Princeton does not have a concentration in theater. Instead, the certificate program encourages students, should they have the inclination, to make connections in their artistic work between their fields of concentration and their love of the theater. Normally, students apply to become a certificate student in the spring of their sophomore year, but applications are accepted through the spring of the junior year.

To obtain a certificate in theater, students must successfully complete:

1. Four practical courses chosen from offerings in acting, directing, playwriting, design, dramaturgy, and criticism.

2. One course in dramatic literature or performance history and criticism.

3. Some kind of independent work in the junior or senior year. This work might take the form of a practical project, such as the direction of a major production, the study and performance of a major role, the writing of a play, or the design of a production, under the supervision of our faculty and professional staff. If the student's department permits, he or she might choose to complete one part of the departmental independent work (senior thesis or one junior paper) on a topic approved by the Program in Theater faculty dealing with some facet of theater in relation to that department's subject matter. This independent work could take the form of a textual, cultural, or theoretical study; or it may be a combination of research and practical work supervised by the program faculty and the student's department.
(4) A certain number of hours of technical work on theater productions staged by the program.

**Certificate of Proficiency**

Students who fulfill the requirements of the program receive a certificate of proficiency in theater upon graduation.

**Advanced Creative Work.** The Program in Theater offers certificate students with the appropriate course background the opportunity to do advanced creative work under the supervision of its faculty and staff. This work usually takes the form of a practical project, such as the writing of a play, the direction or design of a major production, or the study and performance of a major role. These projects may be pursued as extracurricular activities, or, as is more regularly the case, they may be used to fulfill the requirement for independent work in the certificate program. With permission of the student's department of concentration, such projects may also satisfy one of the requirements for independent work in the department, in which case it must consist of or be accompanied by written work, such as a scholarly or critical evaluation.

**Related Courses.** Various departments offer courses in dramatic literature, many in English and some in foreign languages. A list of such courses may be found on the program website. Additional topics are taught in seminars whose titles change yearly. For current descriptions, see listings under the appropriate departments.

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**Courses**

**THR 201 Beginning Studies in Acting: Scene Study  Fall, Spring LA**

Designed to guide students in developing roles and exploring texts and characters. Work will begin with exercises and proceed to consideration of scenes, short sections of plays, and specific roles. *T. Vasen, T. Bersley*

**THR 205 Introductory Playwriting  Spring LA**

A workshop on the fundamentals of writing plays. Emphasis will be on solving problems of structure, plot development, and character through various writing exercises and theater improvisations. Ongoing work of students and instructor is read and discussed. *R. Sandberg*

**THR 300 Acting, Being, Doing, and Making: Introduction to Performance Studies (also COM 359/ENG 373)  Fall LA**

The place of performance—for example, Greek tragedy, Noh drama, modern dance, opera, performance art, crossdressing—within the social, political, cultural, and religious structures it has served. Perspectives from theater and dance history, classical and contemporary theory, and ancient and modern practice. Prerequisite: fulfillment of writing requirement. Two 90-minute seminars. *J. Dolan, S. Wolf*

**THR 301 Intermediate Studies in Acting: Scene Study II  Fall, Spring LA**

A continuation and extension of 201. Prerequisite: 201. *Staff*

**THR 304 Special Topics in Contemporary Practice (see DAN 304)**

**THR 305 Playwriting II: Intermediate Playwriting  Fall LA**

A continuation of work begun in Introductory Playwriting, focusing on the writing of a major play. Prerequisite: 205. *Staff*

**THR 311 Intermediate Studies in Acting: Creating Character and Text  Spring LA**

Creation of an original theater piece in collaboration with a guest artist, leading to a public performance. Will include improvisations, exercises, study of dramatic texts, and scene study. Special attention will be given to the creation of character, both in dramatic texts and in improvisation. Prerequisite: 201. *T. Bersley*

**THR 317 Theatrical Design (also VIS 372)  Fall LA**

An exploration of the various aspects of theatrical design: lighting, set design, costuming. Emphasis will depend to some degree on instructor's area of interest and/or student interest. Studio projects will be designed to coincide with other theater and dance courses and currently scheduled productions. Critical discussion will explore the relationship between dramatic texts and design ideas. Prerequisites: Visual Arts 201, 202, 203, or 204, or instructor's permission. Two three-hour seminars or studio sessions. *R. Hernández*

**THR 326 Criticism Workshop  Fall LA**

A workshop devoted to the development of the student's critical sensibility. Through extensive in-class analysis of their own reviews of professional theater and dance productions and through the study of past and present models, students will learn what makes a good critic of the performing arts. One three-hour seminar. *Staff*

**THR 330 Special Topics in Performance Practice (also ENG 421)  Spring LA**

A special topics course designed to build upon and/or enhance existing program courses, taking into consideration the strengths and interests of program concentrators and the availability of appropriate instructors. Topics, prerequisites,
and formats will vary from year to year. *M. Cadden*

**THR 331 Special Topics in Performance History and Theory (also AMS 332)  Spring LA**

Designed to provide students with an opportunity to study theater and/or dance from a historical or theoretical perspective. Topics, prerequisites, and formats will vary from year to year. *S. Wolf*

**THR 341 Acting and Directing in Musical Theater  Fall LA**

A practical, hands-on introduction to acting and directing in musical theater. The course will require students to prepare songs and scenes from selected musicals with an eye to how best to approach the particular challenges the scene presents. *Staff*

**THR 348 Screenwriting I: Screenwriting as a Visual Medium (see CWR 348)**

**THR 366 American Musical Theater History (also MUS 366)  Fall LA**

This seminar explores one of the most quintessentially "American" forms of performance--the Broadway musical theater--in the context of U.S. culture from the mid-20th-century until today. It will begin in 1949 with Rodgers and Hammerstein's *South Pacific*, move through the "Golden Age" of the "integrated" Broadway musical in the 1950s, the "concept" musicals of the mid-1960s, the so-called "death" of the musical in the 1970s, megamusicals of the 1980s, and end with some contemporary musicals. Two 90-minute classes. *Staff*

**THR 401 Advanced Studies in Acting: Scene Study and Style  Spring LA**

Questions of historical style, poetic stage language, and various methods of contemporary nonrealistic acting. Prerequisite: 301 or 311. *G. Bauriedel*

**THR 411 Directing Workshop  Fall LA**

Special directing assignments will be made for each student, whose work will be analyzed by the instructor and other members of the workshop. Students will be aided in their preparations by the instructor; they will also study the spectrum of responsibilities and forms of research involved in directing plays of different styles. Prerequisite: 201. *T. Vasen*

**THR 448 Screenwriting II: Adaptation (see CWR 448)**

**THR 494 Princeton Atelier (see ATL 494)**

**THR 499 Princeton Atelier (see ATL 499)**
Program in Translation and Intercultural Communication

Issues of translation and intercultural communication arise everywhere in the contemporary world: in literary texts, on the Internet, in television and film, in business, in science, and in questions of human rights. How does one translate the language of a poem? How does one translate a legal system or concepts such as democracy, or happiness, or scapegoat, or hero from one culture and language to another? How does the brain perform translation? What are the languages of artificial intelligence? How do we translate meanings across disciplinary as well as international borders—from genomics to dance, from philosophy to film?

The Program in Translation and Intercultural Communication, an affiliate of the Princeton Institute for International and Regional Studies, seeks to allow students to develop skills in language use and in the understanding of cultural and disciplinary difference. Translation across languages allows access to issues of intercultural differences, and the program will encourage its students to think about the complexity of communicating across cultures, nations, and linguistic borders. For this reason, all students in the program must have proficiency in a language other than English, and must also spend time living in a country where that language is spoken.

Though the program takes linguistic translation as its base, and has a strong international flavor, it also encourages students to study other forms of discourse, the languages of different scholarly disciplines, for example, and seeks to foster lively debates among the social sciences, natural sciences, humanities, material sciences, engineering, and the arts.

Admission to the Program

In order to enter the program, a student should normally have completed at least two courses at the 200 level or above in a language other than English.

Students seeking admission to the program should contact the program manager.

Program of Study

All students enrolled in the certificate program are required to successfully complete the following:

1. The program's two core courses: TRA 200 Thinking Translation: Language Transfer and Cultural Communication and TRA 400 Senior Seminar in Translation and Intercultural Communication.

2. Translation Practices. At least one course selected from a small roster of courses in different areas. For 2010-11, students may choose from among the following courses (note: an asterisk indicates one-time-only course or topic):

   ANT 413 Cultures and Critical Translation
   COS 402 Artificial Intelligence
   CWR 305 Advanced Creative Writing (Translation) (also COM 355)
   CWR 306 Advanced Creative Writing (Translation) (also COM 356)
   *HIS 397 Translation in the History of Science
   LIN 216 Language, Mind, and Brain (also PSY 216)
   *LIN 308 Bilingualism (also TRA 303)
   PHI 317 Philosophy of Language
   PSY 208 The Brain: A User's Guide
   SPA 309 Translation: Cultures in Context

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3. Three additional elective courses selected from a list of approved courses (see program website); substitutes must be
approved by the program director. Students will be closely guided in their individual choices, and departments will be
invited to make their own suggestions for their contributions to this certificate.


5. Senior Thesis. Students in the program will write a senior thesis that incorporates issues of translation in one or
more of its several senses. In departments where this option presents a difficulty, a student may petition to have another
piece of independent work meet the requirement. Such projects may be completed, for instance, during a summer stay
abroad.

Study and Work Abroad

Students wishing to achieve a certificate in the program will spend a year, a semester, or six weeks of the summer in a
Princeton-approved course of study or internship program in an area where the chosen non-English language of
proficiency is spoken.

Certificate of Proficiency

Students who fulfill all requirements for the program will receive a certificate of proficiency in translation and
intercultural communication upon graduation.

Approved Electives. A list of courses currently approved as electives may be found on the program website.

Courses

TRA 200 Thinking Translation: Language Transfer and Cultural Communication (also COM 209) Fall LA
An introduction to a wide range of issues arising in the many acts of translation that constitute the modern world. Built
on a central thread of reflection about translating between languages--What is a language? What is meaning? What is
meant by "equivalence"?--the course looks at issues in international relations, anthropology, artificial intelligence,
cinema studies, literature, law, etc., that involve the boundaries of interlingual translation and intercultural
communication to acquire a better understanding of the problems and practices of translation in the modern world. One
lecture, one preceptorial. D. Bellos

TRA 301 Introduction to Machine Translation (also COS 401) Spring
With increased globalization, the need to communicate across linguistic barriers is constantly rising. There is a range
of software and services in the market place that provide translation from one human language to another at varying
degrees of sophistication and complexity. In this course, you will learn the inner workings of machine translation
technology and gain the experience of building a simple machine translation system for a few language pairs. Students
are required to have programming experience or should have completed COS 126. TRA 200 is recommended and may
be taken simultaneously. One lecture, one preceptorial. S. Bangalore

TRA 303 Bilingualism (see LIN 308)

TRA 400 Senior Seminar in Translation and Intercultural Communication (also COM 409) Fall LA
Required for all students pursuing the certificate in translation and intercultural communication. This course returns to
many of the questions raised in TRA 200, and incorporates the experiences of individual seminar members in their
contact with different languages (in the broadest sense) and in developing their senior theses. Selected key texts in
literature, film, politics, and philosophy will provide a shared ground for weekly discussions. Prerequisite: 200. One
three-hour seminar. M. Wood

http://www.princeton.edu/ua/
Program in Urban Studies

Director
M. Christine Boyer

Executive Committee
Stanley T. Allen, Architecture
M. Christine Boyer, Architecture
Michael A. Celia, Civil and Environmental Engineering
Douglas S. Massey, Woodrow Wilson School, Sociology
Gyan Prakash, History

Associated Faculty
Jeremy I. Adelman, History
Roland Benabou, Economics, Woodrow Wilson School
John W. Borneman, Anthropology
Miguel A. Centeno, Sociology, Woodrow Wilson School
Mitchell Duneier, Sociology

Susan T. Fiske, Psychology
Mario I. Gandelsonas, Architecture
Maria Garlock, Civil and Environmental Engineering
Peter R. Jaffé, Civil and Environmental Engineering
Harold James, Woodrow Wilson School, History
Kevin M. Kruse, History
Sara S. McLanahan, Woodrow Wilson School, Sociology
Devah Pager, Sociology
Catherine A. Peters, Civil and Environmental Engineering
Alejandro Portes, Sociology
Gyan Prakash, History
Esteban Rossi-Hansberg, Woodrow Wilson School, Economics
James A. Smith, Civil and Environmental Engineering
Marta Tienda, Woodrow Wilson School, Sociology

The Program in Urban Studies is an interdepartmental plan of study for undergraduates that offers an interdisciplinary framework for the study of cities, metropolitan regions, and urban and suburban landscapes. With courses in diverse departments, including art and archaeology, history, music, civil and environmental engineering, sociology, and politics along with the School of Architecture and the Woodrow Wilson School of Public and International Affairs, the program encourages students to think about metropolitan centers in all their complexity—as physical spaces; social, cultural, political, and economic nexuses; and historical artifacts.

In addition, students are advised about opportunities to acquire field experience in urban settings through the Community-Based Learning Initiative (CBLI) and, when appropriate, encouraged to participate in that program to gain practical experience in urban policy and service delivery. Those students with appropriate background and training are also encouraged to study and conceptualize cities in a comparative, international perspective, using the resources of Princeton's area studies and international relations programs.

Admission to the Program

The Program in Urban Studies is open to all undergraduate students, regardless of discipline. Students apply for admission during their sophomore or junior year and are accepted into the program on the basis of interest and a coherent academic plan. In their application, students are asked to propose a tentative course of study.

Program of Study

As soon as possible after applying for admission to the program, students meet with the program director to establish an approved course of study. Every student is encouraged to take the program's core course, URB 201, as soon as possible.

Along with URB 201, which students must pass with a grade of B or above, students must complete three electives from the list of approved urban studies electives (or a substitute course approved by the program director). This list of approved electives should be considered a starting point for the student to develop a customized course of study in consultation with the program director. Students should be aware that it is usual for special one-time-only courses to be added to a department's course offerings to take advantage of a visiting professor. When these courses contain substantial urban content, they may be used to fulfill the requirements of the certificate program. These courses must be in addition to course work taken to fulfill the requirements of the student's department of concentration, although they may be used to fulfill distribution requirements. Each course must be from a different division (natural sciences, engineering, social sciences, or humanities) and no elective course may come from the student's department of concentration. To be counted toward the certificate, all courses must be taken for a grade.

While urban studies students' senior theses are written in their home departments, their work must contain an urban component, approved by the program director. A faculty member from the student's home department serves as the primary adviser and first reader. A member of the urban studies program faculty serves as an additional adviser and second reader. Over the course of the senior year, students participate in a senior thesis colloquium, which brings students from different departments together to discuss their urban-related thesis research and present their work to each other and to interested faculty members. The colloquium does not carry course credit, though regular participation is required for completion of the certificate.

Certificate of Proficiency

Students who fulfill the requirements of the program receive a certificate of proficiency in urban studies upon graduation.
Courses

URB 201 Introduction to Urban Studies (also SOC 203)  Fall, Spring
Introduces students to the phenomenon of urbanism by summarizing the social structure and ecological organization of cities from their inception through the present and then presents selected aesthetic, humanistic, architectural, and philosophical reactions to cities in the 19th and 20th centuries. *M. Boyer*

URB 262A Structures and the Urban Environment (see CEE 262A)

URB 262B Structures and the Urban Environment (see CEE 262B)

URB 303 Introduction to Environmental Engineering (see CEE 303)

URB 471 Introduction to Water Pollution Technology (see CEE 471)
Program in Values and Public Life

**Director**
Melissa S. Lane

**Executive Committee**
Kwame Anthony Appiah, Philosophy, University Center for Human Values
Charles R. Beitz, Politics
Sandra L. Bermann, Comparative Literature
John M. Cooper, Philosophy
Christopher L. Eisgruber, Woodrow Wilson School, University Center for Human Values
Elizabeth Harman, Philosophy, University Center for Human Values
Kim Lane Scheppele, Woodrow Wilson School, Sociology, University Center for Human Values
Melissa S. Lane, Politics
Stephen J. Macedo, Politics, University Center for Human Values
Jan-Werner Müller, Politics
Alan W. Patten, Politics
Philip N. Pettit, Politics, University Center for Human Values
Peter A. Singer, University Center for Human Values
Michael A. Smith, Philosophy

The Program in Values and Public Life, an undergraduate interdisciplinary certificate program offered by the University Center for Human Values, focuses on modes of inquiry into important ethical issues in public life. The program helps students develop competence in pursuing such inquiries generally and supports them in applying these intellectual skills to the advanced analysis of one or more related topics. Students attaining the certificate will be equipped to bring informed discussion of values into the public sphere and to integrate a critical value perspective into their future studies and pursuits. The program is open to undergraduates of all disciplines.

**Admission to the Program**

Students interested in applying to the program are advised to begin to consider their interests and a tentative course of study as early as possible, which they are encouraged to do in consultation with the program director. In 2010-11, as the program is launched, most students will apply in the fall of their junior year; sophomores may also apply. In the future, students normally will apply at the end of their sophomore year.

Students will be considered for admission upon meeting the following prerequisites: submission of an essay describing the rationale for completing the certificate and plans for the junior and senior year; an interview with the program director about this rationale; completion of at least one of the core courses (PHI 202, WWS 301, or POL 307) by the end of sophomore year with a grade of B+ or higher; a minimum GPA of 3.0 overall. A faculty committee of the University Center for Human Values will determine admission.

**Program of Study**

To qualify for a program certificate, students are required to complete three core courses, two thematic courses, and independent work as described below.

**Core Courses** (3 courses):
Students must take: (1) PHI 202 Introduction to Moral Philosophy (also CHV 202); (2) either WWS 301 Ethics and Public Policy (also CHV 301, POL 308) or POL 307 The Just Society; (3) a Junior/Senior Seminar in Values and Public Life, or if necessary, another seminar on normative issues approved by the program director.

**Thematic Courses** (2 courses):
Students must identify an area of focus and take 2 courses with an explicit values component related to it, chosen by the student in consultation with the program director. Some illustrative focus areas (or "themes") are:

- Bioethics
- Cognitive psychology, ethics, and public policy
- Democracy in theory and practice
- Global justice and human rights
- Constitutionalism and the rule of law
- History of thought about political justice, human rights, or some other core concept in public morality
- Public dilemmas in literature
- Ethics, religion, and theology

**Independent Work.** Students will write a senior thesis (or, in exceptional circumstances, another substantial piece of independent work) on a normative topic approved by both the director of the program and the student's department of concentration. Students will be expected to participate in a senior thesis colloquium convened by the program.

Note: no more than two of the courses used to satisfy the course requirements for the student's concentration may also be counted toward satisfaction of the course requirements for the values and public life program certificate.
Certificate of Proficiency

Students who fulfill the requirements of the program receive a certificate of proficiency in values and public life studies upon graduation.
Program in Visual Arts

Director
Joseph S. Scanlan

Executive Committee
Jill S. Dolan, English, Lewis Center for the Arts, Theater
Jeffrey Eugenides, Lewis Center for the Arts, Creative Writing
Su Friedrich, Lewis Center for the Arts
Chang-rae Lee, Lewis Center for the Arts, Creative Writing
Susan Marshall, Lewis Center for the Arts, Dance
Paul B. Muldoon, Lewis Center for the Arts, Creative Writing
Joyce Carol Oates, Lewis Center for the Arts, Creative Writing
James Richardson, English, Lewis Center for the Arts, Creative Writing

Professor
Su Friedrich, also Lewis Center for the Arts
Joseph S. Scanlan, also Lewis Center for the Arts
P. Adams Sitney, also Lewis Center for the Arts

Senior Lecturer
Eve M. Aschheim, also Lewis Center for the Arts

The Program in Visual Arts, part of the Lewis Center for the Arts, allows interested undergraduates to explore visual art and media and to develop their creative skills in connection with a general program of humanistic education. Courses are offered in photography, painting, drawing, sculpture, installation art, film and video production, and film history and criticism. Studio courses emphasize direct, hands-on art-making under the guidance of practicing visual arts professionals.

All courses in the program are open to all students at Princeton. A few courses are by application only. The courses are letter-graded (not pass/D/fail) and may be taken in fulfillment of the distribution requirement in LA (Literature and Arts). Summer courses and study abroad are accepted for Program 2 and certificate students only. AP credit is not accepted.

For students interested in pursuing studio arts, there are two options. The first is Program 2, the concentration offered by the Department of Art and Archaeology in cooperation with the Program in Visual Arts that focuses on the visual/studio arts with an art history component. The second option is a visual arts certificate done in addition to a student's departmental concentration. Students wishing either to study film history/theory or do film/video production may pursue this track within the visual arts certificate program in collaboration with departments that accept a creative or written thesis in film.

Admission to the Program

Admission to both Program 2 in art and archaeology and the visual arts certificate program is selective. By the second Tuesday following spring break, students submit an application and a portfolio of creative work (or an essay on cinema in the case of those applying for the track in film and video) to the Lewis Center for the Arts administrative office. The admissions committee will notify students accepted into the program by early April. For specific prerequisites, please see the individual areas below.

Program of Study

Program 2: History of Art and Visual Arts

Program 2 is a concentration in the visual arts that combines studio art and art history, and culminates in a creative senior thesis. For program requirements, see the Program 2 description under the Department of Art and Archaeology.

The Visual Arts Certificate

Overview. A certificate in visual arts will be awarded to students who successfully complete a substantial program of studio work and other requirements, as summarized below, while concentrating in another academic department. Students interested in a certificate in visual arts should submit a portfolio in the spring semester of the sophomore year. Normally students must complete two of the required visual arts courses before being admitted to the program. One course in art and archaeology is also recommended.

Course Requirements. A total of eight courses combined from the Program in Visual Arts and from the Department of Art and Archaeology, as follows:

a) Four visual arts courses, which must include studio courses in at least two different media, and at least two 300- or 400-level studio courses.

b) VIS 392 Issues in Contemporary Art or a cognate. This course is strongly recommended for studio artists, for whom it has been specifically designed. However, it is possible to substitute a relevant 300- or 400-level seminar directly related to the medium a student practices with the prior permission of the director of the program.

c) VIS 416 Senior Thesis Seminar. This course provides a formal structure in which Program 2 and certificate students will present, discuss, and develop ideas for their visual thesis exhibitions.

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d) Two art and archaeology courses, one of which must be in the modern period (19th century to the present).

**Junior Independent Work.** In the fall, students select two advisers from the Program in Visual Arts and complete the Certificate Adviser Approval Form. The junior independent work is done in consultation with the student's advisers, and also with the general visual arts faculty in "open studio" meetings. The advisers' spring-term grade for the junior independent work represents an evaluation of the entire year's studio work. The junior independent work is exhibited in a group show at the beginning of the senior fall semester.

**Senior Independent Work--The Creative Thesis.** In the fall, students enroll in VIS 416 Senior Thesis Seminar, select two advisers from the Program in Visual Arts, and complete the Certificate Adviser Approval Form. The creative thesis studio work is done in consultation with the student's advisers, and also with the general visual arts faculty in "open studio" meetings. Students present their work in an exhibition during the spring term, usually in a two-person show with another certificate or Program 2 student. The grade for the senior independent work represents an evaluation of the entire year's studio work and is the average of two grades: (1) the average of the grades given by the student's two advisers and (2) the average of the grades given by the rest of the visual arts faculty who view the senior exhibition.

**Track in Film and Video**

Students interested in film and video production or criticism and analysis may pursue the film and video track within the visual arts certificate program while concentrating in another academic department. Requirements for this track are summarized below. To enter this track, students must have the approval of their department of concentration to submit a written critical/historical thesis on a film-related topic or present a creative film work in fulfillment of the senior thesis. Normally students in this track must complete a production course and a course in film theory or history.

The five visual arts courses that students in the film and video track take must include:

a) One course in film/video production (VIS 261/262, VIS 361/362, VIS 462)

b) Two courses in film history (any course listed by the Committee for Film Studies) and one visual arts seminar in film theory or history.

c) At least two other courses (either in film production or academic courses in film history).

**Please note:** Three cognates are accepted within the above group. Independent work requirements for the track in film and video are consistent with those set forth for the visual arts certificate program. Junior projects and senior theses may be submitted as historical or theoretical essays or as creative works in film, video, or an installation based on either or both media. Where these projects can fulfill the requirements of the visual arts certificate and the student's department of concentration, they will be jointly advised by faculty members from the program and the student's home department. Where the independent work is not completed in conjunction with requirements for the student's home department, the work will be supervised by two faculty members from the Program in Visual Arts.

**Certificate of Proficiency**

Students who fulfill the requirements of the program receive a certificate of proficiency in visual arts upon graduation.

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**Courses**

**VIS 201 Introductory Drawing (also ARC 201)  Fall LA**

This course approaches drawing as a way of thinking and seeing. Students will be introduced to a range of drawing issues, as well as a variety of media, including charcoal, graphite, ink, and oil stick. Subject matter includes still life, the figure, landscape, and architecture. Representation, abstraction, and working from imagination will be explored. A structured independent project will be completed at the end of the term. Two three-hour studio classes. *E. Aschheim, J. O'Connor*

**VIS 202 Introductory Drawing (also ARC 202)  Spring LA**

This course approaches drawing as a way of thinking and seeing. Students will be introduced to a range of drawing issues, as well as a variety of media, including charcoal, graphite, ink, and oil stick. Subject matter includes still life, the figure, landscape, and architecture. Representation, abstraction, and working from imagination will be explored. A structured independent project will be completed at the end of the term. Two three-hour studio classes. *E. Aschheim, N. Carter*

**VIS 203 Introductory Painting (also ARC 327)  Fall LA**

An introduction to the materials and methods of painting. The areas to be covered are color and its interaction, the use of form and scale, painting from a model, painting objects with a concern for their mass, and interaction with light. Two three-hour studio classes. *E. Aschheim, K. Kauper*

**VIS 204 Introductory Painting (also ARC 328)  Spring LA**

http://www.princeton.edu/ua/
An introduction to the materials and methods of painting. The areas to be covered are color and its interaction, the use of form and scale, painting from a model, painting objects with a concern for their mass, and interaction with light. Two three-hour studio classes. B. Jermusyk, D. Clements

VIS 211 Introductory Photography   Fall, Spring LA

An introduction to the processes of photography through a series of problems directed toward the handling of light-sensitive material, camera, and printing. Weekly laboratory sessions will explore the critical issues of the medium in relation to both student work and the work of guest photographers. One three-hour class and three hours of independent laboratory. Prerequisite: instructor's permission. A. Shepp

VIS 212 Introductory Photography   Spring LA

An introduction to the processes of photography through a series of problems directed toward the handling of light-sensitive material, camera, and printing. Weekly laboratory sessions will explore the critical issues of the medium in relation to both student work and the work of guest photographers. One three-hour class and three hours of independent laboratory. Prerequisite: instructor's permission. A. Macintyre

VIS 215 Graphic Design (also ARC 215/CWR 215)   Fall LA

This studio course will introduce students to the essential aspects and skills of graphic design, and will analyze and discuss the increasingly vital role that non-verbal, graphic information plays in all areas of professional life, from fine art and book design to social networking and the Internet. Students in the course will explore visual organization through a series of focused, interrelated assignments dealing with composition, page layout, type design, and image. Hands on production will include an array of do-it-yourself printing and distribution technologies, from letterpress and mimeograph to photocopying and websites. Staff

VIS 221 Introductory Sculpture   Fall, Spring LA

A studio introduction to sculpture, particularly the study of form, space, and the influence of a wide variety of materials and processes on the visual properties of sculpture. Students will develop an understanding of contemporary sculpture and a basic technical facility in a variety of materials and processes. Two three-hour studio classes. M. Friedman

VIS 222 Introductory Sculpture   Spring LA

A studio introduction to sculpture, particularly the study of form, space, and the influence of a wide variety of materials and processes on the visual properties of sculpture. Students will develop an understanding of contemporary sculpture and a basic technical facility in a variety of materials and processes. Two three-hour studio classes. J. Scanlan

VIS 231 Ceramics/Sculpture   Fall LA

An introductory-level course designed for students interested in learning the fundamentals of working with clay. A wide variety of hand-building and wheel-throwing techniques will be taught, enabling students to make utilitarian vessels as well as sculptural forms. Students will learn about glazing and colored engobe application methods and how to operate electric and gas kilns. Studio work will be complemented by readings, field trips, and slide presentations. Two three-hour studio classes. Staff

VIS 232 Ceramics/Sculpture   Spring LA

An introductory-level course designed for students interested in learning the fundamentals of working with clay. A wide variety of hand-building and wheel-throwing techniques will be taught, enabling students to make utilitarian vessels as well as sculptural forms. Students will learn about glazing and colored engobe application methods and how to operate electric and gas kilns. Studio work will be complemented by readings, field trips, and slide presentations. Two three-hour studio classes. A. Agee

VIS 242 Film Genres: The First Five Decades of Cinema   Not offered this year LA

A historical examination of a film genre--e.g., comedy, documentary, detective film (also called film noir). The object of the course will be the understanding of the uniquely cinematic aspects of each genre, studied against the backdrop of parallel literary genres (e.g., comedy from Aristophanes to Beckett; documentary fiction and essays; 19th- and 20th-century detective fiction). One genre will be the topic of the course each year. Two 90-minute classes, one film screening. P. Sitney

VIS 261 Introductory Video and Film Production   Fall LA

A film/video course introducing the techniques of shooting and editing digital video. Works of film/video art are analyzed in order to explore the development of, and innovations in, cinematic language. Production is oriented toward film/video as a visual art, including narrative, documentary, and experimental genres. Several short video projects produced during the semester. Two three-hour classes. Prerequisite: instructor's permission. K. Sanborn

VIS 262 Introductory Video and Film Production   Spring LA

A film/video course introducing the techniques of shooting and editing digital video. Works of film/video art are analyzed in order to explore the development of, and innovations in, cinematic language. Production is oriented toward film/video as a visual art, including narrative, documentary, and experimental genres. Several short video projects produced during the semester. Two three-hour classes. Prerequisite: instructor's permission. K. Sanborn

VIS 303 Intermediate Painting   LA

http://www.princeton.edu/ua/
This course is designed to allow students to explore more deeply the process and meaning of painting. Students will complete a set of structured assignments and are encouraged to develop an independent direction. Contemporary critical theory is integrated into the course. Two three-hour studio classes. Prerequisite: 203, 204 and instructor's permission. 

E. Aschheim

VIS 304 Intermediate Painting   Spring LA

This course is designed to allow students to explore more deeply the process and meaning of painting. Students will complete a set of structured assignments and are encouraged to develop an independent direction. Contemporary critical theory is integrated into the course. Two three-hour studio classes. Prerequisite: 203, 204 and instructor's permission. 

E. Aschheim

VIS 309 The Handprinted Image: Intaglio and Lithography   Spring LA

An introduction to fundamental techniques of copper plate etching, lithography, and relief printing. Assignments focus on applications of various printmaking techniques, while encouraging independent development of subject matter. Critiques will occur throughout the term. Students are encouraged to draw regularly outside of class to cultivate themes and content applicable to their prints. Field trips to the University's museum and the library's graphics collection will complement class work. Two three-hour classes. 

D. Heyman

VIS 312 Introduction to Color Photography   Fall, Spring LA

Theory, processes, and applications of color photography as an artistic medium, exploring camera technique, color film, and darkroom printing methods. Students investigate the formal issues presented by color as an element of the medium and analyze visual content in the broader project of photographic image-making. Prerequisite: 211 or 212 and instructor's permission. One three-hour class. 

J. Lee

VIS 313 Intermediate Photography   Not offered this year LA

A continuation of 211 or 212, this course focuses on photo chemistry, printmaking methods, and the view camera. The connections between traditions of art, philosophy, science, and photography will continue to be important. One three-hour class and three hours of independent laboratory. Prerequisites: 211, 212, or equivalent experience and instructor's permission. 

Staff

VIS 315 Digital Photography   Fall, Spring LA

An advanced seminar and lab that explores the aesthetic and theoretical implications of digital technology in relation to photography. The emphasis is on making the photographic print in the digital work space. Class will consist of both independent and collaborative projects. One three-hour class, one three-hour laboratory. Prerequisites: 211 or 212, or instructor's permission. 

D. Oliver

VIS 316 Contemporary Practices in Photography   Spring

This is a project-driven course for the intermediate or advanced studio student. This course explores the variety of ways contemporary artists have used photography since the 1950s, including but not limited to, documentary, conceptual, alternative processes and experimental methods, installation, narrative fiction or directional, collage, and serial images, as well as traditional modernist methods. Each student will produce two independent projects that are intended to emulate the methodology and practice of a chosen contemporary artist. 

J. Lee

VIS 343 Major Filmmakers   Fall LA

This seminar will treat in depth the work of two or three filmmakers of major importance. Specific subjects will vary. 

P. Sitney

VIS 346 Brazilian Cinema (see POR 319)

VIS 347 Topics in French Cinema (see FRE 391)

VIS 348 Screenwriting I: Screenwriting as a Visual Medium (see CWR 348)

VIS 361 Intermediate Video and Film Production   LA

A second-level film/video workshop focusing on digital media production. Short works of film/video art will be analyzed in class as a guide to the issues of aesthetic choice, editing structure, and challenging one's audience. Students complete two short videos and a longer final project, and view one film each week outside of class time. Prerequisites: 261 or 262 and instructor's permission. One three-hour seminar. 

K. Sanborn

http://www.princeton.edu/ua/
VIS 362 Intermediate Video and Film Production   Spring LA
A second-level film/video workshop focusing on digital media production. Short works of film/video art will be analyzed in class as a guide to the issues of aesthetic choice, editing structure, and challenging one's audience. Students complete two short videos and a longer final project, and view one film each week outside of class time. Prerequisites: 261 or 262 and instructor's permission. One three-hour seminar. S. Friedrich

VIS 372 Theatrical Design (see THR 317)

VIS 392 Issues in Contemporary Art (also ART 392)   Fall LA
A required seminar for art and archaeology Program 2 majors and visual arts certificate students emphasizing contemporary art practices and ideas. The course addresses current issues in painting, drawing, sculpture, film, video, photography, and ceramics. It includes a visiting artist lecture series, critiques of students' work, and excursions to galleries, museums, and artists' studios. One three-hour seminar. J. Scanlan

VIS 401 Advanced Drawing   Fall LA
A studio course in which students are encouraged to develop an independent direction while being challenged with projects on issues such as: narrative, abstraction, conceptual strategies, collage, computer-aided drawing, and drawing-based installation. Sources include photography, drawing from life, and utilizing one's own imagination. Study of developments in contemporary drawing will parallel the course projects. Prerequisites: 201, 202, and instructor's permission. Two three-hour classes. N. Carter

VIS 403 Advanced Painting   LA
A studio course focused on advanced problems in painting practice, including pictorial structure in abstraction and representation, color in relationship to space and light, working process, and materials. This course, although structured, encourages development of independent work. Group critiques will be conducted. Students gain awareness of historical models as well as contemporary art, as they build and analyze the relationship between student work and contemporary painting culture. Two three-hour studio classes. Prerequisites: 303 or 304 and instructor's permission. Staff

VIS 404 Advanced Painting   Spring LA
A studio course focused on advanced problems in painting practice, including pictorial structure in abstraction and representation, color in relationship to space and light, working process, and materials. This course, although structured, encourages development of independent work. Group critiques will be conducted. Students gain awareness of historical models as well as contemporary art, as they build and analyze the relationship between student work and contemporary painting culture. Two three-hour studio classes. Prerequisites: 303 or 304 and instructor's permission. K. Kauper

VIS 411 Advanced Problems in Photography   Spring LA
Student-initiated problems in photography will be explored in close working relationship with the instructor. Emphasis will be on integrating practice and critical thought. One three-hour class, three hours of independent laboratory. Prerequisites: 211 or 212, and/or 313, and instructor's permission. Staff

VIS 416 Senior Thesis Seminar  LA
This seminar will give senior Program 2 concentrators in art and archaeology and certificate students in the visual arts a more structured and collegial environment for developing their thesis exhibitions. Over the course of the semester students will research and develop their art, their influences, and their aesthetic underpinnings to be presented as a formal proposal for their thesis project for group discussion. Material choices, exhibition design, and publicity strategies also will be addressed. Assigned readings will support and challenge received ideas of what art is and what the form and content of an art exhibition might entail. J. Scanlan

VIS 421 Advanced Sculpture   Spring LA
A studio course in which formal problems are raised and explored through a range of materials. The central focus is on analysis and exploration of the nature of sculptural space. Two three-hour studio classes. Prerequisites: 221 or 222 and instructor's permission. M. Friedman

VIS 442 Film Theory   Not offered this year LA
An examination of the central texts and abiding issues of the theory of cinema. Properties of the shot as a unit of film construction and its relationship to the space of reality are analyzed. Different kinds of film structures and their theoretical underpinnings are studied. P. Sitney

VIS 443 Topics in Modern Italian Cinema (see ITA 310)

VIS 444 Cinema and the Related Arts (also COM 444)   Fall LA
A seminar examining the ways in which filmmakers have used one of the other arts as part of the self-definition of cinema as an autonomous art. One or two such interactions will be the focus of the course, and will vary by term (e.g., painting, architecture, poetry, narrative fiction). P. Sitney

VIS 445 Fascism in Italian Cinema (see ITA 312)

VIS 446 Marxism in Italian Cinema (see ITA 313)

http://www.princeton.edu/ua/
VIS 448 Screenwriting II: Adaptation (see CWR 448)

VIS 462 Advanced Video and Film Production   Spring LA

A third-level film/video course to further develop video production skills. Students have the option of spending the term either creating a single long work or a series of short pieces. Short weekly shooting exercises. Students view one film each week outside of class time. Two three-hour classes. Prerequisite: 361 or 362 and instructor's permission S. Friedrich

VIS 471 Special Topics in Visual Arts   LA

Advanced work in special areas of the various visual media or in areas where the traditional media intersect (for example, typography, video, photoprintmaking). Specific topics will change from year to year, and prerequisites will vary. Staff

VIS 472 Special Topics in Visual Arts   Spring LA

Advanced work in special areas of the various visual media or in areas where the traditional media intersect (for example, typography, video, photoprintmaking). Specific topics will change from year to year, and prerequisites will vary. Staff
Program in the Study of Women and Gender

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Jill S. Dolan

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Deborah A. Prentice, Psychology
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Esther H. Schor, English
Alexandra T. Vazquez, English, African American Studies
Tamsen O. Wolff, English
Virginia Zakian, Molecular Biology

**Sits with Committee**
Mary J. Harper, Society of Fellows
Beth K. Jamieson, PACE Center

The Program in the Study of Women and Gender is an interdisciplinary forum for the study of sex roles, gender, and sexuality across cultures and global geographies both past and present. The program's courses, which are open to all students, examine gender from a variety of disciplinary perspectives. The program offers core courses, seminars, and cross-listed courses, and also directs students to courses of interest that are based in other programs and departments. A current list of course offerings is available on the program website.

**Admission to the Program**

Admission to the program is by application, available via program website, and/or consultation with the program director.

**Program of Study**

Students who wish to complete the requirements for the undergraduate certificate in women and gender studies must take six courses: WOM 201 or 202, the introductory course; WOM 301 or 302, an advanced interdisciplinary seminar; and four additional courses chosen from among other gender- and sexuality-related departmental offerings in the program and across the University. Among these courses, at least one must be taken in each of three broad disciplinary areas: social science, humanities, and science. Students may take gender-related courses in their major departments for certificate credit. In addition, certificate students are urged to incorporate issues related to feminism, women, gender, and/or sexuality into their senior thesis.

**Certificate of Proficiency**

Certificates of proficiency in the study of women and gender are issued upon graduation to students who have completed the program and have met the requirements of their departments.

A list of gender-related courses across the University may be found on the program website. These courses may be used to satisfy the program’s requirements with the director's approval.

**Courses**
WOM 201 Introduction to the Study of Gender  Fall SA
The study of gender from a multidisciplinary perspective, examined in terms of social behavior and symbolic representation. Topics selected from historical, economic, political, and artistic realms. Open to all undergraduates.  G. Salamon

WOM 202 Women in Politics, Media, and Contemporary U.S. (also POL 222)  Fall
An introduction to the various roles and experiences of women in contemporary American politics, media, and society. The course explores changing definitions of womanhood and women's identity during the late 20th and early 21st century. The class will discuss women who hold positions of leadership and relative privilege, and women who find themselves in the most powerless and difficult circumstances in contemporary America. It also explores cross-cutting issues of class, race, sexuality, gender identity, and faith to help understand the many experiences of women in America. One 90-minute lecture, one 90-minute preceptorial.  M. Harris-Lacewell

WOM 212 Classical Mythology (see CLA 212)

WOM 221 Inequality: Class, Race, and Gender (see SOC 221)

WOM 225 Sex, Sexuality, and Gender (see SOC 225)

WOM 301 Evolution and the Behavior of the Sexes (see EEB 301)

WOM 302 Topics in the Study of Gender  Spring SA
Advanced seminar; focus changes from year to year. In general the seminar uses contemporary and classic works of feminist theory to examine ideas about gender that have shaped modern culture. Topics have included feminism and liberalism, literature and ideology, and psychoanalysis and feminism.  J. Delgado

WOM 306 Women and Film (also VIS 341)  Not offered this year LA
An exploration of the relationships between the idea of "woman" and the art of film. Issues addressed will include the role of woman as performer and director, questions of film genre, the identification of the female image as constitutive of the cinematic image, the historical and social dimensions of the female image projected in films of different times and different cultures. Film screenings, one three-hour seminar.  G. Marrone-Puglia

WOM 309 Topics in Judaic Studies (see JDS 301)

WOM 310 The Family in Jewish Tradition (see JDS 315)

WOM 311 Gender, Crime, Media, and Culture (also SOC 311)  Fall SA
The study of culture involves myriad approaches and methods, and attracts researchers in and outside sociology. This course aims to explore scholarship that draws, in different ways, on combined contributions from gender studies, criminology and deviance, media studies, and the growing field of cultural studies. Its goals are to increase your knowledge of issues in each of these sociological subfields; to explore theories and methods used by scholars in these areas; and to assist students in developing their own research projects. One three-hour seminar.  L. Chancer

WOM 312 Gender and Development in the Americas (see SOC 310)

WOM 313 An Introduction to Black Women's Studies (see AAS 311)

WOM 321 Topics in German Medieval Literature (see GER 321)

WOM 328 Women and Gender in Islamic Societies (see REL 328)

WOM 329 Psychology of Gender (see PSY 329)

WOM 330 The Invention of Literature and Culture in France (see FRE 321)

WOM 331 Sex and Gender in the Ancient World (see CLA 329)

WOM 337 Women, Gender, and Politics (see POL 335)

WOM 350 Topics in 19th-Century Art (see ART 343)

WOM 352 Topics in 17th- and 18th-Century French Literature (see FRE 352)

WOM 360 Women and American Religion (see REL 360)

WOM 384 Gender and Sexuality in Modern America (see HIS 384)

WOM 389 Women Writers of the African Diaspora (see ENG 389)

WOM 393 Gender and Science  Fall SA
An exploration of two aspects of the gender and science literature: the historical participation of women (and men) in scientific work and the feminist critique of scientific knowledge. The seminar will explore ways in which women have
been systematically excluded from science and assess the problems with that thesis. One three-hour seminar. A. Creager

**WOM 399 The Female Literary Tradition (see ENG 388)**

**WOM 400 Contemporary Feminist Theory  Spring**

Addresses the question: What is feminism? Going back to the beginnings of contemporary feminist thought, the course will proceed through the variety of feminist approaches that have marked the study of art, literature, cinema and popular culture, history, politics, and society since the 1970s. One three-hour seminar. G. Salamon

**WOM 401 Seminar. Types of Ideology and Literary Form (see COM 401)**

**WOM 420 Born in the U.S.A.: Culture and Reproduction in Modern America (also SOC 420)  Spring SA**

Reproduction is a basic biological process, as well as a fundamental one for all societies. While the biology of human reproduction is universal across time and place, cultural norms and social institutions powerfully inflect and shape the experience of pregnancy and childbirth in every society. This course investigates the history and sociology of reproduction, focusing on the contemporary United States, but with an eye toward other societies for comparison. How, why, and for whom does birth matter? How do reproductive practices reflect gender, race, and class? The course examines the culture, politics, and economics of reproduction. E. Armstrong

**WOM 451 Special Topics in Public Affairs (see WWS 452)**
Woodrow Wilson School of Public and International Affairs

**Dean**
Christina H. Paxson

**Associate Dean**
Nolan M. McCarty

**Departmental Representative**
Brandice Canes-Wrone

**Director of Graduate Studies**
Christopher F. Chyba

**Professor**
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Larry M. Bartels, Public Affairs, Politics
Gary J. Bass, International Affairs, Politics
Roland Benabou, Public Affairs, Economics
Alan S. Blinder, Economics, Public Affairs
Carles Boix, Public Affairs, Politics
Charles M. Cameron, Public Affairs, Politics
Brandice Canes-Wrone, Public Affairs, Politics
Anne C. Case, Public Affairs, Economics
Miguel A. Centeno, Sociology, International Affairs
Thomas J. Christensen, International Affairs, Politics
Christopher F. Chyba, International Affairs, Astrophysical Sciences
John McGonon Darley, Psychology, Public Affairs
Angus S. Deaton, International Affairs, Economics
Paul J. DiMaggio, Sociology, International Affairs
Christopher L. Eisgruber, Public Affairs, University Center for Human Values
Edward W. Felten, Computer Science, Public Affairs
Aaron L. Friedberg, International Affairs, Politics
Noreen J. Goldman, Public Affairs, Demography
Bryan Grenfell, Public Affairs, Ecology and Environmental Biology
Gene M. Grossman, International Affairs, Economics
G. John Ikenberry, International Affairs, Politics
Harold James, History, Public Affairs
Robert O. Keohane, Public and International Affairs
Atul Kohli, International Affairs, Politics
Stephen M. Kotkin, History, International Affairs
Alan B. Krueger, Public Affairs, Economics
Paul R. Krugman, Public Affairs, Economics
David S. Lee, Public Affairs, Economics
John B. Londregan, International Affairs, Politics
Alexandre Mas, Public Affairs, Economics
Douglas S. Massey, Public Affairs, Sociology
Nolan M. McCarty, Public Affairs, Politics
Sara S. McLeanhan, Public Affairs, Sociology
Helen V. Milner, International Affairs, Politics
Andrew M. Moravsek, Politics, International Affairs
Michael Oppenheimer, International Affairs, Geosciences
Christina H. Paxson, Public Affairs, Economics
Stephen J. Redding, International Affairs, Economics
Uwe E. Reinhardt, Public Affairs, Economics
Thomas Romer, Public Affairs, Politics
Esteban Rossi-Hansberg, International Affairs, Economics
Cecilia E. Rouse, Public Affairs, Economics
Kim Lane Schepple, Public Affairs, University Center for Human Values, Sociology
James Trussell, Public Affairs, Economics
Frank N. von Hippel, Public and International Affairs
Keith A. Wailoo, History, Public Affairs
Mark W. Watson, Public Affairs, Economics
Lynn T. White III, International Affairs, Politics
Jennifer Widner, International Affairs, Politics
David S. Wilcove, Public Affairs, Ecology and Evolutionary Biology
Robert D. Willig, Public Affairs, Economics
Deborah J. Yashar, Public Affairs, Politics
Julian E. Zelizer, Public Affairs, History

**Visiting Professor**
Nannerl O. Keohane, Laurance S. Rockefeller Distinguished Visiting Professor of Public Affairs and the University Center for Human Values
Daniel C. Kurtzer, S. Daniel Abraham Visiting Professor in Middle East Policy Studies

**Associate Professor**
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Christina Davis, International Affairs, Politics
Denise L. Mauzerall, Public and International Affairs, Civil and Environmental Engineering
Daniel M. Oppenheimer, Psychology, Public Affairs
Markus Prior, Public Affairs, Politics
Emily Pronin, Psychology, Public Affairs
Alexander T. Toedorov, Psychology, Public Affairs

**Assistant Professor**
Daniela Campello, International Affairs, Politics
Sylvain Chassang, Public Affairs, Economics
Rafaela M. Dancygier, International Affairs, Politics
Jan DeLoecker, Public Affairs, Economics
Taryn L. Dinkelman, Public Affairs, Economics
Alexander Glaser, International Affairs, Mechanical and Aerospace Engineering
Oleg Itskhoki, International Affairs, Economics
Ilyana Kuziemko, Public Affairs, Economics
Amy E. Lerman, Public Affairs, Politics
Elizabeth Levy Paluck, Psychology, Public Affairs
Grigore Pop-Eleches, Public Affairs, Politics
Georges Renier, Public Affairs, Sociology
Jacob N. Shapiro, International Affairs, Politics
Bradley R. Simpson, History, International Affairs
Keren Yarhi-Milo, International Affairs, Politics

**Instructor**
Alexander Hirsch, also Politics

**Lecturer with Rank of Professor**
Stanley N. Katz, Public and International Affairs
Adel A. Mahmoud, Molecular Biology

**Lecturer**
Barbara K. Bodine, Public and International Affairs
Joshua B. Bolten, Public and International Affairs
Edward Freeland, Public and International Affairs
James I. Gadsden, Public and International Affairs
Jean Baldwin Grossman, Public and International Affairs, Economics
Jeffrey S. Hammer, Public and International Affairs

http://www.princeton.edu/ua/
The Woodrow Wilson School of Public and International Affairs is Princeton's memorial to a distinguished alumnus who was president of the University, governor of New Jersey, and president of the United States. The purpose of its undergraduate program is to carry forward Woodrow Wilson's interest in preparing students for leadership in public and international affairs.

The school is policy-oriented and emphasizes problem solving. The undergraduate program therefore stresses a course of study designed to familiarize students with social science and other disciplines applicable to the solution of public problems. For purposes of concentration in upperclass years, the school is the equivalent of a department of instruction.

Courses offered by the Woodrow Wilson School, as well as courses chosen from the economics, history, politics, sociology, and psychology departments, form the plan of study for undergraduates in the school. Policy seminars and the senior thesis are an integral part of the program. A final departmental exercise at the end of senior year tests the student's ability to integrate the senior thesis with other course work.

Policy Seminars. The most distinctive aspect of the undergraduate experience in the school are the junior policy seminars, called task forces or policy conferences. Woodrow Wilson School concentrators and certificate students enroll in one seminar each semester of their junior year. The policy conferences and task forces are very similar, except for their size; the conferences typically enroll 12 to 15 students, the task forces 6 to 10 students. The topics for the policy conferences are therefore somewhat broader.

In each of these exercises, juniors work together with a faculty director, one or two seniors, and often a graduate student toward proposing solutions to current problems in public and international affairs. Each junior conducts research on a topic carefully chosen to shed light upon the larger problem that is central to the group. Topics for independent work are therefore derived from the overall needs of the seminar. The tools students employ in their seminar are likewise a function of the topics to which the group's work is addressed. Woodrow Wilson School students are thus encouraged to use any intellectual discipline or skill that may help solve a problem.

In the seminars, faculty directors and guest lecturers provide background information, bibliographic references, and ideas on possible interviewees, but the students are expected to take responsibility for both the organization and the outcome of the exercise. The principal collective product is a final report with policy recommendations drafted after debates among the entire group.

Admission. Princeton sophomores may apply for admission to the Woodrow Wilson School for the final two years of their undergraduate education. Applications are reviewed and decisions made by a faculty committee. The curriculum and the procedure for admission are discussed with interested sophomores at a meeting held early in the spring term.

Each year the school admits 90 juniors, who are selected on the basis of their academic record and strength of preparation, the perspectives and experiences they would bring to the school, and their commitment to the study of public and international affairs. Among the 90 juniors admitted each year, most will be regular concentrators. A smaller number will be admitted as certificate students.

Information and Departmental Plan of Study

Prerequisites

There are no fixed course prerequisites for admission to the school. The Admissions Committee looks for candidates whose prior academic and nonacademic experience give evidence of interest in public or international affairs and the ability to do well in the courses and independent work comprising the school's curriculum. Before applying, a student should take social science, humanities, natural science, or engineering courses focusing on public concerns. Some knowledge of economics and of the workings of American political and social institutions, together with an acquaintance with the history of the United States and other nations, is strongly recommended. Applicants with interests in policy problems that demand technological expertise should demonstrate a strong background in science, engineering, or mathematics. While a student must fulfill the normal language requirement for graduation, there is no language requirement for admission to the school.

Program of Study

Upon admission, the student prepares a program for the junior and senior years in consultation with the program director. Departmental courses should form a coherent program of study, combining both techniques of analysis from the social science disciplines and courses that give the student substantive depth in a particular policy area.

Concentrators must take the core course, WWS 300 Democracy, and at least three other Woodrow Wilson School courses. They must also take at least three courses, 300-level or above, in one of the following departments: economics, history, politics, psychology, or sociology. In addition, students must take at least one course 300 or above in politics, economics, and history, and one in either psychology or sociology. Finally, the Woodrow Wilson School has ethics and methods requirements:
**Ethics Requirement.** Concentrators and certificate students must take one of the following courses: WWS 301, CHV 310, PHI 202, PHI 307, PHI 309, PHI 319, POL 313, REL 261, REL 363. Students intending to apply to the Woodrow Wilson School may want to fulfill their distribution requirements in ethical thought and moral values (EM) by selecting courses from the Woodrow Wilson School course offerings.

**Methods Requirement.** By the end of their junior year, concentrators and certificate students must take one of the following courses: WWS 332, WWS 333, ORF 245, ECO 302, ECO 312, ECO 313.

**Independent Work**

For WWS concentrators, the policy seminars fulfill the junior independent work requirement of the University. The senior thesis constitutes the independent work of the senior year. The senior thesis is a scholarly paper related to the subject in public or international affairs that is of greatest interest to the student. It is based on extended research and is the major project of the senior year.

**Senior Departmental Examination**

The Woodrow Wilson School senior comprehensive examination is an oral defense of the thesis that also tests the student's ability to integrate the senior thesis with other course work.

**Study Abroad**

Although not a requirement, study abroad has become a regular part of the Woodrow Wilson School program. Study abroad during junior year is limited to those universities at which task forces may be offered. In recent years task forces have been offered at the University of Cape Town in South Africa; Oxford University in England; the Institute of Political and Social Sciences in Paris, France; the American University in Cairo, Egypt; Fudan University in Shanghai, China, and the University of Havana, Cuba.

**Certificate Program.** Princeton sophomores who intend to concentrate in other departments such as science or engineering may be admitted to the Woodrow Wilson School and awarded the school's certificate upon graduation. Certificate students apply to the school in the same manner as concentrators and are considered for admission on the same basis. They have fewer course requirements than concentrators.

Certificate students complete their junior independent work in their home departments. They also take a policy seminar each semester of their junior year and receive course credit for them. Certificate students fulfill the senior thesis requirement in one of two ways: (1) writing a senior thesis in their home department that has a substantial public policy component; (2) writing a senior thesis in the Woodrow Wilson School.

**Research.** The program awards several scholarships each year to students from any department for travel and living expenses related to senior thesis research in public policy. The program also awards several scholarships to Woodrow Wilson School students participating in public policy internships during the summer between the junior and senior years.

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**Courses**

**WWS 300 Democracy  Fall SA**

An introduction to current empirical and theoretical work done in politics on the following topics: the formation of the state, dictatorships, democratic transitions and democratic consolidation, electoral representation and political accountability, the relationship between democracy and redistribution, and the role of constitutional structures in the aggregation of preferences and in policy making. Two lectures, one preceptorial. 

**WWS 301 Ethics and Public Policy (also POL 308/CHV 301)  Spring EM**

This course examines basic ethical controversies in public life. What rights do persons have at the beginning and end of life? Do people have moral claims to unequal economic rewards or is economic distribution properly subject to political design for the sake of social justice? Do we have significant moral obligations to distant others? Other possible topics include toleration (including the rights of religious and cultural minorities), racial and gender equity, and just war. Two lectures, one preceptorial.

**WWS 304 Science, Technology, and Public Policy  Not offered this year SA**

An exploration of the issues encountered by policymakers in scientific and technical areas of public policy. Topics include: the importance of understanding the scientific structure of a problem, critical ethical and technical assumptions, risk assessment, interest groups and policy alternatives, the roles and responsibilities of technical experts. Case studies and policy debates include: nuclear weapons policy, climate change, alternative energy futures, R and D policy, genetic engineering, and cancer risks. Two lectures, one preceptorial.

**WWS 306 Public Leadership and Public Policy (also POL 329)  Spring SA**

Considers the intellectual (ethical and legal) frameworks for making leadership decisions on major public issues in the United States, as well as the operational frameworks for effective and responsible public leadership. Students review

http://www.princeton.edu/ua/
historical cases from federal and state government, discuss the policy decisions made in each case, and examine the decision-making processes in view of these frameworks. Two 90-minute seminars. N. Scovronick

**WWS 307 Economics and Public Policy (also ECO 349)**  Fall SA

Evaluation of public policies in terms of economic efficiency and equity. The course will examine the conditions that lead to efficient markets and those that lead to market failure, as well as the implications for government policy. It will discuss both existing and proposed public policies in a number of areas, including education, health care, poverty, financial markets, the environment, and industrial development. Prerequisites: Economics 101 and 102, or instructor's permission. Two lectures, one preceptorial. E. Bogan

**WWS 309 Media and Public Policy (also SOC 313)**  Fall SA

Introduction to communications policy and law, covering such topics as freedom of the press and the development of journalism; intellectual property; regulation of telecommunications, broadcasting, and cable; and policy challenges raised by the Internet and the globalization of the media. P. Starr

**WWS 310 The American City (also POL 339)**  Not offered this year SA

An introduction to major theories of the growth and structure of cities, and an analysis of contemporary urban policy issues in the United States. We begin with a set of political, social, and economic explanations for the formation and character of American urban environments. To evaluate these theories, the evolution and structural change in United States cities, particularly in the postwar period, will be examined. The course is designed to provide students with the background necessary to analyze urban policies and the prospects for American cities in the next century. Two lectures, one preceptorial. Staff

**WWS 312 The Psychology of Decision Making and Judgment (also PSY 321)**  Spring EC

An introduction to the logic of decision making and reasoning under uncertainty. Focus on psychological mechanisms that govern choice and judgment and on characteristic errors found in intuitive judgment and choice. Discussion of divergence from the model of rational agent often assumed in social science theory and economics. Rules governing pleasure, pain, and well-being provide background for analysis of the rationality of some individual choices and for the evaluation of general policies that affect human welfare. Prerequisite: introductory statistics for social science or instructor's permission. E. Shafir

**WWS 313 Peacemaking (also POL 387)**  Not offered this year SA

The course begins with a discussion of civil and international conflict and the history of making peace. It then focuses on contemporary civil wars and the lessons from an array of United Nations and other efforts to make peace, including the Gulf War, Cambodia, El Salvador, Somalia, and the former Yugoslavia. One lecture, one two-hour seminar. W. Nash

**WWS 315 Bioethics and Public Policy**  Fall SA

Focuses on the relationship between selected issues in bioethics and their implications for public policy. Issues include the ethical responsibilities of doctor and patient to each other; the ethics of research with human subjects; the ethics of death and dying; the ethics of reproduction; eugenics; access to health care; the role of bioethics committees; and animal experimentation. Considers the history of cultural attitudes toward these matters, the contemporary policies designed to deal with them, and the landmark court cases that have focused on bioethics. One three-hour seminar. H. Shapiro

**WWS 316 Health and the Environment**  Fall SA

Explores population history and its relationship to health; ecology, economics, and health; ecosystem dynamics; drought, famine, and health; psychosocial environments and physiology; well-being and positive health; and social stratification and morbidity. Staff

**WWS 317 Race and Public Policy (also SOC 312/AAS 317)**  Spring SA

Analyzes the historical construction of race as a concept in American society, how and why this concept was institutionalized publicly and privately in various arenas of U.S. public life at different historical junctures, and the progress that has been made in dismantling racialized institutions since the civil rights era. One three-hour seminar. D. Massey

**WWS 320 Human Genetics, Reproduction, and Public Policy (also MOL 320)**  Spring SA

Advances in genetic and reproductive technologies will soon make possible rapid, complete genetic screens on individuals and cells and, ultimately, permit us to direct our own evolution as a species. The course presents the science behind genetic screening, therapy, and enhancement, as well as cloning and the manipulation of human embryos, along with an analysis of anticipated uses by individuals and corporations. Discussions will focus on the impact of these revolutionary technologies on society as a whole, as well as on approaches to policy making. Prerequisites: MOL 209 or 214, or AP credit in biology, or instructor's permission. L. Silver

**WWS 321 Theory and Practice of International Diplomacy (also POL 389)**  Not offered this year

This course examines the development, challenges, and multiple complexities of international diplomacy. It addresses three dimensions: the conceptual aspects of diplomacy in the international system; the historic development of international diplomacy; and the intricacies of international negotiations. Two lectures, one preceptorial. W. Danspeckgruber
WWS 322 The Politics of Policy Making (also POL 341)  Not offered this year SA
How and why do American policymakers enact the policies that they do? This seminar first explores the environment in which policymakers operate, with special attention to public opinion and elections, and then examines how Congress, the president, and other political actors make decisions. One three-hour seminar. R. Arnold

WWS 324 Education Policy  Fall SA
This course will consider some of the major issues in education policy, with particular focus on attempts to secure equal educational opportunity. It will include discussions of desegregation and resource equity, education for immigrants and the handicapped, school choice, and school reform. Two 90-minute seminars. Staff

WWS 325 Civil Society and Public Policy (also AMS 350)  Fall SA
Civil society is the arena of voluntary organizations (churches, social welfare organizations, sporting clubs) and communal activity. Scholars now tell us that such voluntary and cooperative activities create "social capital"--a stock of mutual trust that forms the glue that holds society together. The course will be devoted to the study of the history of these concepts, and to the analysis of their application to the United States and other societies. This will be an interdisciplinary effort, embracing history, philosophy, anthropology, sociology, and other disciplines. One three-hour seminar. S. Katz

WWS 327 Pharmaceutical Research and Health Policy (also CHM 443)  Not offered this year SA
Examines the process by which drugs are discovered, tested on human populations, and approved for sale. Analyzes the role of the Food and Drug Administration in guaranteeing the safety of medication, as well as the role of Congress in providing oversight, governing prices, and regulating competition. Examines the legal, political, and economic context in which health policy decisions are made in this area. Two 90-minute seminars. Staff

WWS 332 Quantitative Analysis for Public Policy  Fall, Spring QR
The course will review the principal methods of data analysis and applied statistics used in political, economic, psychological, and policy research, including multiple regression, analysis of variance, and nonparametric methods. These methods will be introduced in the context of case studies that will incorporate research design, data collection, data management, exploratory and inferential analyses, and the presentation of results. Two lectures, one preceptorial. G. Lord

WWS 333 Claims and Evidence in Policy Research  Fall, Spring SA
Teaches concentrators the foundations of research design, including formulating researchable questions from topics and how to use empirical evidence to evaluate claims. Students are exposed to a variety of substantive problems and research approaches that use qualitative and quantitative methods through critical reading of social science literature. Covers several practical aspects of research, including ethics and regulations concerning research with human subjects; library search tools and reference sources in social sciences; and resources for acquiring data and conducting statistical analyses. Two lectures, one preceptorial. Staff

WWS 334 Global Environmental Issues (see CEE 334)

WWS 335 Current and Future Climate (see GEO 366)

WWS 340 The History of Financial Crises (also HIS 466)  Fall SA
This course takes historical examples of financial crises over the past four centuries, including the tulip mania, 19th-century business cycles, international debt defaults, the 1907 crisis, the Great Depression, the Latin American debt crisis of the 1980s, the Asia crisis of 1997, and the post-2007 global financial crisis. Are there commonalities as well as differences in the experience of crisis? How do market participants, policymakers, and academic observers go about learning lessons and drawing conclusions from financial crises? Is there a need for a lender of last resort, domestically and internationally? One three-hour seminar. H. James

WWS 401 Policy Seminars  Fall
Open only to students enrolled in the school. (See description above.) Juniors who are concentrators in the school must register for the policy task force as "Junior Independent Work." Certificate students and seniors should register for WWS 401 or 402 as a course rather than junior independent work. Staff

WWS 402 Policy Seminars  Spring
Open only to students enrolled in the school. Juniors who are concentrators in the school must register for the policy task force as "Junior Independent Work." Certificate students and seniors should register for 401 or 402 as a course rather than junior independent work. Staff

WWS 451 Special Topics in Public Affairs  Fall SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. P. DiMaggio, D. Dobkin

WWS 452 Special Topics in Public Affairs (also POL 326/WOM 451)  SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. N. Scovronick
WWS 456 Special Topics in Public Affairs  Fall SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. H. Price

WWS 457 Special Topics in Public Affairs (also POL 398)  SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. R. Keohane

WWS 462 Special Topics in Public Affairs (also EAS 462/POL 462)  Fall SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. E. Revere

WWS 466 Special Topics in Public Affairs (also NES 466/POL 466)  SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. D. Kurtzer

WWS 472 Special Topics in Public Affairs  SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. P. Krugman

WWS 475 Special Topics in Public Affairs (also POL 475)  SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. A. Friedberg, G. Ikenberry

WWS 476 Special Topics in Public Affairs (also ECO 354)  Fall SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. W. Frist, S. Kotkin, J. Hammer

WWS 477 Special Topics in Public Affairs (also POL 477)  SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. C. Davis

WWS 478 Special Topics in Public Affairs  Fall SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. S. Kotkin

WWS 481 Special Topics in Public Affairs  Fall SA
Each term special courses will be offered on topical issues of concern for public policy. Course form may be seminar, workshop, lecture with preceptorials, or other combinations. These courses are open to students of all departments. J. Bolten

WWS 491 Critical Perspectives on Global Health and Health Policy (see GHP 350)

WWS 493 Technical Innovation and Foreign Policy (see EGR 492)

WWS 497 Race and the American Legal Process: Emancipation to the Voting Rights Act (see AAS 362)
Princeton Writing Program

Director
Amanda Irwin Wilkins

Associate Director
Andrea M. Scott
Keith M. Shaw
Judith A. Swan

Executive Committee
Jill S. Dolan, English, Lewis Center for the Arts
Jeff Dolven, English
James L. Gould, Ecology and Evolutionary Biology
Sharad Malik, Electrical Engineering
Thomas J. Silhavy, Molecular Biology
David S. Wilcove, Woodrow Wilson School, Ecology and Evolutionary Biology
Stacy E. Wolf, Lewis Center for the Arts, Theater

Lecturer
Raphael C. Allison
Alan Allport
Ali Aslam
Anne Bourneuf

James Byrne
Christopher W. Close
Emily Coit
Anne DeWitt
Kristin Dombek
Stephen Donatelli
Megan Foreman
Rachel Galvin
Elena Glasberg
Rebekah Peeples Massengill
Noelle J. Molé
Andrew Mossin
Ken Nielsen
Penelope Sinanoglou
Gregory Spears
Olivia Weisser
William Westerman
C. Leanne Wood
Marion C. Wrenn

Writing is integral to intellectual pursuits of every kind, whether in the humanities, the social or natural sciences, mathematics, or engineering. The Princeton Writing Program was established to encourage excellence in writing at the University through writing seminars for freshmen and a Writing Center for all students.

Writing seminars have a common goal--for students, through practice and guidance, to master essential strategies and techniques of college-level inquiry and argument. Students learn to frame interesting questions, make original claims, structure complex ideas, integrate sources of various kinds, and revise for greater cogency and clarity. In addition to writing frequently and completing four major assignments of increasing complexity, students receive intensive instruction in academic writing, submit drafts for review, and attend one-on-one conferences with their instructor. They also learn to navigate the University library and receive instruction in essential library research skills. To provide students with a worthwhile occasion for writing, each seminar is based on an intellectually stimulating topic, chosen specifically to animate students' writing with compelling questions, debates, and problems. Among the many different writing seminars offered are courses on important historical figures and events, urgent social issues, scientific breakthroughs, and influential artistic traditions. The writing seminar is required of all freshmen, who are assigned in late July to a term, fall or spring, in which to take the course and who make their topic selection based on their interests.

The Writing Center offers student writers free one-on-one conferences with experienced fellow writers trained to consult on assignments in any discipline. Students may bring writing projects to the Writing Center in any form--ideas, rough notes, or a first or full draft. Writing Center fellows offer advice about the writing process, from getting started to revising, and can work with students on essential elements of academic writing, such as thesis, organization, use of sources, and clarity of ideas and sentences. Appointments may be scheduled online.

For more information about the Princeton Writing Program, visit the program website.

http://www.princeton.edu/ua/
Councils and Institutes

The following councils have been created to coordinate and foster interdepartmental teaching and research in certain important areas. Each council develops programs and activities appropriate to its responsibilities. Effective in 1971 the councils were authorized to propose appointments to the faculty for limited duration or on a part-time basis. They may also propose related courses within the curriculum. Thus the councils may supplement existing offerings or take the lead in exploring new and promising areas. The Committee on Humanistic Studies acts for the Council of the Humanities when proposing such appointments or courses.

Council of the Humanities
Council on Science and Technology
Lewis-Sigler Institute for Integrative Genomics
Princeton Institute for International and Regional Studies (PIIRS)
Princeton Institute for the Science and Technology of Materials (PRISM)
Princeton Neuroscience Institute (PNI)
Council of the Humanities

Chair
Gideon A. Rosen

Executive Committee
Angela N. H. Creager, History
Denis C. Feeney, Classics
Eddie S. Glaude Jr., Religion and African American Studies
Gabriela Nouzeilles, Spanish and Portuguese Languages and Cultures
Susan A. Stewart, English
Michael A. Wachtel, Slavic Languages and Literatures
Edwin S. Williams, Linguistics
Michael G. Wood, English, Comparative Literature

Professor
Robert A. Freidin, also Linguistics
Adele E. Goldberg, also Linguistics
Alexander Nehamas, also Philosophy, Comparative Literature
Edwin S. Williams III, also Linguistics

Lecturer
Sarah M. Anderson, also English
David N. Cannadine

Long-Term Visiting Fellow
Adam Becker
Stephen Menn
Juliet Mitchell
Mark Morris
João Moreira Salles

Ferris Professor
Lisa Belkin
Elaine Sciolino
James Steele
Jon Wertheim

Richard Bernstein
Joe Richman
John McPhee
Evan W. Thomas

McGraw Professor in Writing
Anne Hull

Princeton Society of Fellows in the Liberal Arts
Lucia Alais
On Barak
Cullen Blake
Eduardo Canedo
Yaacob Dweck
Amin Ghaziani
Simon Grote
Christine Halperin
Russell J. Leo
Ricardo Montez
Nikolaos Panou
Hester E. Schadee
Janet Vertesi
Kerim Yasar

Committee on Humanistic Studies
Angela N. H. Creager, History
Denis C. Feeney, Classics
Eddie S. Glaude Jr., Religion and African American Studies
Gabriela Nouzeilles, Spanish and Portuguese Languages and Cultures
Susan A. Stewart, English
Michael A. Wachtel, Slavic Languages and Literatures
Edwin S. Williams, Linguistics
Michael G. Wood, English, Comparative Literature

The Council of the Humanities was established in 1953 by the trustees and faculty of the University for the purpose of fostering significant teaching and research in the humanities. In all of its endeavors the council aims to encourage cooperation among departments, both within the humanities and across the University; to foster interdisciplinary teaching and scholarship; to focus attention on the core concerns of humanistic scholarship; and to forge enduring links between the humanities at Princeton and the wider culture.

Membership in the humanities council is open to chairs and directors of all humanities departments, programs and committees, the dean of the School of Architecture, the dean of the School of Engineering and Applied Science, and one representative each from the natural and social sciences. This group meets periodically to discuss matters affecting the humanities at Princeton and to advise the chair, the deans, and the president on policy issues.

The ongoing programs of the council are overseen by an executive committee consisting of members of the faculty appointed by the dean of the faculty and representing a broad spectrum of the council's activities. These activities include a program of Visiting Fellows--distinguished scholars from around the world who spend a period of time in residence in Princeton participating in the life of the University; the Old Dominion Professorships, a small group of faculty members in the humanities and the humanistic social sciences who devote a year to intensive research and discussion; and the Old Dominion Faculty Fellows, members of the faculty from all four divisions who come together for monthly seminars. The humanities council serves as a forum for a number of interdepartmental programs and committees, including American studies, the Ancient World, Canadian studies, classical philosophy, East Asian studies, European cultural studies, film studies, Hellenic studies, humanistic studies, Irish studies, Italian studies, Judaic studies, Latin American studies, linguistics, medieval studies, political philosophy, Renaissance studies, and the University Center for Human Values. The council sponsors the program of Behrman Associate Professors, the Eberhart L. Faber IV Lectures, the Belknap Visitors in the Humanities, the Gauss Seminars in Criticism, and a series of faculty seminars taught by visiting fellows and other scholars. The Edmund N. Carpenter II Class of 1943 chair in the humanities brings a senior scholar to Princeton on a permanent shared appointment between a department and the council. The humanities council is also home to the Princeton Society of Fellows in the Liberal Arts, in which postdoctoral fellows spend three years on campus teaching and pursuing research.

http://www.princeton.edu/ua/
The Council of the Humanities oversees the Ferris Professorship of Journalism, the Harold W. McGraw Jr. Seminar in Writing and Publishing, and the Robbins Seminar in Writing, under whose auspices distinguished journalists and nonfiction writers teach undergraduate seminars each year. The council also sponsors interdisciplinary courses under the aegis of the Program in Humanistic Studies. For information about these HUM and JRN courses, see the description under the Program in Humanistic Studies.

Committee for the Fund on Canadian Studies. Established through the generous support of Princeton’s Canadian alumni and the government of Canada to encourage and support expanded teaching and research on Canada at Princeton University, the Fund for Canadian Studies is administered by an advisory committee of interested faculty members under the auspices of the Council of the Humanities.

The fund serves as a resource for Canadian-focused academic activities, such as the development of new courses (including those of an interdisciplinary and comparative nature), individual research projects, conferences, guest lecturers, and speaker and seminar series.

Advisory Committee on Canadian Studies: Jeremy Adelman, director, history; Gary Bass, Woodrow Wilson School; Natasha Lee, French and Italian; Alan Patten, politics; Gideon Rosen, Council of the Humanities.

Committee for the Fund for Irish Studies. The Fund for Irish Studies affords all Princeton students, and the community at large, a wider and deeper sense of the languages, literatures, drama, visual arts, history, politics, and economics not only of Ireland but of “Ireland in the world.” The mission is twofold: to rationalize and expand existing courses taught by current members of the faculty, and to offer a series of public lectures, literary readings, conferences, exhibitions, screenings, and theatrical performances.

Advisory Committee for the Fund for Irish Studies: Peter Brown, history; Michael Cadden, theater; Linda Colley, history; Lawrence Danson, English; Maria DiBattista, English and comparative literature; Denis Feeney, classics; Colum Hourihane, Index of Christian Art; Paul Muldoon, chair, Lewis Center for the Arts, creative writing; Philip Pettit, politics; Carol Rigolot, Council of the Humanities; Gideon Rosen, Council of the Humanities; Sean Wilentz, history and American studies; Michael Wood, English.
Council on Science and Technology

**Director**
Bonnie L. Bassler

**Executive Committee**
Bonnie L. Bassler, Molecular Biology  
Manjul Bhargava, Mathematics

The Council on Science and Technology, in cooperation with the science and engineering departments, fosters the teaching of science and technology courses for nonscience students. A principal responsibility of the council is to encourage the development of high-quality courses in which undergraduates in the humanities and social sciences can satisfy the University science distribution requirement. The council assists faculty members in developing new courses and revising existing ones and encourages the exchange of ideas and experiences among faculty members teaching science to nonscience students.

The council also supports upper-level courses in science and technology that address cultural and societal issues. In addition to courses taught by Princeton faculty members, it sponsors courses taught by distinguished scientists from other institutions.

In addition, every science department has courses that fulfill the science and technology area requirement (as indicated by an ST designation). There are also science and technology courses that do not satisfy the science requirement that might be of interest to nonscience students. Refer to Course Offerings [http://registrar.princeton.edu/course-offerings/] and the council’s website.

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**Courses**

**STC 349 Science Journalism (also JRN 349)  Spring SA**

This course will help students (science majors and non-majors alike) to develop their skill at writing about science and technology for non-technical readers. Through class discussion, analysis of published writing, and especially through extensive writing exercises, participants will learn to present complex information with both clarity and style. Prerequisite: fulfillment of the writing requirement. One three-hour seminar. *M. Lemonick*

**STC 398 Health and Human Rights in the World Community  Not offered this year SA**

This seminar will examine the relationship between health and human rights. It will provide an overview of human rights violations in the world today and an analysis of their health consequences. The course will consider how individual and community health can be improved by protecting and promoting human rights. It will also evaluate the role of health professionals in caring for victims of human rights abuses, documenting the health consequences of human rights violations, and participating in human rights advocacy and education. One three-hour seminar. *A. Keller*

**STC 460 Diseases in Children: Causes, Costs, and Choices** (see MOL 460)

http://www.princeton.edu/ua/
The Lewis-Sigler Institute for Integrative Genomics was established with a mandate to develop novel approaches to the study of biology in a post-genome-sequence era. The institute comprises a multidisciplinary group of scientists and students working at the interface of biology and the more quantitative sciences and computation. This is meant to include, among others, the fields of genomics, biophysics, computational neurobiology, systems biology, population biology and quantitative genetics, molecular evolution, computational biology, and microbial interactions. Unlike other genomics institutes, the Lewis-Sigler Institute does not focus on generating large amounts of sequence data. Rather, the focus is to extract from these enormous amounts of data an understanding of how biological systems organize and integrate complex processes.

The institute consists of 12 to 15 research groups. All tenured and tenure-track faculty in the institute have appointments in one of the University's departments; among them are molecular biology, ecology and evolutionary biology, physics, chemistry, computer science, chemical and biological engineering, and potentially others.

The institute's mandate includes innovation in teaching, specifically the teaching of biology integrated fully with the more quantitative sciences, mathematics, and computation. Education is carried out formally through the undergraduate certificate and graduate Program in Quantitative and Computational Biology (QCB).

In sum, the Lewis-Sigler Institute is a hub of intellectual activity for quantitatively oriented biologists at every level: undergraduate, graduate, and faculty.
The Princeton Institute for International and Regional Studies (PIIRS) promotes interdisciplinary research and teaching on issues of global significance. It supports a number of the University's regional studies programs, including African studies, South Asian studies, European politics and society, and Russian and Eurasian studies. PIIRS is also the home of the Program in Translation and Intercultural Communication. These five certificate programs offer courses, research opportunities, and periodic lectures open to the entire Princeton community and host visiting scholars from around the world annually.

PIIRS is responsible for the University's Global Seminars, six-week courses taught by Princeton faculty in a variety of overseas locations each summer. These courses offer undergraduates the opportunity to study in cities off the beaten path (e.g., Hanoi, São Salvador da Bahia, Accra, Shanghai, and Seoul), where they learn the basics of the local languages, contribute through community service, and dwell on the history and culture of a society they will come to know well. Over the next decade, PIIRS will be developing Global Seminars led by faculty in all the University's disciplines, from the social sciences to the natural sciences, from the arts and humanities to engineering and architecture.

The institute provides extensive research resources to faculty and graduate students in the form of exploratory seminars (short-term brainstorming sessions with colleagues from around the world), research clusters (three-year projects that include residential fellowships), dissertation grants, and language study abroad. Because its mission is to enhance the capacity of Princeton's departments and programs to undertake international research and teaching, PIIRS cosponsors conferences, seminars, short-term visits of distinguished scholars from around the world, and curriculum development grants to assist in the preparation of new undergraduate courses.

PIIRS is the sponsoring institution of World Politics, one of the premier journals in political science. The journal publishes peer-reviewed research that addresses salient theoretical and empirical questions on topics in international relations, comparative politics, and various related subfields.
The Princeton Institute for the Science and Technology of Materials (PRISM) is a multidisciplinary research and education center in the fields of materials science and photonics. Its mission includes graduate and undergraduate education and research that will have a long-term impact on society. Key elements of PRISM are the integration of the sciences and engineering, with work spanning from fundamental materials theory through device and system applications, and the integration of our work with that outside Princeton. Departments participating in PRISM include chemical and biological engineering, chemistry, civil and environmental engineering, computer science, electrical engineering, geosciences, mechanical and aerospace engineering, molecular biology, and physics. Education is carried out formally through the undergraduate Program in Materials Science and Engineering, joint Ph.D. programs, and course curriculum for graduate students, and the ability for all students to participate in the research programs of the institute.

A special focus of PRISM is the rapidly growing intersection of hard materials (such as conventional semiconductors, metals, ceramics) and soft materials (polymers, organic and biological molecules, fluids, cells), and all of the fields that fundamentally underpin this work. Work at this intersection includes organic and large-area electronics, self-organizing structures, biomedical imaging, nanostructures, microfluidics, bio-chips, quantum information materials and systems, mid-infrared optics, sensor networks, and many emerging opportunities.

Critical to our interaction both within Princeton and outside of Princeton are professionally staffed central research facilities. These include the Micro/Nano Fabrication Lab and the Imaging and Analysis Center.
Princeton Neuroscience Institute (PNI)

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David W. Tank, Molecular Biology, Princeton Neuroscience Institute

Director of Graduate Studies
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Samuel S. H. Wang, Molecular Biology, Princeton Neuroscience Institute

Associated Faculty
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Jonathan T. Eggenschwiler, Molecular Biology
Alan Gelperin, Molecular Biology, Princeton Neuroscience Institute
Philip J. Holmes, Mechanical and Aerospace Engineering
Coleen T. Murphy, Molecular Biology, Lewis-Sigler Institute for Integrative Genomics

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Understanding how the brain works, and how it gives rise to mental function, is one of the most exciting challenges in science. This effort is inherently interdisciplinary, and the Princeton Neuroscience Institute (PNI) draws upon developments in molecular and cell biology, genetic engineering, cognitive and social psychology, as well as applied math, chemistry, computer science, economics, engineering, and physics, for new methods of measuring and understanding neural function.

One of the goals of the institute is to understand how the whole system works together as one unit from all of the very complex interactions and underlying parts. Princeton collaborators utilize their expertise in quantitative disciplines to answer these questions. There is a particular emphasis on the close connection between theory, modeling, and experimentation using the most advanced technologies.

One of the most important objectives of the institute is to provide Princeton undergraduates with training at the forefront of neuroscience. The program encourages the serious study of molecular, cellular, developmental, and systems neuroscience as it interfaces with cognitive and behavioral research. Current research at Princeton includes molecular, genetic, and pharmacologic analysis of learning and memory; the role of neural stem cells in the adult brain; viral infections of the nervous system; optical and electrical recordings of neuronal function; brain imaging studies of cognitive functions, such as attention and memory in humans; and mathematical and computational analysis of neural network function. A more extensive listing of research opportunities in neuroscience is available online.

In addition to providing centralized curricular resources for students and faculty, the institute offers shared scientific facilities and access to state-of-the-art instruments for studying the brain, including a Siemens 3T MAGNETOM Allegra head-only MR system and laser scanning confocal microscopes, to name a few.

http://www.princeton.edu/ua/