

NORTHWESTERN

Undergraduate Catalog 2010–11

Northwestern
Undergraduate Catalog 2010–11
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This catalog for the academic year beginning September 1, 2010, contains University regulations and information about the programs and courses offered by the Judd A. and Marjorie Weinberg College of Arts and Sciences, School of Communication, School of Education and Social Policy, Robert R. McCormick School of Engineering and Applied Science, Medill School of Journalism, and Henry and Leigh Bienen School of Music and about cross-school undergraduate programs. Failure to read this catalog does not excuse a student from knowing and complying with its content.

Northwestern University reserves the right to change without notice any statement in this catalog concerning, but not limited to, rules, policies, tuition, fees, curricula, and courses. In exceptional circumstances, Northwestern University reserves the right, at its sole discretion, to waive any documentation normally required for admission. It also reserves the right to admit or deny a student admission whenever it believes that it has sufficient evidence for the decision.

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Academic Calendar 2010–11

Fall Quarter

September 2010

1	Wednesday	Tuition due
10	Friday	Continuing student registration ends for fall quarter
14	Tuesday	New student orientation begins
17	Friday	New student registration for fall quarter
21	Tuesday	Classes for fall quarter begin 8 a.m.
27	Monday	Last day for late registration, adding any course, or changing a section

October 2010

29	Friday	Last day for dropping any course Last day to withdraw without academic review
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November 2010

15	Monday	Continuing student registration for winter quarter begins
24	Wednesday	Thanksgiving vacation begins 6 p.m.
25	Thursday	Thanksgiving Day; no classes
29	Monday	Classes resume 8 a.m.

December 2010

1	Wednesday	Last day for current students to file an undergraduate financial aid application for winter quarter
4	Saturday	Last day of classes for fall quarter
6	Monday	Fall quarter examinations begin
10	Friday	Examinations end; vacation begins 6 p.m.

Winter Quarter

January 2011

1	Saturday	Tuition due
3	Monday	New and transfer student registration for winter quarter
		Classes for winter quarter begin 8 a.m.
7	Friday	Last day for late registration, adding any course, or changing a section
17	Monday	Martin Luther King Jr. Day; no classes

February 2011

11	Friday	Last day for dropping any course Last day to withdraw without academic review
21	Monday	Continuing student registration for spring quarter begins

March 2011

1	Tuesday	Last day for current students to file an undergraduate financial aid application for spring quarter
12	Saturday	Last day of classes for winter quarter
14	Monday	Winter quarter examinations begin
18	Friday	Examinations end; vacation begins 6 p.m.

Spring Quarter

March 2011

28	Monday	New and transfer student registration for spring quarter Classes for spring quarter begin 8 a.m.
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April 2011

1	Friday	Tuition due Last day for late registration, adding any course, or changing a section
11	Monday	Registration for Summer Session

NOTE: Before the end of spring quarter, students planning to graduate in arts and sciences, communication, education and social policy, journalism, or music in June or August 2012 must file an application for a degree at the Office of the Registrar. Others must file at the appropriate school office. Students completing requirements in December or March should file an application for a degree one year in advance.

May 2011

1	Sunday	Last day for current students to file undergraduate financial aid applications for academic year 2011–12
6	Friday	Last day for dropping any course Last day to withdraw without academic review
16	Monday	Continuing student registration for fall quarter 2011–12
30	Monday	Memorial Day; no classes

June 2011

4	Saturday	Last day of classes for spring quarter
6	Monday	Spring quarter examinations begin
10	Friday	Examinations end 6 p.m.
17	Friday	Baccalaureate 153rd annual Commencement

Summer Session

June 2011

1	Wednesday	Tuition due
20	Monday	Late registration for Summer Session Classes for Summer Session begin 8 a.m.
24	Friday	Last day for late registration, adding any course, or changing a section

July 2011

4	Monday	Independence Day; no classes
29	Friday	Six-week Summer Session examinations
30	Saturday	Six-week Summer Session ends 6 p.m.

August 2011

12	Friday	Eight-week Summer Session examinations
13	Saturday	Eight-week Summer Session ends 6 p.m.

The University reserves the right to make changes in this calendar. A detailed current calendar can be found at www.registrar.northwestern.edu/calendars.

The University

A private institution founded in 1851, Northwestern University is recognized nationally and internationally for the quality of its educational programs at all levels. Innovative teaching and pioneering research take place in a highly collaborative, interdisciplinary environment that combines the resources of a major research university with the level of individual attention of a small college.

More than 19,000 full- and part-time students are enrolled on Northwestern's lakefront campuses in Evanston and Chicago and a new branch campus in Qatar. Almost 8,500 undergraduates study at the University's largest campus in Evanston.

The University's 2,500 full-time faculty members range from MacArthur Fellowship recipients to Tony Award winners. In their ranks are members of the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Sciences, the American Council of Learned Societies, and numerous other honorary and professional societies.

Northwestern's 200,000 alumni include Pulitzer and Nobel Prize laureates, governors, Academy Award-winning actors, college presidents, and leaders in law, science, medicine, media, and other domains.

A HISTORICAL OVERVIEW

A year after nine Chicagoans met to establish a university "of the highest order of excellence" to serve the people of America's Northwest Territory, Northwestern University was officially incorporated in 1851. In 1853 the founders purchased a 379-acre tract of farmland along Lake Michigan 12 miles north of Chicago as a site for the new university. The town that grew up around Northwestern was named Evanston in honor of John Evans, one of the University founders.

Northwestern began classes in fall 1855 with two faculty members and 10 male students. In 1869 it enrolled its first female students, thereby becoming a pioneer in the higher education of women. By 1900 the University was composed of a liberal arts college and six professional schools, including the schools of law and medicine, with a total of 2,700 students. In the 20th century schools were added in management, engineering, education, journalism, and continuing studies. With the establishment of the Graduate School in 1910, Northwestern adopted the German university model of providing graduate as well as undergraduate instruction and stressing research along

with teaching. Recent years have seen a proliferation of academic programs and a new campus in Qatar.

Today, with the academic divisions listed on pages 7 and 8, Northwestern enjoys a position as one of the country's leading private research universities.

THE UNDERGRADUATE EXPERIENCE

Academic Excellence

Despite their relatively small numbers, Northwestern undergraduates enjoy a great range of educational choices, including more than 100 formal academic concentrations and opportunities to do research and special projects, to study abroad, and to pursue internships. Students frequently complete two majors or two degrees, and some construct and receive approval for their own programs of study. Almost a third of Northwestern's undergraduates engage in internships, practicums, paid cooperative education programs, applied research, and other off-campus experiences, often for academic credit. All benefit from a level of faculty involvement unusual for undergraduates at major universities, with faculty teaching more than 97 percent of the courses as well as inviting students to participate in research.

At the heart of a Northwestern education is the belief that a solid foundation in the liberal arts is essential, regardless of one's future plans. Students in all six undergraduate schools may take courses in science, mathematics and technology, individual and social behavior, historical studies, the humanities, and fine and performing arts. Moreover, Northwestern's emphasis on effective communication, regardless of field of study, fosters the ability to think analytically and write and speak clearly and persuasively.

Northwestern's many interdisciplinary research centers have profound implications for undergraduate education. Their research often alters theory and practice within an academic discipline and leads to new curricula. More immediately, many research centers have special programs for undergraduates, who may apply for research grants to fund independent scholarly projects. In recent years many new research centers have been established, especially in science and technology. See www.research.northwestern.edu/centers for a list of the University's research centers.

Other academic resources available to Northwestern students include the 10th largest library collection among U.S. private universities (www.library.northwestern.edu). Northwestern University Information Technology supports students' academic needs with extensive online services,

wired and wireless access from nearly anywhere on campus, and abundant computing sites (www.it.northwestern.edu).

Underpinning the breadth of a Northwestern education is the quarter system, which gives students the opportunity to take more courses than under a traditional semester system. Most undergraduates attend for three quarters each year (fall, winter, and spring). They typically take 4 courses each quarter and 12 courses in an academic year.

Outside the Classroom

In its extracurricular offerings as well as in its academic programs, Northwestern encourages its students to develop holistically and to prepare for life in a diverse, interconnected, and rapidly changing world.

Supported by the Center for Student Involvement, the more than 200 extracurricular groups include organizations devoted to service on campus and in the community, cultural awareness and support, musical and theatrical performance, entertainment programming, political activism, career preparation, and countless mutual interests. The full list can be seen at www.norris.northwestern.edu/csi.php.

A charter member of and the only private university in the Big Ten conference, Northwestern sponsors 19 intercollegiate athletic teams (8 men's and 11 women's), as well as intramural, club, informal, and instructional sport and fitness programs. Fitness centers provide state-of-the-art facilities for exercise and recreation. Northwestern students even have their own beach and the opportunity to take sailing lessons.

About 4,000 undergraduates live in University residence halls, another 800 live in fraternity or sorority houses, and the remainder live off campus. On-campus residents choose from housing that ranges in size, age, and character and in suite arrangements, including themed residential colleges and same-sex facilities.

Services available to undergraduates include career advising and job and internship search help, psychological counseling, and health care. Specialized offices serve members of various religious denominations, students with disabilities, women, international students, and African American, Asian, Asian American, and Latina and Latino students. For all programs offered by the Division of Student Affairs, see www.northwestern.edu/student-affairs.

In addition to enjoying numerous opportunities on campus, students benefit from Northwestern's location in the first suburb north of Chicago. Downtown Evanston offers restaurants, shops, and a multiplex movie theater, and the cultural, entertainment, and sporting events of America's third-largest city are just a short train ride away.

STUDENT DEMOGRAPHICS

Northwestern recruits students of demonstrated academic achievement from diverse social, ethnic, and economic backgrounds. More than 90 percent of applicants rank

in the top 10 percent of their high school classes, and Northwestern is fourth on the list of schools enrolling National Merit Scholars. About one in five applicants is accepted.

All 50 states and nearly 50 countries are represented in the undergraduate student body. In the class of 2013, 40 percent are from the Midwest, 17 percent from the Middle Atlantic states, 15 percent from the West, 9 percent from the South, 6 percent from the Southwest, and 6 percent from New England; 7 percent have overseas addresses. Slightly more than half are female, and more than one-third are members of minority groups. Sixty percent enrolled with financial aid. Almost 97 percent of freshmen return for sophomore year.

Both the federal government and the National College Athletic Association use as a measurement for reporting purposes the graduation rates of entering classes over six continuous years. Such rates at Northwestern have remained above 90 percent for a decade of entering classes. See www.registrar.northwestern.edu/academic_records/enroll-grad_statistics/graduation_rates.html.

CAMPUSES

The six undergraduate schools offer the programs and courses of instruction described in their respective sections of this catalog. Undergraduate study may lead to the bachelor's degree as a final academic goal or to graduate or professional study.

Northwestern is accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools. Some schools have additional accreditation, as noted in the following sections.

Evanston Campus

The schools and other institutional divisions, in order of establishment, are as follows:

- The Judd A. and Marjorie Weinberg College of Arts and Sciences (1851) offers the degree of bachelor of arts. Majors and minors are available through departments and interdisciplinary programs spanning the arts and humanities, foreign languages, mathematics and statistics, the natural sciences, and the social sciences. Through the School of Continuing Studies, Weinberg College also offers the degrees of bachelor of philosophy and bachelor of science in general studies and two certificates in arts and sciences.
- The School of Communication (1878), with departments of communication sciences and disorders, communication studies, performance studies, radio/television/film, and theater, offers a bachelor of science in communication degree and a bachelor of arts in communication degree. Through the School of Continuing Studies, the School of Communication offers the bachelor of philosophy in communication. The school also offers the degrees of master of science in communication and

doctor of audiology. Its programs are accredited by the American Speech-Language-Hearing Association and the National Association of Schools of Theatre.

- The Henry and Leigh Bienen School of Music (1895) offers the degrees of bachelor of music and bachelor of arts in music. In its graduate division the school offers the degrees of doctor of music and master of music and the artist certificate. The school is accredited by the National Association of Schools of Music.
- The J. L. Kellogg School of Management (1908) offers undergraduate certificates in financial economics and managerial analytics as well as the master of business administration (MBA) degree. Many majors are available to MBA students; they are listed at www.kellogg.northwestern.edu/faculty/academics/majors.aspx. In addition to the full-time MBA program, Kellogg offers a part-time evening or weekend MBA program on Northwestern's Chicago campus, an executive MBA (EMBA) in Evanston and Miami, and international executive MBA (IEMBA) programs in Canada, Europe, the Middle East, and Asia. There is also a PhD program; see www.kellogg.northwestern.edu/doctoral/index.htm. In addition, a wide range of nondegree executive education courses are offered at the school's James L. Allen Center on the Evanston campus as well as in Miami. Kellogg is accredited by the American Assembly of Collegiate Schools of Business.
- The Robert R. McCormick School of Engineering and Applied Science (1909) offers the bachelor of science degree in applied mathematics, biomedical engineering, chemical engineering, civil engineering, computer engineering, computer science, electrical engineering, environmental engineering, industrial engineering, manufacturing and design engineering, materials science and engineering, mechanical engineering, and medical engineering (only for students enrolled in the Honors Program in Medical Education). All departments offer advanced study for graduate students. The McCormick School also offers master's degrees in biotechnology, engineering management, information technology, product design and development, and project management. McCormick programs are accredited by the Engineering Accreditation Council of the Accreditation Board for Engineering and Technology.
- The Graduate School (1910) administers all advanced programs leading to the degrees of doctor of philosophy, master of arts, master of fine arts, master of public health, and master of science. *The Graduate School Handbook*, describing requirements for degrees in all schools and departments, is available online at the school's web site, www.tgs.northwestern.edu. Descriptions of individual graduate programs, with degree requirements and authorized courses, can also be found on that web site.
- Summer Session (1920) provides summer programs for undergraduate, graduate, and visiting students.

- The Medill School of Journalism (1921) offers the bachelor of science in journalism degree, master of science degrees in journalism and integrated marketing communications, and an undergraduate certificate in integrated marketing communications. Medill is accredited by the Accrediting Council on Education in Journalism and Mass Communication.
- The School of Education and Social Policy (1926) offers the bachelor of science and master of science in education and social policy and the master of science in learning and organizational change. Its teacher education programs are accredited by the Illinois Board of Education.

Chicago Campus

Schools and institutional divisions on the Chicago campus, in order of establishment, are as follows:

- The Feinberg School of Medicine (1859) offers the degrees of doctor of medicine and doctor of physical therapy. High school graduates accepted for the Honors Program in Medical Education can receive the MD degree from Feinberg seven or eight years after they enter Weinberg College, the McCormick School, or the School of Communication as freshmen. The Feinberg and McCormick Schools cooperate in biomedical engineering programs; joint degree programs with the Graduate School and the Kellogg School offer an MD degree as well as MA, MS, MPH, MBA, and PhD degrees. The Feinberg School has accreditation from the Liaison Committee on Medical Education, Accreditation Council for Continuing Medical Education, American Psychological Association, American Board for Certification in Prosthetics and Orthotics, American Physical Therapy Association, and Accreditation Council for Graduate Medical Education.
- The School of Law (1859) offers the degrees of juris doctor, master of laws, master of laws in international human rights, master of laws in taxation, master of studies in law, and doctor of juridical science. An accelerated JD program allows select motivated students to complete the JD in two calendar years. The School of Law and the Kellogg School offer a joint degree program allowing students to earn both juris doctor and master of business administration degrees in three years. Another joint program with Kellogg permits international and foreign-trained students to earn a master of laws degree and a certificate in business administration in one year. Students also may participate in a five-year program to earn a JD and a PhD in one of the social sciences. In addition, the School of Law offers a master of laws degree to executive students in Seoul, South Korea; Madrid, Spain; and Tel Aviv, Israel. The school is accredited by the American Bar Association and the Association for American Law Schools.
- The School of Continuing Studies (1933) is the continuing education division of the University, providing adults

an opportunity to return to school part-time or full-time on evenings and weekends. Classes are offered on the Chicago and Evanston campuses, in the Chicago Loop, and online. Students may earn bachelor's and master's degrees and postbaccalaureate and professional development certificates or take courses for personal enrichment. Undergraduate degrees offered through SCS are conferred by Weinberg College and the School of Communication. SCS offers a master of science degree in computer information systems; master of arts degrees in liberal studies, literature, and creative writing (conferred by the Graduate School); a master of arts degree in sports administration; a master of fine arts degree in creative writing; and a master of arts degree in public policy and administration (offered in on-campus and online formats). In partnership with the Feinberg School of Medicine, SCS offers a master of science degree in medical informatics in an online-only format. In partnership with Weinberg College's Department of Chemistry, SCS offers a master of science degree in quality assurance and regulatory science. SCS also offers a master of science degree in clinical research and regulatory administration in partnership with the Northwestern University Clinical and Translational Sciences Institute. In addition, SCS's postbaccalaureate and professional development certificate programs provide targeted study to prepare for graduate study or career advancement. SCS also administers Summer Session programs for the University and is the home of the Center for Public Safety and the Osher Lifelong Learning Institute.

Northwestern University in Qatar

Northwestern offers two academic programs at its branch campus in Qatar, one in journalism and one in communication. The Medill School of Journalism offers the bachelor of science in journalism degree; the School of Communication offers the bachelor of science in communication degree.

Although the Qatar campus operates on a semester rather than a quarter calendar, its curricula are closely modeled on those of the Evanston campus, from which a majority of the faculty and staff are drawn.

Northwestern University in Qatar admitted its first class in summer 2008. Northwestern was the sixth U.S. university — joining Carnegie Mellon, Cornell, Georgetown, Texas A&M, and Virginia Commonwealth Universities — to accept an invitation from the Qatar Foundation to establish a campus in Education City in the Qatari capital of Doha.

For more information about Northwestern University in Qatar, please visit www.qatar.northwestern.edu.

Undergraduate Education

ADMISSION

General Requirements for Admission

Northwestern University attracts and enrolls a student body of high ability that reflects a variety of talents, ideas, backgrounds, and experiences, thereby contributing to the diversity of the campus community.

Candidates for admission should demonstrate a level of performance in curricular and extracurricular areas that indicates they will be able to succeed in a competitive academic environment. In the selection of students, careful attention is given to the ability of each candidate as evidenced by academic records and the results of entrance tests as well as by character and personality. The University attempts to select students who are committed to scholarship and who have shown a willingness to become involved in their expressed interest areas. In determining whether to accept a candidate, the University considers

- Secondary school record
- College record (required for transfer candidates)
- Recommendations from school officials and other persons who have information pertinent to the candidate's probable success at Northwestern
- Results of required or recommended tests (All candidates must submit the Scholastic Assessment Test [SAT] Reasoning Test or the American College Test [ACT] Plus Writing. Candidates for certain special admission programs and all home-schooled applicants must submit the SAT Subject Tests specified in the following sections. SAT Subject Tests are recommended for other candidates.)
- Music audition (required of Bienen School of Music candidates)
- Candidate's statements on the application regarding special skills, such as writing, art, music, mathematics, and science, or special accomplishments in extracurricular areas of interest
- Any other information received by the University that bears on the candidate's readiness for study at Northwestern

SAT Subject Tests

Recommended for All Applicants

- Weinberg College of Arts and Sciences, School of Communication, School of Education and Social Policy, Medill School of Journalism, and Bienen School of Music: three of the student's choice, in three different subject areas (math, English, social sciences, natural sciences, or foreign language)

- McCormick School of Engineering and Applied Science: Mathematics I or IIC, Chemistry or Physics, and a third subject of choice

Required for Special Admission Programs and Home-Schooled Applicants

- Honors Program in Medical Education: Mathematics IIC and Chemistry
- Integrated Science Program: Mathematics IIC, Chemistry or Physics, and an additional science
- Home-schooled applicants: Mathematics I or IIC and two other SAT Subject Tests of the applicant's choice from different subject areas (i.e., not two science, two foreign language, or two history, etc.).

Required Subjects

A broad academic experience in high school is the best preparation for admission to Northwestern. Whatever fields of study students follow, the best foundation consists of reading, writing, and mathematics. The value of thorough training in fundamental subjects cannot be overemphasized.

In considering the academic record of a candidate for admission to Northwestern, the Office of Undergraduate Admission notes the subjects studied and the grades received. The student's record should include a minimum of 16 units. (A unit represents a course studied for one year.)

The subject recommendations in the following list represent the minimum requirements for entrance to the University. Allowances are made to permit students to pursue special areas of academic interest. Most applicants present more academic subjects than the minimum.

Required Units

Weinberg College of Arts and Sciences, School of Communication, School of Education and Social Policy, Medill School of Journalism, and Bienen School of Music: 16 units, divided among the following academic areas:

- English: 4 units
- Foreign language: 2 to 4 units
- Mathematics: 3 to 4 units
- Laboratory science: 2 to 3 units
- History/social studies: 2 to 4 units
- Electives: 1 to 3 units in the above academic areas

Students preparing for college are strongly advised to take four years of work in English with as much emphasis on composition as the curriculum allows. Two units of the

same foreign language should be taken; three or four years are strongly recommended.

The McCormick School of Engineering and Applied Science requires a sound secondary school education as described above, with strong preparation in mathematics and science. Specifically recommended are

- Mathematics: $3\frac{1}{2}$ to 4 units (the minimum requirements for mathematics include algebra [2 units], plane geometry [1 unit], and trigonometry [$\frac{1}{2}$ unit]; many entering McCormick freshmen will have taken calculus [1 unit])
- Science: 2 units (credit in both chemistry and physics is recommended)

Credit in other subjects should bring the total to 16 units or more, including 4 units of English and work in social studies and foreign languages.

Admission Notification

Northwestern offers freshman candidates a choice of two notification plans, Early Decision and Regular Decision. Early Decision is a binding admission commitment. Candidates accepted to Northwestern under Early Decision must withdraw all other university applications.

The table on the next page outlines these plans, the notification plans for transfer students, and the financial aid application procedure, including deadlines and the forms available through the College Scholarship Service.

Admission Procedure

To be considered for admission to Northwestern, candidates must complete the following three steps:

- Complete both the Common Application and the Northwestern Supplement. You may apply online at www.commonapp.org. (Instructions for applying on paper instead are found at <https://ugadm.northwestern.edu/freshman/applying>.) Applications for admission may be submitted before candidates take the standardized tests required for college admission.
- Arrange with the officials of their high school to complete and forward the Secondary School Report to the Office of Undergraduate Admission. All candidates should have their records through the sixth semester sent to Northwestern as early in the senior year as possible. Regular Decision candidates should have seventh-semester grades sent as soon as they are available.
- Take standardized tests as described on pages 10 and 12.
- If applying for admission to the Bienen School of Music, present a music audition in person or a high-quality recording. (Audition guidelines will be furnished on request.)

Application to Dual Bachelor's Degree Programs

A student interested in taking advantage of the opportunity to receive bachelor's degrees from two different Northwestern undergraduate schools in five years must apply to both schools. It is possible to be admitted to only one

or both schools, since applicants are considered for each school separately.

Programs available include the following:

- BA/BMus in liberal arts and music
- BS/BMus or BS/BAMus in engineering and music
- BSJ/BMus or BSJ/BAMus in journalism and music

To apply, simply select the program that interests you on the Northwestern Supplement to the Common Application.

For descriptions of these and other dual bachelor's degree programs, see page 28 in the Cross-School Options chapter.

Special Admission Programs

The following undergraduate programs at Northwestern have special application requirements.

Honors Program in Medical Education

The Honors Program in Medical Education (HPME) provides simultaneous admission to undergraduate study and medical school at Northwestern. A student indicates interest by using the information request form at <https://ugadm.northwestern.edu/request> and preapplying by the due date. Those whose preapplications qualify receive the special HPME application to submit in addition to their regular Application for Admission to Weinberg College, the School of Communication (human communication sciences major only), or the McCormick School. (See the Application and Testing Deadlines table on page 12.)

For information about HPME, see page 29 in the Cross-School Options chapter of this catalog.

Integrated Science Program

A student wishing to be considered for Weinberg College's Integrated Science Program (ISP), which provides a rigorous background in the major scientific disciplines and mathematics and can lead to a bachelor's degree in three years, must complete the special ISP application (available at www.isp.northwestern.edu/admissions/applying.html). The Common Application and Northwestern Supplement to the Common Application are also required.

For information on ISP, see page 108 in the Weinberg College chapter of this catalog.

Mathematical Methods in the Social Sciences

A student interested in Weinberg College's program in Mathematical Methods in the Social Sciences (MMSS), which is designed for students with high mathematical aptitude and strong interest in social problems and issues, must complete the special MMSS application (available at www.mmss.northwestern.edu/admission/freshman.html). The Common Application and Northwestern Supplement to the Common Application are also required.

For more information on MMSS, see page 117 in the Weinberg College chapter of this catalog.

APPLICATION AND TESTING DEADLINES: NOTIFICATION PLANS

Regular Programs for Fall Quarter Matriculation

Freshman candidates for other quarters should request information from the Office of Undergraduate Admission.

	Early Decision	Regular Decision
Apply by	November 1	January 1
Take SAT Reasoning Test or ACT Plus Writing by	November test	January test
If taking SAT Subject Tests, take by	November test	January test
To apply for financial aid, file CSS PROFILE by	December 1	February 15
and file FAFSA by	May 15	February 15
Northwestern mails decision letter by	December 15	April 1
Applicant's reply and nonrefundable tuition deposit due	February 1	May 1

Honors Program in Medical Education

	Regular Decision
HPME preapplication deadline	December 1
HPME application deadline	January 1
Freshman application to Northwestern by	January 1
Take SAT Reasoning Test (or ACT Plus Writing) by	December test
Take two SAT Subject Tests by	December test
To apply for financial aid, file FAFSA and CSS PROFILE by	February 15
Northwestern mails decision letter by	April 1
Applicant's reply and nonrefundable tuition deposit due	May 1

Transfer Students for Any Quarter of Matriculation

	Fall	Winter	Spring	Summer
Apply by	May 1	November 1	February 1	May 1
(Because space is limited in some programs, transfer candidates should apply well before these dates)				
Take tests by	May 1	November 1	February 1	May 1
(SAT Reasoning Test or ACT Plus Writing; scores from previous academic years are acceptable)				
Apply for financial aid by	April 1	October 1	January 1	April 1
(Consult with Office of Undergraduate Admission)				
Northwestern mails decision letter as soon as possible after the application deadline; a reply is due within two weeks.				

Advanced Placement

In nearly all areas Northwestern awards credit for Advanced Placement Examination scores of 5; in some cases credit is also awarded for scores of 3 and 4. Specific questions concerning Northwestern's advanced placement policies should be addressed to the Weinberg College Office of Undergraduate Studies and Advising. In some fields, advanced placement and/or credit can be earned through appropriate performance on examinations administered by Northwestern departments.

Northwestern awards credit for distinguished performance on the British General Certificate of Education (A-Level) Examinations, the higher-level examinations of the International Baccalaureate, and certain other foreign university entrance examinations.

Northwestern also recognizes college credits earned by students before entering the University as freshmen. To qualify for such recognition, the courses must be similar to courses offered at Northwestern, must have been taken at a college or university whose accreditation is recognized by Northwestern, must not have been submitted in partial fulfillment of the normal secondary school graduation requirement, and must have been given on the campus of a college or university and taken primarily by bona fide college students (i.e., high school graduates pursuing a college degree). If candidates have taken college courses that do not qualify for credit under these conditions, they should take Advanced Placement Examinations in the appropriate subjects.

Transfer Candidates

Students may be considered for admission as transfers from another college or university provided they have completed one full year of university studies by the application deadline, are in good standing at their postsecondary institution, and have maintained at least a B average in rigorous academic courses. If students have been enrolled full-time at any institution except Northwestern, they cannot be considered for freshman admission and must meet the criteria to apply as transfer candidates. Some undergraduate schools at Northwestern enroll transfer students in the fall quarter only. Transfer students must complete at least the last 23 quarter-courses and six full-time quarters in residence at Northwestern to be eligible for a bachelor's degree.

Transfer Admission Procedure

To be considered for admission, transfer students must complete the following steps:

- Complete the Common Application and the Northwestern Supplement. Both may be filed online at www.commonapp.org. (Instructions for applying on paper instead are found at <https://ugadm.northwestern.edu/freshman/applying>.)
- Arrange with the officials of the high school to forward the complete high school report to the Office of Undergraduate Admission.

- Submit results of the SAT Reasoning Test or the ACT Plus Writing.
- Arrange with the registrar of each college previously attended to forward transcripts of record to the Office of Undergraduate Admission.
- Request a statement of good academic and social standing from the dean of students at the college from which the student is transferring.
- Present a music audition (in person or a high-quality recording) if applying for admission to the Bienen School of Music (audition guidelines will be furnished on request).
- Submit application for admission before the deadline of May 1 (for admission in the fall quarter), November 1 (winter), February 1 (spring), or May 1 (summer).

Evaluation of Credits

Transfer candidates who are accepted by Northwestern will receive a preliminary evaluation of the credits they have earned to date before matriculation, assuming all pertinent transcripts have been received. An official evaluation of credits earned will be made by the Office of the Registrar when an admitted student matriculates. To read the transfer credit policy, go to www.registrar.northwestern.edu/graduation/transferring_non-NU_Courses.html.

Foreign Students

In addition to meeting all regular admission requirements, foreign students are required to present evidence of their ability to speak, read, and write the English language and to meet the financial obligations associated with their study at Northwestern. Students for whom English is a second language must present the results of the Test of English as a Foreign Language (TOEFL). Foreign students must have achieved outstanding school records to be considered for admission. Foreign transfer candidates may apply for fall quarter admission only and must submit their completed applications by May 1.

Returning Adult Students

Adults who interrupt their education following high school or during college and, after several years, decide to complete their undergraduate education are considered "returning adult students" by the Office of Undergraduate Admission. Ordinarily, returning adult students have been out of high school for seven years or more. Depending on the amount of college credit previously earned, they apply as returning adult or transfer candidates.

Evening Students

The School of Continuing Studies (SCS), Northwestern's continuing education division, offers courses in the evenings and on Saturdays for adult students seeking personal enrichment or professional mobility, preparation for graduate study, or pursuit of a degree or a certificate.

Quarter-long courses are offered on the Chicago and Evanston campuses.

SCS allows adults with a college degree, or some college credit and good standing, or a high school diploma but no prior college work to enroll in courses as students at large. Students who wish to earn a degree or a certificate should speak with an academic adviser about admission. More information about SCS is available on its web site, www.scs.northwestern.edu.

Special Students

Properly qualified persons who demonstrate a need for certain courses required for their academic or professional advancement may apply to the University as special nondegree-seeking students. Applicants must present official transcripts of previous study and show evidence of successful academic achievement. Persons who do not meet these requirements should not apply.

Enrollment as a special student does not constitute admission to any degree program at the University, and credits earned as a special student may not be counted toward a degree at Northwestern. (Exception: Special students who subsequently become eligible for admission into the School of Continuing Studies may apply these credits toward a degree.) Special students are granted academic credit for course work satisfactorily completed, and these credits may be transferred to another institution.

Special students are admitted with the understanding that they may register only after students working toward Northwestern degrees have registered. Some classes will be closed, and some schools or departments may not accept nondegree students. These restrictions do not apply to Summer Session.

Special students are not permitted to enroll in 399 or 499 Independent Study courses.

All tuition and fees for special students are charged at the undergraduate rate. Complete instructions and application forms may be obtained from the Office of Special Students, 162 Walter Annenberg Hall, Northwestern University, Evanston, Illinois 60208-2650. See www.scs.northwestern.edu/ugrad/nondegree/ndss.cfm for more information.

Auditors

Course audits for degree-seeking undergraduates are not given formal recognition by either Northwestern or the Office of the Registrar. Only students in the School of Continuing Studies or summer nondegree students are permitted to formally audit classes.

Auditors are persons who enroll in a course to observe or listen only; they are not permitted to engage in class discussion, submit written or oral assignments, or take examinations, and they do not receive academic credit. Auditors are charged a special tuition rate. Consult

with the Office of Special Students or the School of Continuing Studies.

FINANCIAL AID

The University awards financial aid on the basis of need as determined by the financial circumstances of the family. Aid can be a loan, part-time employment, a grant/scholarship, or a combination of these. The funds may come from state, federal, institutional, or private sources. Students are required to reapply for financial assistance each year and maintain the requirements established by the Committee on Financial Aid. The amount of financial aid may change based on the family's financial circumstances. For entering freshmen, financial aid generally is renewable for up to 12 quarters of enrollment. If a student has been enrolled and has not applied for and/or has not received financial aid, the quarters of enrollment will count toward the maximum eligibility. For transfer students, the maximum number of quarters of assistance depends on the number of quarters of transfer credit accepted, as determined by the Office of the Registrar (i.e., a student who transfers with 3 quarters of acceptable credit is eligible for 9 quarters of assistance). Transfer students requiring additional quarters of aid must petition the Committee on Financial Aid.

During the 2009–10 academic year, undergraduate students at Northwestern received more than \$97 million in grant assistance: \$83.3 million from Northwestern, \$9.2 million from federal and state governments, and \$4.7 million from outside sources. The average Northwestern need-based grant for the 3,680 students receiving aid was \$26,817. In addition, \$22.9 million in loan assistance and 3,000 campus jobs were available.

Assistance that is not need based is provided by the Reserve Officers Training Corps (see Military Studies) and from other sources discussed in the Northwestern publication "Financial Aid at Northwestern," distributed by the Office of Undergraduate Admission. For more information consult www.ugadm.northwestern.edu/freshman/financing.

Who Should Apply

Any undergraduate students who believe they cannot afford the full cost of a Northwestern education may apply for financial aid. Since funding is limited, institutional assistance may not be available to transfer students for the first year of study.

Application Procedure

Applicants request consideration for financial aid when submitting the Application for Admission. The Committee on Financial Aid cannot make a decision until the University has admitted the applicant. Candidates should do the following:

- Complete and submit the Common Application and the Northwestern Supplement.

- File the Free Application for Federal Student Aid (FAFSA) and the College Scholarship Service/Financial Aid PROFILE (CSS PROFILE) and request that copies of both reports be sent to Northwestern.
- Submit parent and student federal tax returns to the College Board's Institutional Documentation Service.
- File the applications as soon as the need for assistance is realized but not later than the dates indicated in the table titled Application and Testing Deadlines: Notification Plans (page 12).

Returning students should consult the web site <http://ug-finaid.northwestern.edu> for reapplication instructions, deadlines, and updated policies.

Students are expected to consult their accounts on CAESAR (see inside cover) to verify that all required applications and additional information have been received by the Office of Financial Aid.

Satisfactory Academic Progress and Financial Aid

Satisfactory academic progress at Northwestern means the completion of a minimum full-time course load (9 academic units) at the end of each 3- or 4-quarter cycle of enrollment. Withdrawn, incomplete, and repeated courses are not counted toward that minimum.

Eighteen full-time quarters are the maximum for completing a four-year program, 22.5 quarters for completing a recognized five-year program.

Each school at the University has specific qualitative measurements of progress, which are listed in its chapter of this catalog. Although Northwestern does not require students to have a C average at the end of their sophomore year as long as they have made progress toward a degree, federal regulations state that a student without a C average or equivalent or the required academic standing at the end of the second academic year may not receive further federal aid.

If a student fails to maintain academic progress as described above, financial aid eligibility is limited to one more quarter of enrollment as a probationary period. During this quarter the student must complete course work equivalent to at least three units and earn a C or better in each class. The student will lose financial aid eligibility if he or she fails to meet these requirements but may reestablish eligibility by successfully completing a full-time quarter of enrollment at Northwestern without federal or institutional assistance.

A student may submit a written appeal within two weeks of being notified of aid cancellation because of failure to meet satisfactory academic progress requirements. The appeal must be specific and document any unusual or mitigating circumstances such as illness, family hardship, or a death in the family.

The above procedure is followed except in these cases:

- Students returning to the University after academic dismissal are eligible only for federal assistance during

the first quarter of full-time study, when satisfactory academic progress is being reestablished. After completing course work equivalent to three units with a grade of C or better in each class, students are considered to be making satisfactory academic progress and become eligible for federal and institutional financial assistance in subsequent quarters.

- When students have been in attendance at Northwestern for 12 quarters or the equivalent, they are ineligible for more financial assistance from the University even if they are maintaining satisfactory academic progress. The exceptions are students admitted to the five-year BA/BMus and BS in engineering/BMus programs; they are eligible for University funds for up to 15 quarters of enrollment. Students pursuing other double-degree opportunities are eligible for only federal and state funding.
- The Committee on Financial Aid may grant a continuation of aid when unusual circumstances exist and students demonstrate academic promise.

FINANCIAL REGULATIONS

Tuition and Fees

The cost of education at Northwestern is only partly covered by tuition charges. The balance is met by the income from invested funds and by the gifts of alumni and other supporters of the University.

Tuition and fees listed below are for 2010–11 unless noted otherwise. Rates are subject to change without notice, and increases should be expected in subsequent years. For tuition purposes, the term course refers to course credit. Some course offerings carry more than one course credit.

Undergraduate Tuition

All undergraduate students in degree programs must conform to the Undergraduate Residence Requirement (see page 17). Full-time registration for all undergraduate degree-seeking students is three or more units of credit.

Tuition: each quarter \$13,280

A student who takes more than four units of credit in a quarter will be subject to an overload charge if these credits are used to accelerate graduation. See the Undergraduate Residence Requirement for more complete information.

Acceleration tuition: each course, each quarter \$3,320

Undergraduate Tuition:

Nondegree-Seeking Students and Exceptions

Full-time tuition: three or four courses each quarter \$13,280

Registration exceptions (less than full-time or more than four units): each course, each quarter \$4,726

Service Fees

Student Hospitalization Plan

Required for all students unless they have equivalent hospitalization coverage	\$2,466
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Study abroad administrative fee (not refundable)

Non-Northwestern summer study abroad	\$765
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Term fee (semester or quarter)	\$2,310
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Annual fee (academic or calendar year)	\$3,775
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Tuition deposit fee	\$400
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Required for each new undergraduate student; applied on the first tuition bill and not refundable

Application fee (not refundable)	\$65
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Returned check service fee	\$35
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Replacement WildCARD fee	\$15
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Transcript fee

Electronic transcript	\$8
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Paper transcript	\$10
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Makeup laboratory time, breakage fee	varies
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Other Fees

Late registration fee	\$25
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If fee is billed	\$30
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For registering at other than the scheduled times

Retroactive registration fee	\$225
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For registering for a term after the last day of classes for that term

Housing deposit fee	\$200
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Late payment penalty fee	\$150
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Associated Student Government	\$48
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Activity fee, each quarter

Athletic events fee	\$39
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Student Health fee	\$67
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For new students

Dependent Hospitalization Plan

Contact Student Health Office

Field trip fee	varies
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For courses in which field trips are required to earn credit

Bills and Payments

The Office of Student Accounts issues student bills. A due date is shown on each University bill, and payment must be received by that date. Failure to receive bills is not sufficient cause to extend due dates.

Electronic Billing and Payment

Northwestern's preferred means of transmitting bills and receiving payments for tuition and fees is QuikPAY, the University's electronic billing and payment service. QuikPAY provides e-mail notification of each new bill, allows payments to be made online, and offers the option of receiving paper bills. QuikPAY is free to students and authorized payers such as their parents. Additional information can be found at www.northwestern.edu/sfs.

Installment Payment Plan

The University provides a tuition and fee installment payment plan, 9PAY, which offers the benefit of dividing the educational costs for the academic year into nine monthly payments. For information, contact the Office of Student Accounts, Northwestern University, 555 Clark Street, Evanston, Illinois 60208-1221, phone 847-491-5224, fax 847-467-2451.

Withdrawal from the University: Refunds

Students who withdraw from the University must immediately file a withdrawal form, available at the Office of the Registrar. The completed form, bearing the required signatures, must be filed at the Office of the Registrar.

The Office of Student Accounts considers the date the completed form is received at the Office of the Registrar as the effective date in making financial adjustments.

Tuition deposits are not refundable under any circumstances. Tuition, less the tuition deposit, and refundable fees are refundable depending on the percentage of time the student was enrolled in the quarter. The following policy applies to withdrawals:

- When or before the first 10 percent of the quarter has elapsed, 100 percent of the tuition (less the deposit) is refunded.
- After 10 percent but not more than 25 percent of the quarter has elapsed, 75 percent of the tuition is refunded.
- After 25 percent but not more than 50 percent of the quarter has elapsed, 50 percent of the tuition is refunded.
- After 50 percent of the quarter has elapsed, no refunds are given.

Residence and meal contracts are signed for the full school year. Students who leave a residence before the end of the year are liable for the entire year's rent or for charges up to the date another student takes the vacated space. Meal charges are assessed until the end of the week in which withdrawal is in effect. Adjustments may be made at the discretion of the Housing Office for students who for financial reasons must make room and board arrangements other than those for which they first contracted.

Financial aid recipients who withdraw from the University may be required to return a portion of their Title IV funds to the federal programs as well as some of their state assistance, outside scholarships, and/or institutional financial aid. Three different calculations — the Institutional Refund, Return of Title IV Funds, and Return of Non-Title IV Funds — are used to determine such repayments. Students may request samples of the applications of these refund policies from the Office of Student Accounts or the Office of Financial Aid.

Changes of Registration

No refund or bill reduction is made on any course dropped after the fifth day of classes in the quarter.

Financial Obligations

Students whose University bills are overdue may not be given an academic transcript until all financial obligations are paid in full. Students whose accounts are overdue must pay a late payment penalty fee of \$150. The director of student accounts may cancel or prevent the registration of a student whose bills are past due.

Each student is liable for any costs associated with the collection of his or her past-due account, including but not limited to collection agency costs, court costs, and legal fees.

Supplemental Enrollment Benefit

Students who are unable to complete bachelor's degree requirements in 12 quarters due to circumstances beyond their control, and who have paid full-time tuition to Northwestern for 12 quarters, may petition the Residence Requirement Appeals Committee to enroll in their final quarter at no additional tuition charge. Transfer students who have paid full-time tuition to Northwestern for 9 quarters are also eligible.

A final quarter at no tuition charge is not available for students who choose a program that may take more than 12 quarters to complete or for students who have graduated. A final quarter at no charge is also not available for students who choose an optional program, such as study abroad, a double degree, double major, minor, or extra course work beyond that normally required for the degree. Further information is available from the Office of the Registrar at www.registrar.northwestern.edu.

UNDERGRADUATE RESIDENCE REQUIREMENT

The Undergraduate Residence Requirement (URR) is predicated on the principle that when a student receives a bachelor's degree from Northwestern University, the majority — and certainly the most advanced portion — of his or her academic work was completed on a Northwestern campus as a full-time student under the instruction of Northwestern faculty during the regular academic year. Thus, being “in residence” for a quarter means that the student is enrolled during the fall, winter, or spring quarter at Northwestern, is being taught by or is under the supervision of Northwestern faculty, and completes three or more credits. It includes, for instance, the practicum in the School of Education and Social Policy and the Journalism Residency in the Medill School of Journalism. It does not include the Walter P. Murphy Cooperative Engineering Education Program in the McCormick School or most study abroad credits (see details below).

The URR applies only to undergraduate students seeking a bachelor's degree and must be completed in addition to the degree requirements established by the various school faculties. Its provisions are:

1. A student entering as a freshman is required to be in residence for 12 quarters in a four-year degree program or 15 quarters in an approved dual bachelor's degree program involving two schools. See page 28 for information on approved dual bachelor's degree programs.
2. A student entering as a freshman may gain exemption from up to three quarters of the required residency through any combination of a maximum of 12 credits earned through the Advanced Placement or the International Baccalaureate programs; a maximum of 12 credits earned through approved study abroad; credits earned through “credit by examination” at Northwestern; credits earned at Northwestern through less than full-time enrollment; and a maximum of four transfer credits from other (domestic) colleges or universities earned at any time prior to the final three quarters of residence. Each four such credits confer one-quarter exemption from the URR. Certain courses offered during the academic year through Northwestern's own study abroad programs (those carrying Northwestern course numbers and the SA designation) count directly as courses taken while in residence rather than toward exemptions from the URR.
3. A student who completes three or more credits in a single Northwestern Summer Session will gain exemption from one quarter of the URR. A second quarter of exemption may be earned by completing four credits in a second Summer Session. Summer courses offered through Northwestern's own study abroad programs and carrying Northwestern course numbers and the SA designation are also subject to these regulations.
4. A student who receives Northwestern transfer credit for non-Northwestern study abroad courses that do not carry Northwestern course numbers and the SA designation must be in residence for either the final three quarters or 4 of the last 6 quarters before the awarding of the degree.
5. A student who takes more than four credits in one quarter will be subject to an overload charge if these credits are used to accelerate graduation. (Acceleration occurs when the total quarters completed by the student, including those exemptions allowed in items 2 and 3 above, at graduation total less than 12 for a single-degree program or 15 quarters in an approved dual bachelor's degree program involving two schools.)
6. A student entering as a transfer student will have his or her residence requirement determined at the time of transfer. In no case will the residence requirement be less than 6 quarters and 23 credits. The following regulations also apply:
 - o Each four units of credit transferred will reduce the 12-quarter residence requirement by one quarter. Transfer students may further reduce the residence requirement by up to one additional quarter by applying accepted AP credit. A maximum of four AP credits may be applied toward residency, regardless of the total number of AP credits accepted.
 - o Transfer students who have a residence requirement of 7 or more quarters may reduce the residence requirement by up to 1 additional quarter by participating in

an approved study abroad program. Transfer students with a residence requirement of 6 quarters may participate in study abroad, but participation will not further reduce their residence requirement. (Study abroad on Northwestern programs with course work carrying Northwestern course numbers and the SA designation counts as described in items 2 and 3 above.)

- o With the exceptions of limited AP credit and study abroad course work outlined above, those entering as transfer students from another institution may not apply any additional course work taken outside the University toward the URR. Such courses may be useful in meeting academic requirements but may not be used toward the URR.
7. Students may appeal for URR variances to the Residence Requirement Appeals Committee, which consists of the associate provost for University enrollment, the associate provost for undergraduate education, the University registrar, and two undergraduate school representatives from different schools who are appointed by their deans and serve three-year terms on a rotating basis.

For additional information, interpretation, or application of the URR, contact the Office of the Registrar, 633 Clark Street, Evanston, Illinois 60208-1118, 847-491-5234.

Returning Students

Students who withdraw from the University and wish to return must submit a Returning Student Application Form to the Office of the Registrar six weeks before the desired date of reentry. Students who want credit for course work taken at another institution must submit an official transcript to the Office of the Registrar. The Office of the Registrar will determine the extent to which credit earned away from Northwestern may apply toward the 12-quarter URR.

ACADEMIC REGULATIONS

Registration for All Students

Students register for classes using the CAESAR online system. The Office of the Registrar maintains a complete, up-to-date online class schedule, which can be found by selecting the “View the Quarterly Class Schedule” link at www.northwestern.edu/caesar.

- A quarterly reference copy may be downloaded from www.registrar.northwestern.edu/registration. Failure to read the registration information at www.registrar.northwestern.edu/registration or the printed class schedule does not excuse students from compliance with the information and regulations stated therein.
- The dates of registration for each quarter are announced in advance. Students whose initial registration occurs during the late registration period are subject to a late-registration fee. Inconvenience, illness, and other personal reasons for registering late are not accepted as reasons for waiving the

fee. Late registration is permitted only through the fifth full day of classes in any quarter.

- Credit is not given for work in a course in which a student is not properly registered.
- Duplicate course entries remain on the student's permanent record and are used to calculate the cumulative grade point average. However, credit is awarded only once.
- Credit is not given for certain courses that are prerequisites for a more advanced course if the prerequisite is taken after the more advanced course has been completed. Waiver of prerequisites for admission to courses may be obtained from the instructor concerned or the department in which the course is offered.
- Undergraduate students may not enroll for fewer than three quarter-courses in one academic quarter except by permission of the dean of their school. Permission is granted only in extraordinary circumstances.
- In Weinberg College, undergraduate students may not enroll for more than 4½ quarter-courses in one academic quarter except by permission of the dean's office (see www.weinberg.northwestern.edu/advising/rules/courseload.html). This regulation applies to total credit for courses taken at other institutions in addition to credit obtained in residence at Northwestern. Additional tuition may be charged for excess registration (see Undergraduate Residence Requirement).

Changes of Registration

Changes in registration in fall, winter, and spring quarters are subject to the following provisions:

- In no case may a course be added after the fifth day of classes. No course may be dropped after the sixth Friday of classes.
- Undergraduate students may change registrations from grade to the pass/no credit (P/N) option or vice versa through the third Friday of the quarter. Check regulations of the individual schools for specific information on the P/N option.
- To add a class, students must log on to CAESAR and add the course to their record. Consent of the department or instructor may be required. See the class schedule for specific course information.
- To drop a course, students must log on to CAESAR and drop the course from the record. In most cases no special consent is required.
- Changes in ungraded sections (laboratory or discussion) before the add deadline must be made in CAESAR. Changes in ungraded sections after the add deadline may be made in the department and do not require notifying the registrar.
- A course dropped by the sixth Friday of a quarter does not appear on the permanent academic record, and no grade is recorded.
- Failure to drop a course within the time allowed may result in a failure and may be recorded with a grade of F.

(See also Withdrawal from the University: Refunds and Change of Registration under Financial Regulations.)

Registration in the School of Continuing Studies

The School of Continuing Studies, with locations in Evanston, Chicago, and the Chicago Loop, operates on the quarter system. SCS courses are designed primarily for working adults, and enrollment caps limit the registration of students enrolled in an undergraduate school. Undergraduates may take SCS courses only with the approval of the office of the dean of their school and only when the courses are not given during the day or when there are clear cases of conflict. Priority is given to students who need a course to complete a major. Such work is counted as a regular part of a student's registration.

To register for SCS courses, students must

- Pick up a Dual Registration Form from the Office of the Registrar in Evanston.
- Secure approval from the office of the dean of their school.
- Turn in the form at the Office of the Registrar in Evanston before the first meeting of the class.

To drop an SCS course, students must log on to CAESAR and drop the course.

Interschool Transfers

Undergraduate students who wish to transfer from one school or college of the University to another must have an interschool transfer approved by the dean's office of each school. A return to the original school must be approved in the same way. Approval of an interschool transfer is usually contingent on satisfactory performance in the original school. The policy concerning interschool transfer can be found at www.registrar.northwestern.edu/graduation/Inter-School_Transfers.html. Consult the academic calendar at www.registrar.northwestern.edu/calendars for appropriate dates to process an application for interschool transfer.

Cancellation of Registration

Students who complete advance registration for a quarter and later decide not to attend classes that quarter must notify the Office of the Registrar in writing before the first day of classes of the quarter to avoid being charged the applicable tuition and fees.

Withdrawal from the University

Students who wish to withdraw from the University after registering for classes in any quarter must file a withdrawal form (available at the Office of the Registrar). The withdrawal takes effect the day the completed form, bearing the required signatures, is received at the Office of the Registrar. Students who have taken the final exam may not withdraw and must take the grade they earned. (See also Withdrawal from the University: Refunds under Financial Regulations.)

Readmission to the University

Undergraduate and graduate students who have not registered for one or more quarters of an academic year must file at the Office of the Registrar an application to reenter no later than six weeks before the first day of registration of the quarter in which they plan to return.

Students are not required to file the application to reenter if they

- Have registered during the spring quarter and intend to return in the fall
- Have registered in the spring quarter and intend to return during Summer Session of the same year
- Are students in the Graduate School who have attended the preceding Summer Session and intend to register during the next Summer Session and have not registered during the academic year

Students must obtain advance approval from the dean of their school if they wish to transfer credit for work taken elsewhere during an absence from Northwestern. An official signed and sealed transcript of that work must be furnished to the Office of the Registrar before the end of the next quarter in residence at Northwestern, or credit for such work is not allowed.

If a student interrupts a program of study for an extended period of time and if degree requirements are changed during this period, the new requirements normally must be met. Any modification of the requirements is made by the appropriate administrative officers of the school in which the student is registered.

Work at Other Institutions

After enrolling at Northwestern, students who want to study at other accredited institutions and transfer credit for that work to Northwestern must obtain advance approval of their proposed study. Forms for obtaining such approval are available at www.registrar.northwestern.edu/graduation/transferring_non-NU_Courses.html. The McCormick School Academic Services Office also has forms available for engineering students, and the Medill Office of Student Life has forms available for journalism students. Students in Weinberg College should secure the appropriate forms (and a copy of the regulations governing study away from Northwestern) in the Weinberg College Office of Undergraduate Studies and Advising. Students also should check the regulations for the Undergraduate Residence Requirement.

If courses are taken elsewhere during an absence from Northwestern (or during the summer), an official transcript of the work must be on file in the Office of the Registrar before the end of the next quarter in residence at Northwestern, or credit for such work is not allowed.

Students may not register concurrently at Northwestern and at another institution and receive transfer credit for work taken at the other institution unless permission is granted in advance by the office of the dean of their

school. This applies to evening courses as well as to regular courses in residence.

Petition to Graduate

Undergraduate students must submit a graduation petition one calendar year before they expect to graduate. Students in Weinberg College, the School of Communication, the School of Education and Social Policy, the Medill School of Journalism, and the Bienen School of Music submit petitions to the Office of the Registrar; McCormick School students submit petitions to their school's Academic Services Office. The name of any student who submits a petition less than two months before graduation may be omitted from the printed Commencement program.

Academic Advising

Academic advising is an essential component of an undergraduate education. All freshmen are assigned an academic adviser through their school. Upperclass students may obtain academic advice through their major department and from the dean's office of their school. Specialized advice on academic issues that transcend school boundaries — such as study abroad or field studies opportunities — may be obtained from the University Academic Advising Center. For other appropriate sources, students may consult the index of this catalog or the Northwestern web site.

In addition to meeting with an academic adviser on a regular basis, students should routinely check their degree progress report — accessible via the Student Center menu option at www.northwestern.edu/caesar — to ensure that they are meeting their degree requirements; any concerns about progress or discrepancies in the report should be promptly discussed with an adviser.

Classification of Students

Students are classified as follows:

- Senior: has completed at least 33 quarter-courses
- Junior: has completed at least 22 but less than 33 quarter-courses (engineering co-op students are considered pre-seniors when they have completed 32 quarter-courses and seniors when they have completed 40 quarter-courses)
- Sophomore: has completed at least 11 but less than 22 quarter-courses
- Freshman: has completed less than 11 quarter-courses
- Graduate student: has a bachelor's degree or equivalent and has been admitted to a graduate program
- Special student: is not working toward a degree at Northwestern but is working for credit
- Auditor: attends classes and listens to lectures but is not eligible to participate in class discussions or exercises and does not receive credit (not available to degree-seeking students)

For loan deferment and enrollment verification purposes, student status is defined as follows:

- Full-time: enrolled in at least three quarter-courses or the equivalent
- Half-time: enrolled in at least two but fewer than three quarter-courses or the equivalent
- Part-time: enrolled in fewer than two quarter-courses or the equivalent (also referred to as less than half-time)

Grading Policies

The following grading system is used in computing the grade point average:

<i>Grade</i>	<i>Grade Points</i>
A	4.0
A-	3.7
B+	3.3
B	3.0
B-	2.7
C+	2.3
C	2.0
C-	1.7
D	1.0
F	0
X Failed to earn credit: missed final examination	0
Y Failed to earn credit: work incomplete	0

The following notations are ignored in computing the grade point average:

- P Pass with credit
- N No grade, no credit
- K In progress
- S Satisfactory: noncredit course
- U Unsatisfactory: noncredit course
- W Withdrawn by permission

Northwestern University does not rank its students.

Pass/No Credit (P/N)

The P (pass) or N (no credit) option allows full-time students to explore fields beyond the areas of their specialization without concern about grade point average. Many undergraduate courses are open to the P/N option. For information about a particular school's P/N policy, see that school's chapter in this catalog.

Incomplete Course Work

At the end of a quarter a grade of X or Y will be given only if the instructor believes the student has a reasonable chance of passing the course by taking an examination or turning in the required work, or both. Some undergraduate schools prohibit the posting of X or Y grades without the approval of the dean's office. Students should contact their school for its regulations concerning X and Y grades.

If a grade of X or Y is to be changed and credit established, the deficiencies must be made up before the end of the next quarter in which the student is in residence in any school of Northwestern, or within one year after the

course was offered if the student is not in residence, or credit is forfeited.

A notation of K must be resolved before graduation. An unresolved K will be changed to Y and the grade point average recomputed.

Regular Examinations

Regular course examinations are held during the last week of each quarter at the times indicated in the quarterly class schedule and online at www.registrar.northwestern.edu/registration. Summer Session examinations are usually held at the last class meeting. Students are responsible for knowing the time and location of each examination. Early examinations are not permitted. Permission to be absent from the final examination is given by the instructor and the dean only for cause beyond the student's control. Normally such permission must be secured in advance of the date of the examination. Any deficiency must be made up before the end of the next quarter in which the student is in residence in any school of Northwestern, or within one year after the course was offered if not in residence, or credit is forfeited.

Makeup of Course Work and Examinations

All undergraduate students in residence in any school of Northwestern University must make up grades of X (absent) and Y (incomplete) before the end of the next quarter, or credit is forfeited. Students not in residence must make up all such grades within one year after the course was offered, or credit is forfeited. Those not in residence must also apply for any makeup examinations in advance. Permission to take a makeup examination to remove a grade of X must have the written approval of the instructor and the dean. Makeup examinations are conducted by the departments concerned early in each quarter. An application for a makeup examination must be filed several weeks in advance at the office of the school in which the course is offered. (See the academic calendar at www.registrar.northwestern.edu/calendars for exact dates the applications are due.)

Class Attendance and Absence

Students are expected to attend all sessions of the courses for which they are registered. Excessive absence is cause for failure in the course. Some courses require attendance at the first class meeting; students may be dropped for nonattendance (see the online class schedule at www.northwestern.edu/caesar).

Grade Reports

Quarterly grades are not mailed but are delivered through CAESAR (www.northwestern.edu/caesar). A printout of the CAESAR record may be made for verification purposes. Notices of deficiencies in scholarship may be reported to the student before the end of the quarter, but the University does not assume the responsibility of issuing such warnings.

Transcripts

Students who have satisfied all financial obligations to the University are entitled to an official transcript of their academic record, which they may request from the Office of the Registrar. Northwestern provides transcripts either on paper or in the form of a certified PDF that may be distributed securely. A fee is charged for all transcripts (see Service Fees under Tuition and Fees).

Except for internal educational uses or as otherwise required by law, Northwestern issues official transcripts only upon written authorization of the student concerned. Requests for transcripts initiated by persons or agencies other than the student or appropriate educational agencies will not be filled until written authorization has been secured from the student. When these requests can be anticipated, students can avoid delay by providing such authorization in advance. Because of the confidential nature of a student's record, telephone or e-mail requests for transcripts will not be accepted.

Current students can use their access to CAESAR to request an official transcript from the Office of the Registrar or to print unofficial copies for their personal use. Former students can order an official transcript by following the instructions at www.registrar.northwestern.edu/academic_records/obtaining_a_transcript.html. The site provides full information on the University's policies and procedures governing academic records.

Northwestern neither releases nor certifies copies of transcripts received from other schools or institutions. Students who study abroad and subsequently need a transcript of their course work must request it from the institutions they attended or through their study abroad programs.

Access to Student Records

Under the Family Educational Rights and Privacy Act (FERPA), all students have certain rights with regard to their educational records. A copy of Northwestern's student records policy is available at www.registrar.northwestern.edu/academic_records/FERPA_policy.html.

FERPA grants students various rights, including the rights to

- Inspect and review their educational records at Northwestern University
- Request an amendment of their records to ensure that the records are not inaccurate, misleading, or otherwise in violation of privacy or other rights
- Consent to release or to restrict disclosure of personally identifiable information contained in their educational records, except under certain limited circumstances when, by law, consent is not required
- File a complaint with the U.S. Department of Education concerning alleged failures by Northwestern University to comply with FERPA requirements

The University's Use of E-mail

E-mail is the University's mechanism for official communication with students, and Northwestern has the right to expect that students will read official e-mail in a timely fashion.

All students are assigned a u.northwestern.edu address that is maintained in the University e-mail directory. Northwestern provides a convenient mechanism for students who want to forward e-mail from the University address to another e-mail address of their choice, but students assume the risk of forwarding e-mail. Failure to receive or read University communication that was sent to the u.northwestern.edu address does not absolve a student from knowing and complying with the content of the communication.

Faculty may use e-mail for communicating with students registered in their classes so that all students will be able to comply with course requirements.

Academic Integrity

Academic integrity at Northwestern is based on a respect for individual achievement that lies at the heart of academic culture. Every faculty member and student, both graduate and undergraduate, belongs to a community of scholars in which academic integrity is a fundamental commitment.

Students enrolled at Northwestern are expected to adhere to the University's standards of academic integrity. Questions about the acceptability of specific behavior should be addressed to the appropriate faculty member or school dean. The following is a nonexhaustive list of types of behavior that violate the standards of academic integrity:

- *Cheating*: using unauthorized notes, study aids, or information on an examination; altering a graded work after it has been returned, then submitting the work for regrading; allowing another person to do one's work and submitting that work under one's own name; submitting identical or similar papers for credit in more than one course without prior permission from the course instructors
- *Plagiarism*: submitting material that in part or whole is not entirely one's own work without attributing those same portions to their correct source (material discussing the use and acknowledgment of sources is available in the Office of the Provost)
- *Fabrication*: falsifying or inventing any information, data, or citation; presenting data that were not gathered in accordance with standard guidelines defining the appropriate methods for collecting or generating data and failing to include an accurate account of the method by which the data were gathered or collected
- *Obtaining an unfair advantage*: stealing, reproducing, circulating, or otherwise gaining access to examination materials prior to the time authorized by the instructor; stealing, destroying, defacing, or concealing library materials with the purpose of depriving others of their

use; unauthorized collaborating on an academic assignment; retaining, possessing, using, or circulating previously given examination materials, where those materials clearly indicate that they are to be returned to the instructor at the conclusion of the examination; intentionally obstructing or interfering with another student's academic work; otherwise undertaking activity with the purpose of creating or obtaining an unfair academic advantage over other students' academic work

- *Aiding and abetting dishonesty*: providing material, information, or other assistance to another person with knowledge that such aid could be used in any of the violations stated above; providing false information in connection with any inquiry regarding academic integrity
- *Falsification of records and official documents*: altering documents affecting academic records; forging signatures of authorization or falsifying information on an official academic document, grade report, letter of permission, petition, ID card, or any other official University document
- *Unauthorized access to computerized academic or administrative records or systems*: viewing or altering computer records; modifying computer programs or systems; releasing or dispensing information gained via unauthorized access; interfering with the use or availability of computer systems or information

It is the responsibility of every member of the academic community to be familiar with the specific policies of his or her school. A student who violates these policies may be subject to sanctions, including but not limited to one or more of the following: a letter of warning; a defined period of probation with the attachment of conditions; a period of suspension with or without the attachment of conditions; course failure; notation on the official record; exclusion from the University, with notation on the transcript; or revocation of an awarded degree. A student may not change his or her registration in a course in which a violation of academic integrity has been alleged, regardless of whether the allegation has been referred to the designated school official. Nor may a student receive a University degree while a finding is pending or while a suspension has been imposed pursuant to a finding. Information on procedures that will be followed in cases of alleged dishonesty can be obtained from the dean's office of each school. A complete statement of the University's principles regarding academic integrity can be obtained from the Office of the Provost.

The student-faculty Undergraduate Academic Conduct Committee works to maintain a high level of academic integrity at Northwestern; on the request of the provost, that committee also hears appeals from students of school decisions concerning academic dishonesty. Such appeals must be in writing and include a detailed statement setting forth the grounds for the appeal. Appeals to the provost are limited to alleged errors in procedures, interpretation of regulations, or the question of whether a finding or sanction appears manifestly contrary to the evidence. The provost will receive

appeals only after a sanction has been specified for the alleged violation and the appropriate appeal process at the school level has been exhausted; an appeal to the provost may concern the finding and/or the proposed sanction.

Academic Standing

The decision concerning the academic standing of a student is the responsibility of the faculty of the school in which the student is registered.

Academic probation constitutes notice of unsatisfactory academic performance; it is a warning that minimum standards for graduation are not being met. Unless a student demonstrates significant scholastic improvement during the period of probation and thereby indicates ability to fulfill degree requirements within a reasonable period of time, the student may be dismissed from the University. A student will be notified in writing no later than the middle of a term that, because of unsatisfactory work in a previous term or terms, he or she will be excluded in the event of unsatisfactory work during the term for which the notice is issued.

Academic Probation

The following are ordinarily placed on academic probation:

- Students who have received final grades below C in two or more courses in any quarter or Summer Session
- Sophomores, juniors, or seniors who have a cumulative academic record below a C average on all work attempted at Northwestern University
- Students who have failed to complete at least three quarter-courses or the equivalent in each of two consecutive quarters
- Students who, on account of dropped courses, failure, or uncompleted courses, have failed to earn credit for an average of three quarter-courses per quarter after 6 quarters of residence
- Students who have failed to maintain a C average in the major or a professional field of study

The faculty of each school may impose such additional conditions of academic probation as they may deem appropriate.

Removal from Academic Probation

Students on academic probation are ordinarily removed from probation if the deficiencies that resulted in probation have been remedied during the next succeeding quarter in residence. Students are rarely removed from probation on the basis of a program consisting of less than four courses graded on a basis other than the pass/no credit option.

If students on probation who receive grades of X or Y are not dismissed, probation continues until they have completed all courses or until the end of the next quarter in residence, when the students' records are again subject to scrutiny.

In no case are students removed from probation at the end of a quarter in which they have failed any course.

Academic Dismissal

The following is a partial list of categories of students who may be dismissed for academic deficiencies (in every case the decision is determined in part by the student's cumulative academic record):

- Students on academic probation whose academic records have not improved significantly during the period of probation (which will not normally exceed two consecutive quarters)
- Students not on academic probation who fail in half the work in any quarter or Summer Session
- Students who demonstrate flagrant neglect of academic work at any time
- Students who do not make satisfactory progress toward completion of degree requirements

As a matter of general policy, the probation period for a freshman may be extended to the third quarter of residence if such extension appears to be in the best interests of the student and the University. Such consideration is not granted to a freshman whose record clearly discloses lack of aptitude or flagrant neglect of work.

Disciplinary Dismissal

Students suspended from Northwestern by the University Hearing and Appeals Board or the Sexual Assault Hearing and Appeals System may not receive Northwestern credit for academic work at any other institution during the period of suspension.

HONORS AND PRIZES

Graduation with School Honors

Degrees with honors are awarded to the top 25 percent of the graduating class within each undergraduate school, as determined by grades in all work at Northwestern University. Students in the highest 5 percent of the class are awarded degrees *summa cum laude*; those in the next 8 percent, *magna cum laude*; and those in the next 12 percent, *cum laude*. Graduation honors are not announced before Commencement, and the GPA cutoffs for each level of honors based on the stated percentages are not made public.

Graduation with Departmental Honors

Departmental honors may be granted to graduating seniors who have done outstanding work in a department in connection with a research project or work of an integrative nature. Students are nominated for these honors by their departments. The faculty of the school concerned makes the final awards. See the school chapters of this catalog for more information on departmental honors.

Honorary Organizations and Prizes

Students who qualify by reason of superior scholarship or other outstanding achievement are eligible for membership in certain honorary societies. Some of these recognize

outstanding performance within one of the undergraduate schools, while others recognize distinction in a specific field of study, certain extracurricular options, or other endeavors.

In addition, several prizes established through gifts and endowments are awarded each year to undergraduate students at Northwestern. Some are all-University prizes, and others are available only to students in the school, department, or program that administers the awards. Prizes may recognize past achievements or provide students with funding for research projects or creative activities. See the section on funding for student research on page 25.

SPECIAL ACADEMIC OPPORTUNITIES

Double Major

Some students complete two majors. Often both majors are in the same undergraduate school, but completing majors in two different schools may also be an option. See the relevant school and department sections in this catalog for details.

Self-Designed Major

A self-designed major permits students, with the permission of the school's curriculum committee or dean, to concentrate advanced study in an area other than one of those recognized through a departmental or interdisciplinary major. This option is identified as an ad hoc major in Weinberg College and the Bienen School of Music, as the interdepartmental studies major in the School of Communication, and as the Combined Studies Program in the McCormick School.

Dual Bachelor's Degree Programs

Qualified students may undertake a program to receive bachelor's degrees from two different undergraduate schools at Northwestern. Five years of full-time study are usually required. The following options are available:

- BA/BS in liberal arts and engineering
- BA/BMus in liberal arts and music
- BS/BMus or BS/BAMus in engineering and music
- BSJ/BMus or BSJ/BAMus in journalism and music

For information on applying to the combined music programs, see Application to Dual Bachelor's Degree Programs on page 11. For descriptions of all the programs, including requirements, see the Cross-School Options chapter of this catalog.

Accelerated Degree Programs

Honors Program in Medical Education

The Honors Program in Medical Education (HPME) provides an opportunity for highly talented high school seniors to be admitted to an undergraduate program and to the Feinberg School of Medicine and to complete their formal premedical and medical studies in seven or eight years. Each year a small number of students are

admitted to the program and to Weinberg College, the School of Communication, or the McCormick School. For information on applying to HPME, see Special Admission Programs on page 11. For a description of the program, including requirements for students in the different undergraduate schools, see the Cross-School Options chapter of this catalog.

Integrated Science Program

The Integrated Science Program (ISP) is a highly selective undergraduate program of integrated science studies within Weinberg College. The curriculum provides a thorough and rigorous background in the major scientific disciplines and mathematics and offers special research opportunities. ISP can lead to a bachelor's degree in three years or, after a fourth year at Northwestern, to a double major or an advanced degree. For information on applying to ISP, see Special Admission Programs on page 11. For a description of the program, see page 108 in the Weinberg College chapter of this catalog and www.isp.northwestern.edu.

Accelerated Master's Programs

Combined bachelor's/master's degree programs enable exceptional undergraduates in the McCormick School, the Medill School of Journalism, and certain departments of Weinberg College to receive both degrees in less than the usual time. The programs are highly demanding intellectually and require early commitment to a discipline and careful planning. See Accelerated Master's Programs in the McCormick, Medill, and Weinberg College chapters of this catalog for more information on options and requirements.

Teaching Certification

Weinberg College students may complete the requirements of the secondary teaching program and qualify for Illinois state certification. See Teacher Certification at Northwestern in the School of Education and Social Policy chapter of this catalog.

Study Abroad

Northwestern encourages qualified students to study abroad when such study promises to enrich their academic programs. With early planning, most students, regardless of school or major, should be able to study abroad during the academic year and still graduate within four years. Students may also study abroad during the summer on one of Northwestern's summer programs or on an approved non-Northwestern program.

The Study Abroad Office provides information and advising services to all students interested in study abroad. Approval from the University Study Abroad Committee and the Study Abroad Office is required before the study abroad experience. Students must submit a study abroad application, including signatures from school advisers and,

in many cases, department advisers, to the Study Abroad Office. All students approved by Northwestern to study abroad remain registered at Northwestern while abroad.

Most Northwestern students studying abroad do so on one of more than 100 programs administered by or affiliated with the University. Students participating in University exchange programs continue to pay Northwestern tuition. For all other programs, students pay the program fee plus a Northwestern administrative fee. Students participating in affiliated programs may apply for financial aid, including Northwestern grant assistance, to help offset the cost of their programs.

Students who wish to participate in unaffiliated programs must petition for permission to apply through the Study Abroad Office. No financial aid is available from the University for students on unaffiliated programs, and Northwestern cannot process their outside aid.

Since study abroad often requires special language or other preparation, interested students should consult with the Study Abroad Office early in their Northwestern careers. The office hosts information sessions and has an extensive resource library with detailed information on affiliated programs and study abroad policies. For more information please see its web site at www.northwestern.edu/studyabroad.

Field Study and Internships

Many off-campus field studies and internships, and research opportunities sponsored by various schools and departments, are available to Northwestern students. The programs vary greatly: Some carry academic credit and/or a stipend. Some are done in conjunction with course work, while others require full-time commitment and may involve living away from campus. Field study and internship opportunities are available during both the regular academic year and Summer Session. See the individual schools and departments in this catalog for details. Additional information on internship opportunities is available from University Career Services.

Special Courses

Student-Organized Seminars (SOS)

Students who wish to pursue studies not included in the catalog can plan and initiate their own courses under the supervision of sponsoring faculty members. SOS credit courses may be developed in all undergraduate schools except the Medill School of Journalism.

Residential College Tutorials

With the sponsorship and participation of a faculty member, students in a residential college may organize a course on a topic of special interest. Proposals must be approved by the dean's office of the appropriate school, and enrollment is normally limited to 10 members of the residential college.

Independent Study (399)

Many departments offer undergraduate seminars and independent studies for qualified students. A 399 course in any department enables a student to engage in individual special study and research, which may involve work in a laboratory or library, fieldwork outside the University, or the creation of a work of art. The maximum credit a student may receive for 399 (or equivalent independent study) during any one quarter is two units.

Funding for Student Research

Students interested in engaging in research or creative projects under faculty guidance may inquire about funding from their school or department or apply to the Undergraduate Research Grants Program. Administered by the Office of the Provost and open to all undergraduates regardless of major, the program offers grants at three levels: up to \$1,000 for quarter-long research projects during the academic year; up to \$3,000 for full-time (eight-week) summer projects; and up to \$500 for travel to an academic meeting to present research findings or creative productions. Projects entailing international travel are eligible for additional funds. Each spring's Undergraduate Research Symposium, organized by the Office of the Provost, offers a showcase for student projects.

Northwestern Immersion Experience

Open to all Northwestern undergraduates, Northwestern's Immersion Experience program allows students to focus intensively on one project for one quarter or longer. Limited only by the student's interests and imagination, the project may be pursued on campus or off, in the United States or abroad. Students may even find or design their own immersion experiences. The Office of the Provost offers grants of up to \$2,000 for students whose projects cannot be completed or funded through existing programs. In addition, language grants of up to \$2,000 are available to fund intensive summer language study at approved centers around the country and the world. More information is available at www.northwestern.edu/immersion.

Key to Course Numbers

Although the course listings in this catalog are as complete and exact as is possible at the time of printing, some changes may occur later, and courses may be dropped or added. The class schedule for each quarter is posted at www.northwestern.edu/caesar and contains a complete and updated listing of classes for that quarter. The University reserves the right to cancel classes for which registration is not sufficient.

Course Credits and Quarters

Daytime work in all the schools on the Evanston campus is on the quarter system. A quarter-course, the unit of instruction, is the work done in a class meeting at least three hours per week and carries the value of one unit of credit. Exceptions are courses meeting less than three hours per week, which may carry less than one unit, and 15-week courses, which carry 1.5 units. A quarter-course is the equivalent of $2\frac{2}{3}$ semester hours. (For transfer to other institutions or for certification stated in credit hours, undergraduates may consider a quarter-course equivalent to four quarter hours of credit.)

Numbering System

Three sets of characters denote all courses:

- The first set is the subject code indicating the area of study.
- The second set is a three-digit course number:
 - *100-level* courses are primarily for freshmen and sophomores, usually without college prerequisite.
 - *200-level* courses are primarily for freshmen, sophomores, and juniors, sometimes with the prerequisite of a 100-level course in the same or a related department.
 - *300-level* courses are primarily for upperclass students, with the prerequisite of junior standing or a 100- or 200-level course in the same or a related department.
 - *400-level* courses or seminars, in which the major part of the work is not research, are primarily for graduate students; they may be open to advanced undergraduate students with permission.
 - *500-level* courses or seminars are graduate courses in which the work is primarily research.
- The third set (one, two, or more numbers) usually indicates whether the course is part of a sequence.
 - -0 = one-quarter course
 - -1,2 = two-quarter sequence
 - -1,2,3 = three-quarter sequence

Special characters identify certain groups of courses.

If a course is taught only through a Northwestern study abroad program, the designation SA is included with the course number. Other designations may be used by the individual departments; see departmental listings for details.

If a course carries less or more than one unit of credit, the number of units follows the course title in parentheses — e.g., (1.5) or (1.5 units) = 1.5 units of credit.

Cross-School Options

Northwestern values interdisciplinarity. Many Northwestern faculty are members of more than one department or program, and many of their academic endeavors cut across traditional fields of study. Similarly, many Northwestern students have interests that span traditional academic boundaries.

Each of Northwestern's six undergraduate schools has its own unique curriculum, but many courses across the University are open to students from all six undergraduate schools. In addition, each school offers majors, minors, certificates, field studies, or other programs in which students from other schools may participate. Collaborative efforts involving more than one undergraduate school, an undergraduate school and a graduate program, or a University center or institute provide additional options for students. The University is committed to developing programs that build pedagogical and intellectual bridges between disciplines and across schools to create new interdisciplinary opportunities for undergraduates.

SCHOOL-BASED OPTIONS FOR ALL UNDERGRADUATES

In the Weinberg College of Arts and Sciences

Nearly all majors and minors in Weinberg College are open to students from Northwestern's other undergraduate schools. These include traditional fields of study in the social sciences, the humanities, mathematics, and the natural sciences, as well as many interdisciplinary majors and minors. Students from throughout Northwestern may also participate in the Chicago Field Studies programs housed within Weinberg College. For more information on these options, see the Weinberg College chapter of this catalog.

In the School of Communication

The School of Communication offers several programs open to students from other schools. These include the following:

- Dance minor
- Film and media studies minor
- Human communication sciences minor
- Internship program
- Sound design minor
- Theatre minor

See the School of Communication chapter of this catalog for more information.

In the School of Education and Social Policy

The School of Education and Social Policy offers two programs that are open to Northwestern undergraduates regardless of school: the Civic Engagement Certificate Program and the Summer Field Studies programs in Chicago, Washington, D.C., and San Francisco. For more information on these programs, see the School of Education and Social Policy chapter of this catalog.

Additionally, Weinberg College students may pursue secondary teaching certification in a variety of subject areas through the School of Education and Social Policy's teacher preparation program.

In the McCormick School of Engineering and Applied Science

The certificate in engineering design, administered by the Segal Design Institute of the McCormick School, is open to undergraduates from other schools. For details on requirements, see the McCormick School chapter of this catalog.

In collaboration with McCormick School departments, Weinberg College offer majors and/or minors in computer science, environmental sciences, and materials science. For details on these options, see the Weinberg College chapter of this catalog.

In the Medill School of Journalism

The Medill School offers a certificate in integrated marketing communications open to undergraduates throughout Northwestern and including prerequisite courses from the other undergraduate schools. Details on prerequisites and requirements can be found in the Medill School chapter of this catalog.

In the Bienen School of Music

Several minors in the Bienen School are open to students from other schools. These include the following:

- Commercial music
- Jazz studies
- Music cognition
- Music composition
- Musicology
- Music technology

In addition, any nonmusic major may complete a concentration in music. Information on these options, including course requirements and application instructions, can be found in the Bienen School chapter of this catalog.

DUAL BACHELOR'S DEGREE PROGRAMS

Cross-school collaborations provide opportunities for undergraduate students to complete course work in two Northwestern schools concurrently and to receive bachelor's degrees from both schools. Students may choose from four dual bachelor's degree programs:

- BA/BS in liberal arts and engineering
- BA/BMus in liberal arts and music
- BS/BMus or BS/BAMus in engineering and music
- BSJ/BMus or BSJ/BAMus in journalism and music

Completion of any of these programs typically requires five years of full-time study, and students have an Undergraduate Residence Requirement (URR) of 15 quarters (see page 17 in the Undergraduate Education chapter of this catalog).

Students apply to the BA/BS program after matriculating. For information on applying to the other three programs, see page 11. Students receiving financial aid should also note the restrictions under Satisfactory Academic Progress and Financial Aid on page 15.

Liberal Arts and Engineering Program

Qualified Northwestern undergraduates with strong interests in the liberal arts as well as engineering may elect to earn both a bachelor of arts degree in a liberal arts discipline from Weinberg College and a bachelor of science degree in an engineering field from the McCormick School (BA/BS). Students may pursue any combination of majors from the two schools. They must complete all requirements of both schools and both majors and are subject to all regulations of both schools and a 15-quarter URR. The one exception is that students may be exempted — by decision of the Weinberg College associate dean for undergraduate academic affairs — from the rule that a maximum of 11 non-Weinberg College courses may be counted toward requirements for a Weinberg BA degree.

Interested students most often begin their studies in the McCormick School. To do the necessary planning, they should consult with Weinberg College's Office of Undergraduate Studies and Advising and the undergraduate engineering dean's office in the McCormick School as soon as possible after enrolling at Northwestern. Students should meet regularly with advisers in both schools to discuss their progress toward completion of both sets of requirements.

Liberal Arts and Music Program

Some Northwestern undergraduates choose to combine intensive study in music with a broad exploration of the liberal arts and a major in a liberal arts discipline. Students accepted into the Weinberg College–Bienen School of Music dual bachelor's degree program may simultaneously earn a bachelor of arts degree from Weinberg College and a bachelor of music degree from the Bienen School (BA/BMus). They must complete all Weinberg College degree requirements, including at least 30 Weinberg courses, as

well as all Bienen School degree requirements, including at least 30 music courses, and a 15-quarter URR.

Participants in this program must be accepted by both Weinberg College and the Bienen School. Students work closely with academic advisers from both schools to develop an individual curricular program. Most follow a balanced curriculum in which about half of the course work each year is done in each school. It is possible, however, to take mostly courses in one school in the earlier years and to then take mostly courses in the other school. Current students interested in this program should consult with the associate dean for undergraduate studies in Weinberg College and the assistant dean for admission and student affairs in the Bienen School.

Engineering and Music Program

Highly capable students who have a strong interest in and commitment to both engineering and music may apply to the McCormick School–Bienen School dual bachelor's degree program. Students accepted into this program may simultaneously earn a bachelor of science degree from the McCormick School and a bachelor of music or bachelor of arts in music degree from the Bienen School (BS/BMus or BS/BAMus). They must complete all McCormick School degree requirements, including at least 36 McCormick courses, as well as all Bienen School degree requirements, including at least 30 music courses, and a 15-quarter URR. Any field of study in engineering may be chosen, resulting in a bachelor of science degree in the chosen field.

The program may be entered no later than the beginning of the sophomore year, and admission requires concurrent approval of both the McCormick School and the Bienen School. Current students interested in this program should consult with the undergraduate engineering dean's office in the McCormick School and the assistant dean for admission and student affairs in the Bienen School.

Journalism and Music Program

This dual bachelor's degree program allows extremely talented students to earn both a bachelor of science in journalism from the Medill School and a bachelor of music or bachelor of arts in music degree from the Bienen School (BSJ/BMus or BSJ/BAMus). The program is intended to prepare students for journalism careers emphasizing music and arts reporting. Prospective students typically apply to the program while applying for undergraduate admission to Northwestern.

The program requires completion of all Medill School degree requirements, including at least 35 Medill courses, as well as all Bienen school degree requirements, including at least 30 music courses, and a 15-quarter URR. Students must fulfill all minimum GPA requirements for journalism classes and for the Journalism Residency. The three freshman journalism classes and core music classes are taken during the

freshman year. Students complete the Journalism Residency and all prerequisite course work in a concentrated 1½-year time frame — either during their second and third years or during their third and fourth years of enrollment. Students should work with advisers from both schools to develop a timeline for completing all requirements.

COLLABORATIONS WITH THE GRADUATE AND MEDICAL SCHOOLS

Accelerated Master's Programs

Accelerated master's programs enable exceptional undergraduates in Weinberg College, the McCormick School, and the Medill School to receive both bachelor's and master's degrees in less than the usual time. The programs are highly demanding intellectually and require early commitment to a discipline and careful planning.

In Weinberg College students receive permission to double-count some courses toward both bachelor's and master's degrees so that both degrees can be completed in four years. The following Weinberg College departments and programs have combined degree programs approved by the Graduate School: chemistry, earth and planetary sciences, economics, French, and linguistics. See the Weinberg College chapter of this catalog for the general information on accelerated master's programs (page 39) as well as the relevant department information.

In the McCormick School a BS/MS program in engineering allows advanced students to complete the BS requirements early (usually through Advanced Placement/International Baccalaureate or transfer credit) and to accelerate study toward a master's degree. For more information see Accelerated Master's Program in the McCormick School chapter of this catalog.

Students in the Medill School who exhibit exceptional ability in undergraduate work may apply to that school's graduate division for early admission to the graduate editorial program. This program allows students to qualify for bachelor of science in journalism and master of science in journalism degrees in 12 to 15 quarters of full-time study. For more information see Accelerated Master's Program in the Medill School chapter of this catalog.

Honors Program in Medical Education

www.feinberg.northwestern.edu/AWOME/HPME

The Honors Program in Medical Education (HPME) provides an opportunity for highly talented high school seniors to be admitted to an undergraduate program and to the Feinberg School of Medicine and to complete their formal premedical and medical studies in seven or eight years. Applicants should be able to qualify for advanced placement in chemistry and mathematics. Each year a small number of students are admitted to the program and to Weinberg College, the School of Communication, or the McCormick School. Only candidates applying directly

from high school are considered. For information on applying, see Special Admission Programs on page 11.

The first three or four years of the program are spent in undergraduate study, during which students must complete 36 courses that meet HPME requirements; these include required courses in chemistry, physics, and the biological sciences, as well as courses that meet the requirements for HPME students in an undergraduate school. To remain in the program, students must maintain designated grade point averages both in required science courses and overall. They must satisfy an Undergraduate Residence Requirement of 9 full-time quarters (see page 17 in the Undergraduate Education chapter of this catalog). Only courses taken at Northwestern or on an approved study abroad program may be used to satisfy this enrollment policy.

In addition to the required science courses, HPME students enrolled in Weinberg College fulfill the college's general education requirements by taking courses in the humanities, social sciences, and arts. In the first year they complete at least 1 freshman seminar. The third year is usually devoted to completing the requirements for a BA in Weinberg College by doing advanced course work in the major and/or to studying abroad in a Northwestern-affiliated program. Students may also take an additional undergraduate year at Northwestern.

Students in the McCormick School spend three or four years pursuing an in-depth education in mathematics, the sciences, and engineering while taking core courses in biomedical engineering. To supplement their technical courses, students also take courses in the humanities and the social sciences.

Students in the School of Communication's Department of Communication Sciences and Disorders supplement their HPME science requirements with courses in the social sciences, humanities, and the arts. At the same time, as majors in human communication sciences, they study the basic science principles underlying human communication and cognition, as well as hearing, speech, language, and learning disorders. Through exposure to both research and clinical activities, they consider the relationship between basic science and real-life health issues.

After the first three or four years, HPME students move to the Chicago campus as members of the first-year Feinberg School of Medicine class. After successfully completing their first year at the Feinberg School, Weinberg College students who have not received a BA degree qualify for a bachelor of science in medicine, and School of Communication students qualify for a bachelor of science in communication. After the second year of medical school, McCormick School students qualify for a bachelor of science in medical engineering. At the end of seven or eight years, HPME students qualify for the doctor of medicine degree from the Feinberg School.

Premedical Scholars Program

www.feinberg.northwestern.edu/nupsp

Each year five undergraduates are accepted into the Northwestern Undergraduate Premedical Scholars Program, guaranteeing acceptance into the Feinberg School of Medicine and offering participation in its preprofessional experiences. See the web site for more information.

MANAGEMENT CERTIFICATES FOR UNDERGRADUATES

www.kellogg.northwestern.edu/certificate

The Kellogg School of Management administers a program leading to an undergraduate certificate in either financial economics or managerial analytics. Each certificate requires completion of 4 courses taught at an advanced level by Kellogg professors. Building on students' existing analytical skills, the certificate curriculum serves as excellent preparation for careers in the financial services and consulting industries and/or for doctoral or professional school programs.

About 100 students each year are accepted into the certificates program through a competitive application process. They must meet rigorous course prerequisites in advanced calculus and linear algebra, intermediate probability and statistics, advanced econometrics/statistics, microeconomics, and optimization. Students apply at the end of their sophomore or junior year for participation during the following school year. Applications are due during winter quarter.

In addition to course work, certificate students who start the program in their junior year may complete an internship at a company or conduct research with a Kellogg faculty member during the summer before their senior year. A dedicated career services professional helps certificate students in planning and preparing for their careers and securing both summer and full-time employment.

Certificate in Financial Economics

Any Northwestern undergraduate student who has completed the prerequisite courses — see www.kellogg.northwestern.edu/certificate for a list — is eligible to apply for this certificate. The financial economics curriculum comprises the following 4 courses.

KELLG FE 310 Principles of Finance Foundation course for the certificate; taken in the fall. Basic principles of finance, focusing on the effects of time and uncertainty on value. First half emphasizes valuation, including discounted cash flows, equity and debt valuation, the term structure of interest rates, portfolio theory, asset pricing, and efficient market theory. Second half examines firms' financing decisions, including capital budgeting, capital structure, and payout policy.

KELLG FE 312 Investments Active portfolio strategies in bonds and stocks, optimal portfolio selection from the perspective of individual and institutional investors, and the role of style and performance benchmarks in portfolio

management. Other special topics, including performance evaluation and trading costs.

KELLG FE 314 Derivatives Use and pricing of forwards and futures, swaps and options. Strategies for speculation and risk management, no-arbitrage pricing for forward contracts, the binomial and Black-Scholes option pricing models, and applications of pricing models in other contexts.

KELLG FE 316 Topics in Financial Economics Examines different topical finance issues each year.

Certificate in Managerial Analytics

Any Northwestern undergraduate who has completed the prerequisite courses — see www.kellogg.northwestern.edu/certificate for a list — is eligible to apply for this certificate. The managerial analytics curriculum comprises the following 4 courses.

KELLG MA 320 Analytical Decision Modeling Foundation course for the certificate; taken in the fall. Structuring, analyzing, and solving business decision problems on Excel spreadsheets and examining problems involving resource-allocation decisions and risk analysis of decisions under uncertainty. Some data analysis and demand forecasting. Topics include analysis of resource-allocation decisions by Solver optimization; risk analysis of decisions involving uncertainty by Monte Carlo simulation; modeling and analysis of sequential decisions by decision trees; data analysis by pivot tables and filters; demand forecasting by time series analysis.

KELLG FE 310 Principles of Finance See Certificate in Financial Economics.

KELLG MA 322 Pricing Comparison of the three main ways to set prices (haggling/negotiation, posted price, and auctions) and how to choose the best method in a given situation. Customizing the price of the same product or service to different segments, using optimization models to set prices when volume is uncertain, as well as pricing multiple products. Introduction to some of the main techniques (regression, conjoint analysis, EVC) for gathering information about buyer valuations and demands.

KELLG MA 324 Operations and Supply Chain Strategy

Provides framework for determining what key capabilities an operation and a supply chain must develop to support the business strategy of a firm and the relationship between the desired capabilities and the structure of a supply chain. Exposure to methodologies and analysis that support operations and supply chain strategy and planning decisions. Analysis uses case studies and development of analytical spreadsheet models.

ADDITIONAL OPTIONS

Environmental Science, Engineering, and Policy

www.wcas.northwestern.edu/eseep

The program in environmental science, engineering, and policy is designed to provide students with an

interdisciplinary understanding of the biological, chemical, and physical environment, the relations of humans to the environment, and the impacts of past, current, and possible future interventions. Although many aspects of environmental problems lie within the purview of the natural sciences and engineering, others are addressed in the social sciences and humanities. Effectively confronting environmental issues requires broad training and collaboration among experts in diverse fields. Environmental science students are prepared to tackle complex environmental problems in a rigorous way and with an appreciation of the related science, engineering, and policy issues. Similarly, environmental engineering involves an understanding of engineering analysis and design combined with an understanding of human use of and effects on the environment. The development and implementation of effective environmental policy require understanding of relevant aspects of human behavior, the natural world, and their interactions.

The program in environmental science, engineering, and policy is coadministered by Weinberg College and the McCormick School. It offers two majors:

- Environmental sciences (see the Weinberg College section of this catalog for a detailed description)
- Environmental engineering (see the McCormick School section of this catalog for a detailed description)

Sustainability and Energy

www.isen.northwestern.edu

Undergraduate and graduate courses in energy and sustainability have been developed by the new Initiative for Sustainability and Energy at Northwestern (ISEN). They include broad survey courses with no prerequisites that are open to students from all six undergraduate schools. ISEN approaches education with an interdisciplinary style involving team teaching by faculty from different departments and programs.

ISEN was established in 2008 to create, advance, and communicate new science, technology, and policy related to sustainability and energy. It supports on-campus research at the undergraduate, graduate, and postdoctoral levels spanning multiple fields, including physical and social sciences, engineering, law, policy, ethics, business, economics, and journalism. It also sponsors related non-classroom activities and promotes relevant activities of other Northwestern areas.

A list of courses on energy and sustainability offered throughout the University is available on the ISEN web site.

Transportation and Logistics

<http://transportation.northwestern.edu>

The interschool Transportation and Logistics Program offers a minor that is available to all undergraduates.

Passenger and freight transportation represents nearly a fifth of the U.S. gross domestic product and influences every aspect of our lives: where we live, where we work, and the goods we can purchase. The study of transportation and logistics is inherently interdisciplinary, reaching across disciplines, schools, and departments. Northwestern offers relevant courses through the Departments of Civil Engineering and Industrial Engineering and Management Sciences in the McCormick School and the Department of Economics and other social science departments in Weinberg College. This minor offers undergraduates the opportunity to obtain a more rounded education in transportation and logistics than that offered within their selected majors. The curriculum equips students with a broad understanding of the economics, engineering, and operations of transportation and logistics systems and the role of public policy.

The minor is administered by the Transportation Center, an interdisciplinary research center founded in 1954. The center's affiliated faculty are drawn from many of the participating departments. Additional information about the program is available from the Transportation Center.

Minor in Transportation and Logistics

Students are required to complete 7 courses, of which 1 is a required course. The other 6 courses must include at least 3 core courses, at least 2 of which must be outside the school in which the student is majoring.

Students in the McCormick School may double-count a maximum of 2 courses from their major program toward the minor. Students from other schools are not allowed to double-count courses that are part of their major but may count courses that fulfill related course, distribution, or social science and humanities requirements. It is assumed that students will already have taken courses in calculus and in probability and statistics as part of their major.

Prerequisites

It is assumed that students in the minor will already have taken courses in calculus and probability and statistics as part of their major.

Minor requirements (7 units)

- TRANS 310
- 3 or more core courses
 - Chosen from ECON 310-1, 355; CIV ENV 371, 376, 382; IEMS 310 or 313, 381, 383.
 - 2 must be outside the student's major school.
 - No substitutions are allowed.
- 3 additional courses selected from core courses or approved electives
 - Approved electives include
 - ECON 309, 337, 349, 350, 354, 361, 370, 381-1,2
 - GEOG 341, 343
 - HISTORY 322-2

- POLI SCI 221, 321, 329
- SOCIOL 301, 312
- CIV ENV 304, 338, 360
- IEMS 315, 317, 382
- IEMS 326 or ECON 360
- 1 unit of approved independent study
- Students in the McCormick School may double-count a maximum of 2 courses from their major program toward the minor.
- Students from other schools are not allowed to double-count courses that are part of their major but may count courses that fulfill related course, distribution, or social science and humanities requirements.

Courses

TRANS 310-0 Seminar in Transportation and Logistics

Yearlong senior seminar on the structure of the transportation and supply-chain industries and evaluation of relevant public policy. Students receive 1 credit in the spring quarter of their senior year.

TRANS 399-0 Independent Study Advanced work chosen by mutual agreement with a faculty member. Only 1 unit may count toward the minor. Consent of faculty required.

Undergraduate Leadership

www.northwestern.edu/lead

The interschool Undergraduate Leadership Program is a certificate program open to all Northwestern undergraduates. The program helps students understand the nature of leadership and prepares them to become leaders on campus, in the community, and in their professions. Participants explore key leadership themes and issues, build and refine a personal leadership model, and develop foundational leadership assets.

Certificate requirements (4 units)

- 1 introductory course: GEN CMN 204
- 1 elective course complementing GEN CMN 204
 - Taken after 204.
 - Chosen from a preapproved list (found on the ULP web site) to provide a macro-level exploration of leadership.
 - Students may petition to substitute a related course.
- 2 units of CRDV 369, in which students critically explore and engage leadership outside the classroom.

Courses

GEN CMN 204-0 Paradigms and Strategies of Leadership

This course provides an introduction to the program's six foundational leadership assets: asking powerful questions, inspiring others through narrative, mobilizing people, thriving in collaborative and hierarchical settings, navigating through change, and resilience. Components include weekly lectures, guest speakers, discussion groups, and a community group project.

CRDV 369-0 Field Study in Leadership In this course students attempt to leave a positive "leadership footprint" by fostering the success of a group, organization, or community. Spending at least 16 hours outside the classroom, students undertake a leadership role, an internship or externship, or a community-service experience, exploring leadership models and concepts through application.

Center for the Writing Arts

www.northwestern.edu/writing-arts

The Center for the Writing Arts was established in 1994 to highlight Northwestern's strengths in the teaching of writing and to provide a focal point for continuing efforts to fulfill the University's commitment to excellence in writing. The center sponsors a number of programs, including courses for creative writers taught by distinguished visiting writers-in-residence, innovative writing-intensive courses for freshmen, and a variety of colloquia for the entire campus community on topics related to writing.

Courses

Center for the Writing Arts courses 301, 302, and 303 are taught by visiting writers-in-residence. Consult the center's web page or assistant director for more information about its courses and admission requirements.

WRITING 115-5,6 Modes of Writing A team-taught course, designed specifically for freshmen, that combines rigorous exploration of a lively intellectual theme with close attention to helping students become strong writers. The format alternates between large-group lecture and discussion sessions led by an accomplished lecturer and small, intensive seminar meetings led by a skillful teacher of writing. Themes explored typically have the spark of controversy and sharp focus characteristic of topics for successful freshman seminars, but also the broader historical or theoretical scope characteristic of distribution requirement courses. Recent themes have included time and chance, the Bible and its transformations, and language and social policy. Weinberg students earn distribution requirement credit for the first quarter and freshman seminar credit for the second quarter. Students are expected to enroll for both quarters; the first quarter is a prerequisite for the second. May not be taken P/N.

WRITING 301-0 The Art of Fiction Fundamental skills of narrative in the creation of fictional works. Extensive writing exercises. Prerequisites: background in writing, a writing-intensive course, and submission of a manuscript of 5–15 pages.

WRITING 302-0 The Art of Poetry Writing of poetry in the light of the poetic, linguistic, and historical tradition. Extensive writing exercises. Prerequisites: serious interest in poetry, a writing-intensive course, and submission of sample poems.

WRITING 303-0 The Art of Nonfiction Narrative as a fundamental skill of nonfiction writing of many kinds.

Extensive writing exercises. Prerequisites: background in writing, a writing-intensive course, and submission of a manuscript of 5–15 pages.

MILITARY PROGRAMS

The military studies programs are administered by the Office of the Provost.

Naval Science

www.northwestern.edu/nrotc

The Northwestern University Naval Reserve Officers Training Corps (NROTC) Unit was established in 1926 by congressional authorization when Northwestern became one of the original six universities to create a naval science department. The professor of naval science chairs Northwestern's Department of Naval Science. Department faculty members are commissioned officers serving on active duty in the U.S. Navy or Marine Corps. They are selected and nominated by their respective services and screened and approved by the University. The unit is located at 617 Haven Street, Evanston, Illinois 60208-4140, phone 847-491-3324.

Naval ROTC Programs

NROTC offers young men and women the opportunity to obtain leadership and management experience as commissioned officers in the U.S. Navy (Navy option) or Marine Corps (Marine Corps option) after graduation from Northwestern, through either the Scholarship Program or the nonscholarship College Program.

At Northwestern, NROTC midshipmen lead essentially the same campus life as other students. They make their own arrangements for room and board and participate in campus activities of their choice, including the opportunity for University-sponsored overseas study. There are no prescribed academic majors for NROTC students, though scientific and technical studies are encouraged. NROTC students are required to complete the naval science curriculum, attend a weekly two-hour laboratory, and participate in four to six weeks of active-duty summer training at sea or ashore. NROTC students are required to abide by the Midshipmen Regulations issued by the unit. Students may enroll in the NROTC program at any time from the beginning of their freshman year until the end of their sophomore year.

Courses

In addition to the required courses listed below, participants in the NROTC program must satisfactorily complete a number of other courses prescribed by the Department of the Navy, which are offered by other departments of the University. Current information on those course requirements is available from the NROTC unit.

With the exception of 110 and 355, Northwestern course credit is granted for successful completion of naval

science courses; applicability to graduation requirements is subject to limitations imposed by the responsible University faculty committees and by the undergraduate schools. For more information on credit availability, consult the dean of each school. Naval science courses are open to non-NROTC students with department approval. Courses with an asterisk (*) are not required for Marine Corps option students.

NAV SCI 110-0 Introduction to the Organization and Culture of the Naval Services Composition and organization of the Naval Services; diverse missions, makeup, and manning of naval sea services with emphasis on duties and responsibilities of officers, rank and enlisted rating structure, training of subordinates, promotion and advancement, and military courtesy. Students gain a fundamental understanding of the formal and informal structures of the main warfare communities and how each contributes to completion of the U.S. Navy and Marine Corps missions.

NAV SCI 120-0 Seapower and Maritime Affairs A study of the influence of seapower on world history with a focus on U.S. naval history. Topics include the evolution and use of naval strategy; the influence of technology on tactics; naval power as an instrument of foreign policy; the Navy's interactions with the other armed services and with the executive and legislative branches of government; naval leadership in historical perspective; and past and future roles of the U.S. Navy and Marine Corps during conflict (including those in Iraq and Afghanistan) and in peacetime.

***NAV SCI 210-0 Marine Navigation** An in-depth study of marine navigation from the perspective of a deck officer aboard a naval warship. Focus on piloting, electronic navigation, and the rules governing the conduct of vessels on the high seas. Students become familiar with the proper use of navigational charts, publications, and various aids to navigation and gain understanding of the influence of environmental factors (e.g. weather, tides, and currents) on ship operations.

***NAV SCI 220-0 Naval Ship Systems II (Naval Weapons Systems)** Theory and employment of the Navy's weapons, navigation, and communications systems. Processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. Topics include fire control systems and major weapons types, including capabilities and limitations; physical aspects of radar and underwater sound; tactical and strategic significance of command, control, communications, computers, and intelligence with respect to weapons system integration. Supplemental review/analysis of case studies involving the moral and ethical responsibilities of leaders in employing weapons.

NAV SCI 230-0 Leadership and Management Seminar for Naval Officers Addresses leadership, management, and organizational behavior issues facing naval officers in a stressful environment, including strategic planning, time management, communication, counseling, team building, and decision making.

***NAV SCI 331-0 Naval Operations** Introduction to basic concepts and tools required for safe and proper operation of naval vessels. Students become proficient at maneuvering boards, concentrating on interception, pass-no-closer-than, and wind problems. Formation operations, external communications, replenishment at sea, and ship handling.

NAV SCI 336-0 Evolution of Warfare (Marine Corps option only) Evolution of warfare from 600 B.C. to present. Students develop understanding and knowledge of the classic principles of war, the changes in conduct of war through time, and the actions and decisions of battlefield commanders and their soldiers.

NAV SCI 341-0 Naval Leadership and Ethics An academic, discussion-oriented course intended to provide future leaders with a broad understanding of the various moral, ethical, and leadership philosophies that help strengthen junior-officer character.

***NAV SCI 345-0 Naval Ship Systems I (Naval Engineering)** Provides an elementary overview of naval engineering systems and a detailed knowledge of the principles behind ship construction. Taught from a systems engineering standpoint. Topics include ship design, stability, and structural engineering; hydrodynamic forces; air and water systems; electrical theory, generation, and distribution systems; thermodynamics; damage control; hydraulics and ship control; theory and design of steam, nuclear, gas turbine, and diesel propulsion.

NAV SCI 346-0 History of Amphibious Warfare (Marine Corps option only) Evolution of amphibious warfare from the battle of Marathon to present. Students develop understanding and knowledge of the evolution of amphibious warfare doctrine, the impact of significant events in history relating to amphibious operations, and the problems and advantages relative to employing amphibious forces in the modern era.

NAV SCI 350-0 Naval Science Laboratory A two-hour weekly laboratory required each quarter for all NROTC students. The laboratories serve to develop students' professional leadership skills, provide a basic understanding of the U.S. Navy and Marine Corps as part of the U.S. armed forces, and further challenge, test, and evaluate students on their potential to become commissioned officers in the U.S. Navy or Marine Corps.

NAV SCI 355-0 Directed Study Provides midshipmen with an opportunity to work under the supervision of an officer-instructor on projects related to professional development. Prerequisite: consent of department.

Aerospace Studies

Northwestern students may participate in the programs of the Air Force Reserve Officers Training Corps through a cross-enrollment agreement with the Illinois Institute of Technology (IIT). Within the limits of the Northwestern school in which the student is registered, credits earned in approved aerospace studies courses at IIT may be counted

toward the degree requirements at Northwestern. Further information may be obtained from Air Force ROTC Detachment 195, Illinois Institute of Technology, 10 West 31st Street, Chicago, Illinois 60616, phone 312-567-3525. For course descriptions, see <http://afrotc.iit.edu>.

Military Science

Northwestern students may participate in the programs of the Army Reserve Officers Training Corps through a cross-enrollment agreement with the University of Illinois at Chicago (UIC). Credits earned in approved military science courses at UIC may be counted toward degree requirements within the limits of the Northwestern school in which the student is registered. Further information can be obtained from the Department of Military Science, University of Illinois at Chicago, 728 West Roosevelt Road, M/C 252, Chicago, Illinois 60607, phone 312-996-3451.

Judd A. and Marjorie Weinberg College of Arts and Sciences

www.weinberg.northwestern.edu

The Judd A. and Marjorie Weinberg College of Arts and Sciences — oldest of Northwestern's 11 schools — has been the center of the University's academic and intellectual life since the 1850s. Weinberg College offers a liberal arts education that combines broad exposure to the insights and methods of the principal academic disciplines with focused study in one or more areas. The 600-member college faculty is dedicated to superior teaching informed by advanced research. Nearly all members of the faculty, including the most senior, regularly teach undergraduates in a curriculum including more than 2,000 courses each year, as well as tutorials, laboratory rotations, internships, and other individualized forms of instruction. The 4,200 undergraduates and 1,300 graduate students in arts and sciences enjoy a great deal of choice, with access to departments and programs offering 37 majors, 10 adjunct majors, and more than 50 minors. Among these are several majors and minors that are interdisciplinary within Weinberg and a growing number that represent curricular collaboration across schools.

A liberal arts education in Weinberg College emphasizes the ability to reason clearly, to extract the essential significance of large bodies of information, to apply general principles in new contexts, to communicate effectively, and to be sensitive to human creativity and morality. Required course work in several disciplines provides an overview of the complexity of the world and different ways of apprehending and solving problems. These courses examine how scholars from many backgrounds confront fundamental issues and how social conditions shape their inquiries. Proficiency in composition and competence in a foreign language build communication skills and expand the capability to study and understand another culture, while intensive course work in a required major and optional minor develops an understanding of advanced concepts and lays the groundwork for original research. Many areas of the curriculum encourage interdisciplinary study that integrates the approaches of different fields and enhances the ability to address questions that cross traditional academic boundaries. A period of study abroad is encouraged to develop firsthand knowledge of other cultures and greater intellectual and personal independence. Students are also encouraged to undertake independent research projects that help them move beyond course work and synthesize what they learn in their majors.

Weinberg College promotes participatory learning that begins in the first year of study in required freshman

seminars and continues in laboratory experiences, internships, professional linkage and senior seminars, and other small-group or individualized instruction. Students can experience the excitement of discovery in the sciences, humanities, and social sciences not only through lectures by faculty working at the forefront of their fields but also through special projects developed under faculty guidance or by assisting faculty in their research. Northwestern's strong undergraduate preprofessional schools and its graduate and professional schools offer liberal arts students unusual opportunities to extend their interdisciplinary studies and to pursue applied work in several areas. In some cases this may lead to a minor, a concentration, or a certificate. (See the Cross-School Options chapter.) The University's outstanding libraries and its research centers further support and enrich the educational pursuits of liberal arts undergraduates.

ACADEMIC POLICIES

Requirements for the Degree of Bachelor of Arts

Weinberg College offers courses of study in the arts and sciences leading to the degree of bachelor of arts. Students have extensive flexibility in structuring their academic programs within a framework of general education and major requirements specified in the following section. Guidance in planning a coherent personal curriculum is available from several sources; see Academic Advising on page 40.

Students earning the bachelor of arts degree must complete 45 units of credit and fulfill the course, residence, and grade requirements described below. These include completing 2 freshman seminars, demonstrating proficiency in writing and in a foreign language, satisfying distribution requirements in six major areas of intellectual inquiry, and completing the requirements of a major in one of the departments or programs of Weinberg College.

Freshman Seminar Requirement

First-year students must complete two freshman seminars. Offered by nearly all departments in Weinberg College, these are small, discussion-oriented courses designed to develop basic intellectual skills: how to read critically, think logically, and communicate effectively, typically through the investigation of a specific theme or issue. Freshman seminars are limited to about 16 students to encourage discussion, and each seminar requires considerable expository writing — usually a minimum of 15–20

typed pages per quarter. These seminars ordinarily supplement rather than replace standard introductory courses and usually do not provide the preparation necessary for advanced work in a field.

Except for students in special programs (BA/BMus, HPME, ISP, and MMSS), who take their seminars in winter and spring, incoming freshmen are assigned to a fall seminar based on preferences they submit to the Weinberg Office of Undergraduate Studies and Advising during the summer. The fall-seminar instructor also serves as the academic adviser for the year. Also during the summer, freshmen are informed of the quarter in which they are to take their second seminar. Freshmen also have the opportunity through the Kaplan Humanities Scholars Program to take small seminars linked to larger lecture courses focusing on a common broad theme.

Writing Proficiency Requirement

Students are required to demonstrate proficiency in writing. This may be achieved in a number of ways. Freshman seminar instructors make the initial evaluation of writing in courses. Students who do not write well in their freshman seminars or in other courses may be asked to take ENGLISH 105 Expository Writing. Courses in expository writing and intermediate composition are available for all students who wish to increase their skill and confidence in writing.

Foreign Language Requirement

Before graduation students must demonstrate proficiency in a classical or modern foreign language equivalent to the work covered in a second-year college-level course. Language proficiency may be shown in any one of three ways:

- Achieving a score designated by the Weinberg College Council on Language Instruction on a College Entrance Examination Board Advanced Placement Examination
- Passing a proficiency examination given online during the summer or at Northwestern during New Student Week and periodically during the school year (language departments may limit the number of times a proficiency examination may be taken)
- Successfully completing designated course work (these courses may not be taken under the pass/no credit option, and a grade of C– or higher must be earned in the last course in a sequence fulfilling the foreign language requirement)

Students who believe they are proficient in a language not regularly taught at Northwestern may petition the Council on Language Instruction for a proficiency examination in that language. Petitions are available in the Office of Undergraduate Studies and Advising and must be filed during a student's first quarter.

Students with professionally diagnosed disabilities related to foreign language acquisition should contact the Office of Services for Students with Disabilities about possible accommodations.

Distribution Requirements

To ensure breadth of education, Weinberg College students must take 2 courses in each of the six distribution areas listed below. The list of courses that satisfy the distribution requirements is established by a Weinberg College faculty committee. A current list is available on the college web site.

- I. Natural sciences
Courses introduce methods of inquiry and fundamental concepts in the natural sciences.
- II. Formal studies
Courses introduce concepts, methods, and use of formal rules of inference in mathematics, statistics, computer science, logic, linguistics, and cognate areas by showing how objects of thought and experience and their relationships can be analyzed in formal terms.
- III. Social and behavioral sciences
Courses introduce the theories, methods, and findings of empirical research on human behavior and its relation to social, cultural, economic, and political groups and institutions.
- IV. Historical studies
Courses introduce the chronological development of cultural, social, political, and economic affairs and their historical relationships.
- V. Ethics and values
Courses introduce the analysis of moral, social, and religious values and how they have developed.
- VI. Literature and fine arts
Courses foster understanding of how the attitudes, ideas, and values of individuals, groups, societies, or cultures are represented in their literature, arts, and other creative activities.

Some of these distribution requirements may be satisfied by achieving sufficient scores on College Entrance Examination Board Advanced Placement or higher-level International Baccalaureate examinations. A list of qualifying scores and tests as well as detailed information concerning the distribution requirements are available from the Office of Undergraduate Studies and Advising and on the college web site.

Major Study Requirement

All students must fulfill the requirements of a major, which should be declared by the end of the sophomore year. Majors are declared by meeting with the designated adviser in the department or program offering the major; at that meeting a course plan is developed and a Declaration of Major Form is completed. All courses applied to the major requirements must be passed with grades of C– or higher. Grades of P (pass) are not acceptable in major and related courses. (See also Grade Requirements.)

Students may pursue two or more majors by completing each department's major requirements. With limited exceptions, the same course may not be applied to the major

requirements of two departments. However, a course used as a major course in one department may also fulfill a related course requirement for another major program.

A student's total number of majors plus minors may not typically exceed three. Exceptions require permission from the Weinberg College Advising Office and cannot be granted during the freshman year.

A student may elect a major from among the following options:

- **Departmental major**
Each department offers a major in one or more programs of specialization. Requirements are described in detail preceding the lists of departmental course offerings in this catalog.
- **Area or interdisciplinary major**
The college offers many interdisciplinary majors that apply the approaches of several departments to certain scientific, cultural, and political areas. Most are open to all students. American studies, European studies, integrated science, legal studies, and mathematical methods in the social sciences are limited-admission majors that require a special application, as does the English department's writing major. African studies, Asian studies, gender studies, geography, international studies, legal studies, mathematical methods in the social sciences, Middle East studies, science in human culture, and urban studies are available only as adjunct majors that must be completed with a second major. Requirements for area and interdisciplinary majors are described in detail in their respective sections of this catalog.
- **Ad hoc major**
Occasionally students with well-defined interests are led to programs of study that do not fit neatly into the mold of a traditional major. They may develop an ad hoc major in bioethics or Asian American studies, for example, by bringing together courses from various departments. Ad hoc majors must be approved by the faculty's Curricular Review Committee. For more information see the assistant dean for advising in the Office of Undergraduate Studies and Advising.

Residence Requirement

Of the required 45 units, the last 23 must be taken while students are enrolled as undergraduates at Northwestern. During the last three quarters preceding the granting of the BA degree, students must be enrolled as degree candidates in Weinberg College. In addition, students returning from study abroad are expected to be enrolled in course work on the Evanston campus for at least one quarter after returning and before graduating.

In addition to and independent of the requirements set by Weinberg College, all students must satisfy the Undergraduate Residence Requirement (see Undergraduate Education chapter of this catalog). This

requirement addresses the number of quarters for which a student must be in residence at Northwestern.

Grade Requirements

Students must achieve a grade point average of C (2.0) or higher in courses offered to meet degree requirements. No work passed with a grade of D or P counts toward a major or minor (including any course prerequisite to a course required in the department or program as well as any related course). Transfer students must normally complete the equivalent of at least 4 one-quarter advanced (300-level) courses at Northwestern in the department of their major.

Full-time students in Weinberg College are permitted to enroll in a limited number of courses with the understanding that they will receive in place of a regular letter grade the notation P (pass) or N (no credit), neither of which counts in the student's grade point average. No more than 1 course per quarter and 6 courses in all may be taken under this P/N option; it is not permitted for courses taken to satisfy freshman seminar or distribution requirements or the foreign language requirement. No more than one-fifth of the total courses taken at Northwestern and offered for graduation may have grades of P or D.

While some other undergraduate schools of the University offer a Target Grade–P/N registration option, such registration is not available for courses offered by Weinberg College. Special rules govern registrations by Weinberg College students in courses of the undergraduate schools where this plan is available as well as by non–Weinberg College students who transfer into the college. Questions concerning this policy should be addressed to the Office of Undergraduate Studies and Advising.

Taking Courses in Other Schools of the University

Weinberg students may take advantage of Northwestern's other schools to take as many as 11 of their required 45 units; of those 11, up to 3 may be instruction in applied music. School of Continuing Studies courses may be counted toward the BA degree only if approved by the Office of Undergraduate Studies and Advising; approved SCS courses in Weinberg disciplines do not count toward the 11-unit limit. A student must obtain the advance consent of the Office of Undergraduate Studies and Advising to register for SCS courses.

No credit is given for individual instruction in speech or course work in music education or physical education.

No more than 4 of the required 45 units of credit may come from the military studies programs.

Taking Courses at Other Institutions

University, college, and department and program rules govern how many courses taken at other institutions a student may count toward requirements, where they may be taken, in which areas of study they may be, and which

requirements they may fulfill. Information about credit from other institutions is available from the Office of the Registrar.

Students must secure prior approval from the Weinberg College Office of Undergraduate Studies and Advising before taking courses at other U.S. institutions that they will submit for Northwestern credit.

Many Weinberg College students spend time studying abroad, most often for a summer or for part or all of junior year. The University's Study Abroad Office is an essential source of information about programs around the world as well as about the rules and process for going abroad. Advisers in the Study Abroad Office, the college's Office of Undergraduate Studies and Advising, and the departments and programs can help students select programs that fit their academic needs.

No credit toward a Weinberg College degree is given for shop work, individual instruction in speech, course work in music education or physical education, or any other course work taken at other institutions and not accepted by Northwestern University.

Awards and Honors

Each year Weinberg College awards several prizes and honors to exceptional students. Recognition is given for outstanding writing in freshman seminars and outstanding academic achievement in certain areas of study. Each spring the Northwestern chapter of the liberal arts honorary society Phi Beta Kappa elects juniors and seniors to membership. Each quarter the college's Dean's List honors students with sufficiently high grades. Seniors whose grade point averages meet certain criteria graduate with college honors. In addition, many departments and programs recognize outstanding achievement, including awarding department or program honors at graduation.

The college also awards funds to students working on research projects and creative activities; see Research Funding on page 40 for information.

ACADEMIC OPTIONS

Minors

Students may choose from more than 50 minors offered by departments and programs; among these are Weinberg College minors, interschool minors, and minors offered by some of Northwestern's other undergraduate schools (see Cross-School Options chapter). Minor requirements are listed under the appropriate headings in this catalog.

Completion of a minor is optional, not a degree requirement. A student's total number of majors plus minors may not typically exceed three. Exceptions require permission from the Weinberg College Advising Office and cannot be granted during the freshman year.

Students may not count any course toward both a minor and a major unless the catalog description of the minor

explicitly permits this or the course fulfills a related course requirement for the major. A course may not be counted toward more than one minor.

Independent Study and Undergraduate Seminars

Registering for 399 Independent Study allows students to earn course credit by working on a research and/or creative project under the supervision of a faculty member. 399 is generally open to juniors and seniors, and department consent is required; in some cases sophomores may qualify. During the quarter before enrolling in 399, students must submit to the department for approval a detailed description of the work they will undertake and the basis for its evaluation. Upon completion of the course, they must submit an abstract of the completed work to the department, where the description and the abstract are filed.

By departmental invitation seniors may take 398 (a senior-year seminar) in one or more quarters, up to a maximum of 4 units.

Students may not register for more than 2 units of 399 in a quarter or take 399 to make up for credit they lack as a result of failure or uncompleted courses. No more than 9 units of 398 and 399 may be presented as credit for graduation. Certain independent study courses offered by some departments with course numbers different from 398 and 399 are also subject to these restrictions.

Honors in the Major

Each major in Weinberg College offers a program that may lead to the award of departmental honors at graduation to seniors with outstanding achievement, including a research project or other integrative type of work. Although the detailed criteria vary somewhat by major, all share certain features.

Students recommended for departmental honors must have completed with distinction the regular courses required for their major as well as at least 2 quarters of 398 or 399 or their equivalent, or 400-level courses, or some combination thereof. The honors project must result in a research report, thesis, or other tangible record; course work alone, such as completion of 400-level courses, is not sufficient. Simple data collection, computer programming, analysis of data with canned programs, and summaries of primary or secondary sources are not alone bases for the award of departmental honors.

Each major has an undergraduate honors committee responsible for administering its honors program and for preparing the final recommendations for honors that are submitted in May to the Weinberg College Committee on Undergraduate Academic Excellence. Students are proposed for honors by the faculty adviser, who writes a letter describing and evaluating the student project. Additional evaluative letters giving independent and substantive judgments of the project must be submitted by faculty members unconnected with the student's project. The departmental honors

committee reviews all nominations for departmental honors in a given year during spring quarter and takes a separate recorded vote on each candidate. Approved nominations are forwarded to the Committee on Undergraduate Academic Excellence for final review.

Procedures for students pursuing separate honors in two departments or programs or interdisciplinary honors spanning two majors are available from the Office of Undergraduate Studies and Advising.

Professional Linkage Seminars

Undergraduates may take specially designed linkage seminars that approach social and work-related concerns through the eyes of an accomplished nonacademic professional with an affinity for the liberal arts and a gift for intellectual inquiry. These seminars link liberal education to professional issues, illustrating how theory and practice affect and enrich one another. In this way, they focus on the transition from the academic to the nonacademic world. Topics have included professional ethics, science writing, gender issues in aid to developing countries, the history of business, and the history of urban planning in Chicago.

Preprofessional Study

Weinberg College offers its students excellent preparation for subsequent training in professions such as law, medicine, and management. Each year many graduates pursue professional study in these areas. Other students enter the workforce directly.

All majors can furnish suitable preparation for professional schools, provided appropriate courses are taken. No major, however, is intended solely as preprofessional training. The college advisers in the Office of Undergraduate Studies and Advising help students design academic programs that combine the breadth of a liberal arts education with adequate preparation for further professional study.

Field Study and Internships

Many students seek to enrich their education with practical experiences gained off campus. Chicago Field Studies administers several programs that combine seminars taught on campus with internships at Chicago-area organizations. Other Weinberg College departments and programs also offer opportunities for off-campus work. These are described in their sections of this catalog.

Study Abroad

Weinberg College students are encouraged to study abroad. The philosophy of the college is that the best foreign study experience combines continued work in a student's chosen course of study with significant opportunities for immersion in the culture of the host country. For example, an economics major might study NAFTA in Mexico; a political science student might study the European Union in France. The college encourages participation

in full-academic-year programs that include extensive study of languages and culture. The Office of the Provost offers grants for intensive summer foreign language study abroad. As early as freshman year, interested students should discuss study abroad plans with their Weinberg College and department advisers. Complete study abroad information is available from the Study Abroad Office (www.northwestern.edu/studyabroad).

Cross-School Options

Dual Bachelor's Degree Programs (BA/BS and BA/BMus)

Two programs allow undergraduates to combine a bachelor's degree in the liberal arts with a bachelor's degree in another Northwestern undergraduate school. One results in a BA from Weinberg College and a BS from the McCormick School of Engineering and Applied Science, and the other results in a BA from Weinberg College and a BMus from the Bienen School of Music. Both options typically require five years of study. For more information see the Cross-School Options chapter of this catalog.

Honors Program in Medical Education

The Honors Program in Medical Education (HPME) is designed for unusually gifted high school students who seek a career in medicine or medical science. It provides a plan whereby students entering Northwestern are admitted simultaneously to Weinberg College, the McCormick School, or the School of Communication and to the Feinberg School of Medicine. HPME students then spend the first three or four years in undergraduate study and the last four years in the Feinberg School, potentially reducing the period of formal training by one year. For more information see the Cross-School Options chapter of this catalog.

Accelerated Master's Programs

Undergraduate students doing outstanding work in certain Weinberg College majors may be accepted into one of the accelerated master's programs approved by the Graduate School: chemistry, earth and planetary sciences, economics, French, and linguistics. These students receive permission to double-count some courses toward both bachelor's and master's degrees so that both degrees can be completed in four years. Admission is by departmental invitation only and must be approved by the Graduate School. See the Cross-School Options chapter of this catalog, as well as the individual department sections, for more information.

The approved departmental programs share the goal of selecting and training exceptional students. Students are not self-selected but are recommended by the department to the Graduate School for admission. Students are officially admitted to the Graduate School only after their credentials have been thoroughly reviewed and approved by

the dean of the Graduate School. Therefore, students should be aware of these guidelines:

- No particular grade point average, however high, automatically entitles a student to participate in an accelerated master's program.
- Only one academic year — three quarters or two semesters or less — of transfer credit from another institution may be applied as credit toward the bachelor's portion of the combined degree, including credit for a junior year abroad. Any participating department may impose a more restrictive standard if it desires.
- An accelerated master's program requires a minimum of 12 full quarters of work. The master's portion must be completed during the final three contiguous quarters of registration, beginning with the fall quarter. In schools or departments of the University that operate on a four-quarter system, that is, that offer a full program during Summer Session staffed by the regular faculty, one Summer Session only may be counted toward fulfillment of the 12-quarter requirement. In schools of the University that do not operate on a four-quarter system, cases of one summer of credit will be considered on an ad hoc basis by petitioning the dean of the Graduate School.
- All requirements, both undergraduate and graduate, must be met by the conclusion of the fourth academic year. The bachelor's and master's degrees are awarded simultaneously.
- Both degrees will appear on a single transcript, as will the results of all work completed for both degrees.
- Continuation of graduate work at Northwestern by those who complete an accelerated master's program must receive separate approval by the department and the dean of the Graduate School.

See the individual departments offering accelerated master's programs for additional information.

Teaching Certification

Students enrolled in a number of departments of Weinberg College may simultaneously pursue secondary teaching certification through the School of Education and Social Policy. Areas of certification are art, biological sciences, chemistry, economics with history, English, French, German, history, Latin, mathematics, physics, political science with history, sociology with history, and Spanish.

Majors in the certification areas who wish to be considered for teaching certification must apply, be admitted to, and complete all requirements of the Secondary Teaching Program as described in the School of Education and Social Policy chapter of this catalog. Application should be made with the Office of Student Affairs in the School of Education and Social Policy.

Other Cross-School Options

Weinberg College students participate in many academic opportunities outside of the college, sometimes taking

individual courses of interest and sometimes completing a formal program of study. In addition to options described above, opportunities include the Undergraduate Leadership Program as well as programs administered through the Center for the Writing Arts and the Transportation Center (see the Cross-School Options chapter of this catalog for more information). Certificates open to Weinberg undergraduates are offered through the School of Education and Social Policy, the McCormick School of Engineering and Applied Science, the Kellogg School of Management, and the Medill School of Journalism. Minors in several of Northwestern's undergraduate schools, as well as a concentration in music, are also open to Weinberg College students. For more information see the relevant school chapter of this catalog. Interested students should also contact the schools through which the options are offered.

STUDENT RESOURCES

Academic Advising

General advising is centered in the college's Office of Undergraduate Studies and Advising, where faculty advisers are available throughout the year to assist students in all aspects of academic and career planning. Each freshman is assigned a freshman adviser who in nearly all cases is the student's instructor in a fall-quarter freshman seminar. At the end of freshman year each student is assigned a Weinberg College adviser, who will continue to be that student's adviser through graduation. In addition, each Weinberg department and program has a corps of faculty advisers who counsel all undergraduates about course selections, majors and minors, and research and career opportunities.

Research Funding

Weinberg College is committed to facilitating student research and to helping undergraduates immerse themselves in challenging, intense explorations through well-focused projects. Toward this end, the college as well as some of its departments and programs provide, on a competitive basis, funds to support research by students working under the guidance of faculty members. Academic-year awards can cover some research expenses, and some summer awards also provide assistance with living expenses.

The University's Undergraduate Research Grants Program is another source of research funding for qualified students. See page 25 for information.

Student Organizations

Many departments and programs within the college sponsor student organizations. Some are honorary organizations, recognizing students who have achieved distinction within their fields of study. Others provide opportunities for students with common interests to come together for

academic, social, career-focused, and service activities that complement classroom experiences.

The Weinberg College Student Advisory Board (SAB), the primary source of student advice to the dean and the associate dean for undergraduate academic affairs, selects students to serve on several college committees. The board includes representatives from each major in the college.

ACADEMIC OFFERINGS

GENERAL LIBERAL ARTS

These interdivisional courses are open to all qualified students.

GEN LA 280-1,2,3,4,5,6,7 Residential College Tutorial

A seminar for members of a residential college on a theme of common interest, meeting in the residential college and often directed by one of its faculty associates. Enrollment is normally limited to nine students. Course number indicates distribution requirement area in which a tutorial counts. Proposals for tutorials must be approved by the associate dean for undergraduate academic affairs of Weinberg College.

GEN LA 290-0 Summer Research (0 units) Required registration for students receiving summer research grants from Weinberg College or the Undergraduate Research Grants Committee. Grade of satisfactory will be entered after final report is submitted.

GEN LA 298-0 Student-Organized Seminars Students who desire to study topics in arts and sciences that are not covered in the college's course offerings may initiate their own courses under the supervision of sponsoring faculty members. Enrollment in these seminar courses is limited to 20 students. The student organizer or organizers must, in consultation with the faculty sponsor, prepare a plan for the seminar and submit it to the assistant dean for advising before the middle of the quarter preceding the quarter in which the seminar is held. The plan must include a topic description, a reading list, specification of the work that will be graded (such as term papers and written examinations), prerequisites, and the meeting schedule. The associate dean for undergraduate academic affairs forwards proposals to the Curricular Review Committee of the college, which must review and approve all seminars to be offered. Students may enroll in only 1 Student-Organized Seminar per quarter, and enrollment must be on the P/N basis. Weinberg College students interested in organizing a seminar should consult the associate dean for undergraduate academic affairs for further details.

AFRICAN AMERICAN STUDIES

www.afam.northwestern.edu

The study of the African American experience has a long and distinguished history in the United States. The field has developed exciting insights as well as firm intellectual

and empirical foundations for the systematic study of the African American experience. Through such study the field provides a greater understanding of the larger American experience. From its beginnings the field has been strongly interdisciplinary, bringing the perspectives of different disciplines to bear on understanding black life. The Department of African American Studies exemplifies these traditions and strengths and, through its courses, provides opportunities to explore the richness and diversity of the African American experience in a meaningful and coherent way.

The department offers courses that focus on people of African descent in the United States and other regions of the Americas and the African diaspora — the communities created by the dispersion of peoples from the African continent. By comparing the black experience in various parts of the world, students learn to analyze identity, race, and racism as formations that change over time and space. This broad study of the black experience is one of the key features of the department, distinguishing it from similar departments at other institutions. Major themes in the curriculum include the nature of colonization and its impact on the colonizer and the colonized; racism and its effects on society as well as on scholarship; the importance of oral language, history, and tradition in the African American experience; the roots and development of African American music, literature, and religious styles; analysis of key social, political, and economic institutions such as families, churches, and labor markets; and the traffic of people, ideas, and artifacts throughout the African diaspora.

African American studies provides good preparation for graduate work in the social sciences, the humanities, and the professions, as well as for jobs and careers in a variety of fields. Education, law, journalism, urban planning, health-care delivery and administration, business, social work, and politics are only a few of the fields for which African American studies provides an excellent background. In addition, since scholars and political leaders are paying increased attention to the Caribbean and Latin America as well as to blacks and other minorities in the United States, students of African American studies will enter a field that touches on issues of far-reaching national and international significance.

Major in African American Studies

Department courses (12 units)

- 5 core courses: 210-1 or -2; 212-1 or -2; 215; 236; 245
- 6 additional courses
 - At least 4 must be at the 300 level.
 - Courses are selected in consultation with the director of undergraduate studies.
- 1 senior course: 390, 396, or 399

Related courses (5 units)

- At least 3 must be at the 300 level, and the other 2 can be 200- or 300-level courses.
- Courses must be approved by the department adviser.

- Students are expected to choose courses that develop methodological skills and substantive focus.

Minor in African American Studies

The minor in African American studies provides thorough exposure to contemporary scholarship concerning the black experience.

Minor requirements (8 units)

- 4 core courses chosen from 210-1,2; 212-1,2; 215; 236; 245
- 4 additional courses in the department or approved by the department, including 3 at the 300 level

Honors in African American Studies

To qualify for honors, a student must demonstrate consistently high performance in the major and complete a major research project during the senior year. Specifically, a student must have a cumulative grade point average of at least 3.3 in African American studies courses, with no grade below a B in any single course. A senior who meets these criteria and is interested in pursuing departmental honors must notify the honors coordinator during the fall of the senior year. The student will select a thesis adviser in consultation with the honors coordinator, who also serves as director of undergraduate studies. The thesis adviser need not be a member of the department. Completion of the thesis ordinarily requires at least two quarters, during which the student and thesis adviser are expected to meet regularly. Merely completing a thesis does not guarantee honors; the thesis adviser and one other faculty member, selected by the honors coordinator, must recommend the project to the college. See also Honors in the Major on page 38.

Core Courses

AF AM ST 210-1,2 Survey of African American Literature

Two-quarter sequence on the literature of blacks from slavery to freedom. Works of major writers and significant but unsung bards of the past.

AF AM ST 212-1,2 Introduction to African American History

1. Key concepts in African American history from 1700 to 1861. Includes African origins, the Atlantic slave trade, origins of slaving and racism in the United States, life under slavery in the North and South, religion, family, culture, and resistance. **2.** Key concepts in African American history from emancipation to the beginnings of the civil rights era. Focus on constructions of class, gender, and community; the rise of Jim Crow; strategies of protest; and migration and urbanization. Taught with HISTORY 212; students may not earn credit for both courses.

AF AM ST 215-0 Introduction to Black Social and Political Life Analysis of class, gender, sexuality, immigrant status, and ethnic origin in black society and politics. Focus on

demographic trends, lived experiences, and ideological debates.

AF AM ST 236-0 Introduction to African American Studies

Key texts and concepts in African American studies from a range of disciplinary perspectives.

AF AM ST 245-0 The Black Diaspora and Transnationality

Examination of events, movements, theories, and texts that have shaped development of the African diaspora. Topics include slavery, abolitionism, pan-Africanism, the culture-politics nexus, hip-hop, AIDS, and linkages among gender, sexuality, and diasporic sensibilities.

Courses

AF AM ST 214-0 Comparative Race Studies in the United States

Problems and experiences of racialized minorities: blacks, Native Americans, Asian Americans, and Latinos. Comparative exploration of their relationships to each other and to the majority society. May be repeated for credit with change of comparative racial groups or time period explored.

AF AM ST 218-0 Cracking the Color Lines: Asian-Black

Relations in the U.S. Comparative historical analysis of Asian-black relations in the United States, including racialized and sexualized discourses structuring interracial relations and social, political, and economic location. Slavery, immigration, model minority myth, cross-racial politics. Taught with ASIAN AM 218; students may not earn credit for both courses.

AF AM ST 220-0 Civil Rights and Black Liberation The Northern and Southern civil rights movements and the rise of black nationalism and feminism, 1945–72.

AF AM ST 225-0 African American Culture Survey of African American culture from slavery to the present. Relation of African American culture to African and Euro-American cultures, the Black Atlantic as a unit of analysis, representations of blackness in the public imagination.

AF AM ST 226-0 Introduction to Transnational Black

Cultures An interdisciplinary introduction to history, cultural production, or politics of societies whose relationships to each other extend beyond national boundaries.

AF AM ST 250-0 Race, Class, and Gender Introduction to scholarship and key theories that treat race, class, and gender as intersecting social constructs. Race, class, and gender in work, family and reproduction, education, poverty, sexuality, and consumer culture. How race, class, and gender inform identity, ideology, and politics to incite social change.

AF AM ST 259-0 Introduction to African American Drama

Thematic and historical survey of African American drama. Sociopolitical context, the aesthetic reflected in the work, impact on African American and general theater audiences.

AF AM ST 310-0 Contemporary Asian-Black Relations:

Conflict and Cross-Cultural Collaboration in Urban America Divides between Asians and blacks; areas of positive cross-cultural collaboration. Historical analysis of reparations, the 1992 Los Angeles riots, and affirmative action. Cross-racial

exchange in youth expressions, popular culture, hip-hop. Taught with ASIAN AM 310; students may not earn credit for both courses.

AF AM ST 319-0 Race, Ethnicity, and the American Constitution

Investigation of how race and ethnicity have influenced the evolution of the U.S. Constitution and legal debate and practice. Topics include affirmative action, school integration, and the death penalty. Prerequisite: 220 or POLI SCI 220 or 230.

AF AM ST 320-0 The Social Meaning of Race Race as a social concept and recurrent cause of differentiation in multiracial societies. Impact of race on social, cultural, economic, and political institutions. Discussion of prejudice, racism, and discrimination.

AF AM ST 327-0 Politics of African American Popular Culture

Examination of the debates within African American communities about the proper role and function of black art and artists in relation to black politics.

AF AM ST 330-0 Black Women in 20th-Century United States

Experiences and leadership of African American women in major events in recent history, including antilynching, women's suffrage, civil rights movements, and World War II.

AF AM ST 331-0 The African American Novel

Readings in classic black American fiction. The author as creator and participant. Works of Wright, Ellison, Baldwin, and others. Prerequisite: sophomore standing.

AF AM ST 332-0 Black Feminist Theories In-depth survey of major constituents of black feminist theory, utilizing interdisciplinary approach with readings from history, sociology, literature, popular culture, and religious studies.

AF AM ST 334-0 Gender and Black Masculinity Perceptions and constructions of black masculinity within African American and "American" cultures in the United States; readings in gender studies, feminist theory, African American studies, and cultural studies.

AF AM ST 335-0 Race and Literature in 19th-Century America

Examination of the evolution and persistence of the notion of "race" in 19th-century America, with attention to the origins of the idea of race in the West. Focus on the multiracial character of 19th-century America.

AF AM ST 342-0 Comparative Slavery Traces slavery across historical epochs and geographic contexts, with an emphasis on Latin America, the Caribbean, and the United States.

AF AM ST 345-0 Black Politics in Latin America Introduction to the history of race in Latin America and the Spanish-speaking Caribbean; exploration of histories and experiences of racialized groups through examining relationships between racial and social inequality, racial difference, and political development.

AF AM ST 348-0 Afro-Latin America: Communities, Cultures, and Identities Exploration of the history of African-descended people throughout Latin America, emphasizing slavery, freedom, and the emergence of Afro-Latin American communities, cultures, and identities. Topics include race, gender, Afro-Latin spiritual systems/religion, family, and resistance.

AF AM ST 350-0 African American Literary Criticism and Theory

Advanced introduction to African American literary cultural criticism and theory. Topics include the "black aesthetic"; black writers as critics; black feminism, representation, and sexuality; critiques of the roles of black intellectuals; and the uses of and resistance to post-structuralist theory in African American criticism.

AF AM ST 357-0 Performing Memory in the Black World

Exploration of the ways in which peoples of the Black Atlantic remember slavery and fashion identities through novels, film, folktales, and drama.

AF AM ST 360-0 Major Authors In-depth examination of a selected author's body of work. Choice of author varies. May be repeated for credit with change of author.

AF AM ST 363-0 Racism in Western Modernity Impact of racism in the formation of Western modernity. Critical conceptual and historical analyses of the social formation of "race" and the historical implications of racism in the contemporary West.

AF AM ST 365-0 Black Chicago Surveys the social, cultural, and political history of African Americans in Chicago, including the Great Migration, the black political machine, black Chicago music, racial segregation, internal class stratification, and the role of black churches.

AF AM ST 370-0 Black Activist Debates Analysis of African American political thought and advocacy since Reconstruction. Major ideological and tactical debates among Ida B. Wells, W. E. B. DuBois, Booker T. Washington, and Marcus Garvey; the shift from civil rights to Black Power in the black liberation movement; the rise of black feminism and the gay and lesbian rights movement; the rise of black conservatism and the contemporary struggle for reparations for slavery and segregation.

AF AM ST 375-0 Postcolonial African American Studies

Develops critical approaches to African American studies from the perspectives of postcolonial analysis. In particular, examines the meaning of the colonial in the formation of African American experiences and the significance of modernity, race, and black politics in the historical contexts of the United States, Latin America, and the Caribbean.

AF AM ST 378-0 The Harlem Renaissance African American political and social movements and cultural production in theater, music, visual arts, and literature from 1915 to 1930. Prerequisites: consent of instructor and 210-1,2 or another African American literature course.

AF AM ST 379-0 Black Women Writers Intensive, multigenre examination of the contribution of black women to African American, women's, and American literature, with consideration of the factors and figures that have influenced the reception of black women's writings across time.

AF AM ST 380-0 Topics in African American Studies

Advanced work on social, cultural, or historical topics. May be repeated for credit with different topic. Prerequisite: advanced student or senior standing.

AF AM ST 381-0 Topics in Transnational Black Culture

Examination of texts such as novels, poetry, film, drama, slave narratives, and historical texts in order to compare how artists from across the African diaspora have approached this historically and emotionally loaded event. Prerequisite: advanced student or senior standing.

AF AM ST 390-0 Research Seminar in African American

Studies Methods of researching the African American experience. Identification of research problems; location, selection, and critique of relevant literature; data gathering and analysis; report writing. Topics vary. Prerequisite: advanced student or senior standing.

AF AM ST 396-0 Internship in African American Studies

Analysis of social and cultural institutions through field study and participant observation. Entails a research project sponsored by a Northwestern faculty member. Prerequisite: advanced student or senior standing.

AF AM ST 399-0 Independent Study Open to advanced students with consent of instructor. Prerequisite: advanced student or senior standing.

Relevant Courses in Other Departments

- AF ST 390, 398
- ANTHRO 320, 332, 372 (if related to people of African descent)
- COMM ST 326 (see the School of Communication chapter of this catalog)
- ECON 321, 325, 326, 354
- ENGLISH 365 (if related to people of African descent), 366
- FRENCH 365, 366
- GEN MUS 330, 340-1,2,3 (see the Bienen School of Music chapter of this catalog)
- HISTORY 212-1,2, 306-1,2, 355, 356-1,2, 357, 358-1,2
- LATIN AM 391
- PERF ST 216, 309 (see the School of Communication chapter of this catalog)
- PHIL 368 (when appropriate)
- POLI SCI 327, 357 (if related to people of African descent), 359, 360
- SOCIOL 201, 207, 323, 325
- THEATRE 368 (see the School of Communication chapter of this catalog)

AFRICAN AND ASIAN LANGUAGES

www.paal.northwestern.edu

The Program of African and Asian Languages (PAAL) offers opportunities to explore through language study some fascinating cultures: those of Africa, China, India, Japan, Korea, and the Middle East. Students who combine study of one of PAAL's African or Asian languages with a major or background in such departments as history, economics, political science, or sociology will be well prepared for graduate study, professional programs, and careers in international business, journalism, trade, law, or diplomacy.

Even the natural sciences have exchange programs in which knowledge of non-Western languages is useful.

PAAL offers courses in Arabic, Chinese, Hebrew, Hindi, Japanese, Korean, Persian, Swahili, and Turkish. Minors are available in Chinese and Japanese language and culture. In addition, a minor in Hebrew studies is offered through the Jewish studies program; see page 110 for details.

Any PAAL language may be taken to fulfill the Weinberg College requirement of two years of foreign language study. For programs of study that integrate PAAL's language offerings, see the Program of African Studies, Asian and Middle East Studies Program, International Studies Program, and Jewish Studies Program.

Advanced language study may be taken through registration in 399 Independent Study. Students are strongly encouraged to enrich their language learning by studying abroad. Interested students should consult an adviser in the Study Abroad Office early in their academic careers.

Students must pass each course with at least a C- to continue to the next level.

Minor in Chinese or Japanese Language and Culture

These PAAL minors offer a concise and coherent set of courses designed to develop strong language skills in either Chinese or Japanese along with a sense of the cultural context of the language. The minors also offer the opportunity to incorporate study abroad experience for even more intensive encounters with the language and culture.

Minor requirements (8 units)***Option A***

- 5 language courses
 - 3 200-level Chinese or Japanese courses
 - 2 300-level Chinese or Japanese courses
- 3 courses in literature and/or culture
 - 2 quarters of Chinese or Japanese literature in translation (from COMP LIT/AMES 271-1,2,3,4 or 274-1,2,3)
 - 1 course from an Asian studies discipline (e.g., ART HIST 240; HISTORY 281, 284, 381, or 384)

Option B: Semester or full-year study abroad

- 5 language courses
 - 3 200-level Chinese or Japanese courses taken either partly or entirely in China or Japan (remainder taken upon return)
 - 2 300-level Chinese or Japanese courses taken upon return
- 3 courses in literature and/or culture taken in China or Japan

Courses in this program previously had the designation AAL and different numbers. Old designations and numbers are shown in parentheses after current ones.

Arabic Courses

ARABIC 111-1,2,3 (AAL 105-1,2,3) Arabic I 3-course

introduction to modern standard Arabic primarily, along with some exposure to and familiarization with the main regional spoken varieties. Speaking, reading, and listening comprehension and basic writing skills developed.

ARABIC 114-0 (AAL 165-0) Conversation and Culture in the Arab World: Spoken Egyptian Arabic In-depth introduction to culture and everyday language of Egypt; contrastive analysis of formal written modern standard Arabic and spoken Egyptian Arabic. Prerequisite: ARABIC 111-2 or equivalent.

ARABIC 121-1,2,3 (AAL 106-1,2,3) Arabic II Further development of grammar knowledge, reading, writing, speaking, and listening skills. Completion of at least this level is recommended for students seeking functional proficiency for study abroad. Prerequisite: 111-3 or equivalent.

ARABIC 211-1,2,3 (AAL 207-1,2,3) Arabic III Continued skills development through reading and discussion of Arabic writings from both textbooks and media resources. Prerequisite: 121-3 or equivalent.

ARABIC 311-1,2,3 (AAL 308-1,2,3) Arabic IV Continuation of instruction in Arabic using textbooks and supplemental materials from literary sources (prose and poetry) and broadcast and print media. Emphasis on developing more advanced writing skills. Prerequisite: 211-3 or equivalent.

ARABIC 316-1 (AAL 309-3) Reading Arabic Poetry (in Arabic) Introduction to classical and modern Arabic poetry in both traditional meter and free verse, including selections from the Umayyad, Abbasid, and modern periods. Prerequisite: 311-3 or equivalent.

ARABIC 316-2 (AAL 309-2) Reading Classical Arabic Texts (in Arabic) Samples of *adab* and classical branches of learning are used to introduce students to classical Arabic literature and continue to strengthen their skills. Prerequisite: 311-3 or equivalent.

ARABIC 316-3 (AAL 309-1) Reading Modern Arabic Prose (in Arabic) Samples of modern Arabic short stories and novels are used to introduce students to modern Arabic literature and continue to strengthen their skills. Prerequisite: 311-3 or equivalent.

ARABIC 399-0 Independent Study For students who have advanced beyond the regular course offerings in Arabic.

Chinese Courses

All Chinese language courses offer two tracks: regular courses for mainstream students and accelerated courses for students who come from Chinese-speaking homes. Mandarin-speaking students from mainland China, Taiwan, Singapore, or Hong Kong should join the accelerated courses.

CHINESE 111-1,2,3 (AAL 111-1,2,3) Chinese I Speaking, aural comprehension, reading, writing of basic vernacular Chinese. Both standard and simplified characters involving about 1,500 compounds.

CHINESE 115-1,2,3 (AAL 111-1,2,3) Chinese I — Accelerated Similar to 111-1,2,3 but for heritage speakers.

CHINESE 121-1,2,3 (AAL 112-1,2,3) Chinese II Conversation, aural comprehension, writing based on reading Chinese stories, poems, stories of ballets, historical and cultural texts. Prerequisite: 111-3 or equivalent.

CHINESE 125-1,2,3 (AAL 112-1,2,3) Chinese II — Accelerated Similar to 121-1,2,3 but for heritage speakers. Prerequisite: 115-3 or equivalent.

CHINESE 211-1,2,3 (AAL 213-1,2,3) Chinese III Readings from the works of contemporary Chinese writers. Discussion and writing based on the reading materials. Prerequisite: 121-3 or equivalent.

CHINESE 215-1,2 (AAL 213-1,2) Chinese III — Accelerated Similar to 211-1,2,3 but for heritage speakers. Prerequisite: 125-3 or consent of instructor.

CHINESE 215-3 (AAL 213-3) Chinese III — Accelerated: Globalization and Popular Culture Includes contemporary topics and media other than literature — notably cinema, video, and music. Offered spring quarter only. Prerequisite: 125-3 or consent of instructor.

CHINESE 311-1,2,3 (AAL 314-1,2,3) Chinese IV: Modern Literature Advanced reading and writing skills and Chinese literature. Prerequisite: 211-3 or equivalent.

CHINESE 315-1,2,3 (AAL 314-1,2,3) Chinese IV — Accelerated: Classical Literature Study of classical Chinese poems, prose, dramas, and novels from 400 B.C.E. to 1900. Prerequisite: 215-3 or equivalent.

CHINESE 399-0 Independent Study For students who have advanced beyond the regular course offerings in Chinese.

Farsi Courses

See Persian.

Hebrew Courses

A minor in Hebrew Studies is available through the Jewish Studies program. See page 110.

HEBREW 111-1,2,3 (AAL 101-1,2,3) Hebrew I Understanding, speaking, reading, and writing of mainly conversational Hebrew. Hebrew used as language of instruction. Drill in language laboratory.

HEBREW 121-1,2,3 (AAL 102-1,2,3) Hebrew II From language to literature: review of grammar; reading and discussing Hebrew literary works (prose and poetry) and newspaper articles. Compositions and oral presentations. Prerequisite: 111-3 or equivalent.

HEBREW 216-1,2,3 (AAL 203-1,2,3) Hebrew III: Topics in Hebrew Literature Reading Hebrew literature, some biblical but mostly modern prose. Compositions and oral presentations. Prerequisite: 121-3 or equivalent.

HEBREW 316-1,2,3 (AAL 355-1,2,3) Hebrew IV: Advanced Topics in Hebrew Literature Reading 20th-century Hebrew literature. Presentations, discussion, and essays in Hebrew. Prerequisite: 216-3 or consent of instructor.

HEBREW 399-0 Independent Study For students who have advanced beyond the regular course offerings in Hebrew.

Hindi Courses

Hindi language offerings include two tracks, regular and accelerated, at the first-year level only.

HINDI 111-1,2,3 (AAL 128-1,2,3) Hindi I 3-course introduction for basic literacy and oral proficiency.

HINDI 115-1,2,3 (AAL 128-1,2,3) Hindi I — Accelerated

Course is designed for students who come from a Hindi-speaking background but have no or limited literacy skills in the language. The three quarters cover the grammar and material from Hindi 111-1,2,3 and Hindi 121-1 with much more speaking in class. Admission by instructor's permission only.

HINDI 121-1,2,3 (AAL 129-1,2,3) Hindi II 3-course sequence developing literacy and interactive oral proficiency. Prerequisite: 111-3 or equivalent.

HINDI 399-0 Independent Study For students who have advanced beyond the regular course offerings in Hindi.

Japanese Courses

JAPANESE 111-1,2,3 (AAL 115-1,2,3) Japanese I A 3-quarter sequence of beginning college-level Japanese, covering speaking, aural comprehension, and reading and writing skills. Introduces the Hiragana and Katakana syllabaries and Kanji (characters).

JAPANESE 121-1,2,3 (AAL 116-1,2,3) Japanese II A 3-quarter continuation of 111, covering speaking, aural comprehension, and reading and writing skills. Prerequisite: 111-3 or equivalent.

JAPANESE 211-1,2,3 (AAL 217-1,2,3) Japanese III A 3-quarter intermediate-level sequence in which speaking, aural comprehension, and reading and writing skills are developed. Readings about and discussions of Japanese sociocultural issues. Prerequisite: 121-3 or equivalent.

JAPANESE 311-1 (AAL 318-4) Japanese IV: Reading Modern Japanese Literature in Japanese Focus on learning pre-1946 orthography and reading of original texts of modern short stories. Translation skills are emphasized; discussion in English. Prerequisite: 211-3 or equivalent.

JAPANESE 312-1 (AAL 318-1) Japanese IV: Contemporary Japanese Literary Works for Reading and Discussion Focus on reading contemporary Japanese poems, essays, nonfiction, and novels; discussion in Japanese. Prerequisite: 211-3 or equivalent.

JAPANESE 313-1 (AAL 318-3) Japanese IV: Japanese Newspaper Reading and News Listening Focus on reading Japanese newspaper articles and debating the issues discussed in Japanese. Develops news listening skills. Prerequisite: 211-3 or equivalent.

JAPANESE 314-1 (AAL 318-2) Japanese IV: Japanese Essay

Writing Focus on refining writing skills — narrative, descriptive, persuasive, and argumentative. Review of grammar and expressions through writing clinics. Prerequisite: 211-3 or equivalent.

JAPANESE 399-0 Independent Study For students who have advanced beyond the regular course offerings in Japanese.

Korean Courses

Both first- and second-year Korean language courses offer regular and accelerated tracks. Accelerated courses are for Korean heritage students.

KOREAN 111-1,2,3 (AAL 125-1,2,3) Korean I 3-course introduction to basic literacy and oral proficiency for true beginners.

KOREAN 115-1,2,3 (AAL 125-1,2,3) Korean I — Accelerated 3-course introduction to literacy and oral proficiency for Korean heritage students with knowledge of the Korean alphabet.

KOREAN 121-1,2,3 (AAL 126-1,2,3) Korean II Development of literacy and interactive proficiency skills. Prerequisite: 111-3 or equivalent.

KOREAN 125-1,2,3 (AAL 127-1,2,3) Korean II — Accelerated Development of literacy and interactive proficiency to the advanced level. Class for Korean heritage students with oral and aural proficiency and some reading and writing skills. Prerequisite: 115-3 or equivalent.

KOREAN 399-0 Independent Study For students who have advanced beyond the regular course offerings in Korean.

Persian Courses

PERSIAN 111-1,2,3 (AAL 131-1,2,3) Persian I Sequential 3-course introduction to basic literacy and oral proficiency.

PERSIAN 121-1,2,3 (AAL 132-1,2,3) Persian II Intermediate Persian Prerequisite: 111-3 or equivalent.

PERSIAN 399-0 Independent Study For students who have advanced beyond the regular course offerings in Persian.

Swahili Courses

SWAHILI 111-1,2,3 (AAL 121-1,2,3) Swahili I Basic literacy skills and interactive proficiency; Swahili in cultural and historical context.

SWAHILI 121-1,2,3 (AAL 122-1,2,3) Swahili II Development of literacy and interactive proficiency skills; introduction to verbal arts. In Swahili. Prerequisite: 111-3 or equivalent

SWAHILI 216-1,2,3 (AAL 223-1,2,3) Introduction to Swahili Literature 1. Swahili verbal arts in the oral tradition.

2. Classical Swahili literature. 3. Standard Swahili literature. Prerequisite: 121-3 or equivalent

SWAHILI 399-0 Independent Study For students who have advanced beyond the regular course offerings in Swahili.

Turkish Courses

TURKISH 111-1,2,3 (AAL 118-1,2,3) Turkish I Sequential 3-course introduction to basic literacy and oral proficiency.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

TURKISH 121-1,2,3 (AAL 119-1,2,3) Turkish II Intermediate
Turkish Prerequisite: 111-3 or equivalent.

TURKISH 399-0 Independent Study For students who have advanced beyond the regular course offerings in Turkish.

AFRICAN STUDIES

www.northwestern.edu/african-studies

In 1948 the distinguished scholar Melville J. Herskovits organized the Program of African Studies at Northwestern; more than a half-century later the program remains a model at the forefront of Africanist study and research. Through sponsorship of multidisciplinary courses with African content, language training, and promotion of Africa-based study, the program supports and enlivens the undergraduate study of Africa while serving as the University's "headquarters" for formal and informal interaction between interested students, faculty, and visitors. Every year the program brings undergraduates studying Africa together with faculty and other experts in many areas of inquiry — across disciplinary boundaries and regional specializations — for lectures, seminars, workshops, conferences, and research programs. Northwestern's Melville J. Herskovits Library of African Studies, an unparalleled resource for Africanist study, attracts students and scholars from all over the world. Over the years the program has remained in active contact with its counterparts in Africa and elsewhere, while expanding its role in the University and off-campus communities.

The program offers both an adjunct major and a minor. Although there is no formal language requirement for either, students are strongly encouraged to study a non-English language that is spoken in Africa or its diaspora, such as Swahili, Arabic, French, German, Italian, Portuguese, or Spanish. Competence in a foreign language can facilitate individual research projects, widen understanding of particular topics, and increase study abroad opportunities.

Adjunct Major in African Studies

The adjunct major is structured to serve two broad aims.

First, students are exposed to the geographical and disciplinary breadth of African studies. To that end, all students take 200-level core courses in African history, anthropology, literature, and/or politics, as well as 7 elective courses chosen from an array of disciplines, including African studies, African American studies, anthropology, history, political science, religious studies, and several language and literature departments.

Second, students engage in in-depth research or immersion practica, the products of which they develop in a capstone senior research seminar. Practica often involve a central research component, but other proposed practica whose quality, depth of immersion, etc., are acceptable may also be approved. Among the experiences that may satisfy this requirement with appropriate content are study

abroad in Africa, research connected to the Program of African Studies, internships, and independent study and senior thesis projects.

Program courses (11 units)

- 3 core courses chosen from 276; ANTHRO 255; HISTORY 255-1,2,3; POLI SCI 259 (additional courses from this list may be counted toward the next group)
- 7 additional courses chosen from an approved list
 - At least 3 must be at the 300 level.
 - Courses must be selected from at least three departments.
- 1 senior seminar: 395
- All adjunct majors require completion of a stand-alone major as well. At most 2 courses counted toward the African studies adjunct major may be double-counted toward another major.

Research or immersion practicum

- The quarter-long practicum must be approved by the program.
- It must directly relate to African studies.
- Credit earned through the practicum may count as 1 of the 7 additional courses with adviser permission.

Minor in African Studies

The minor in African studies approaches the study of African societies, cultures, histories, and arts across the disciplines — in the humanities, social sciences, and the professions. Students earning a bachelor's degree in Weinberg College or another undergraduate school may complete a minor in African studies by merging a core of courses with African content with their major program of study. Undergraduates in all disciplines are welcome to participate formally or informally in the program's activities, which advance the training of Africa specialists at Northwestern and promote awareness of Africa in a wider context.

Minor requirements (6 units)

- Courses must be chosen from at least two departments.
- At least 2 courses must be from the HISTORY 255-1,2,3 sequence.
- 1 must be ANTHRO 255.
- Students must have at least an overall B average in the 6 courses.
- At least half of the work in a course taken through another department must have African studies content for the course to count toward the minor. Selections must be approved by the program.
- At least 5 courses for the minor must not be double-counted toward a major.
- Students must declare the minor at least two terms before they intend to graduate. They are encouraged to meet regularly with program staff and the director of undergraduate studies to monitor their progress.

Honors in African Studies

Outstanding students majoring in African studies may be considered for program honors. For information on criteria and procedures, contact the director of undergraduate studies. See also Honors in the Major on page 38.

Courses

AF ST 276-0 African Literature in Translation Continental African literature. Content varies. May be repeated for credit with different topic. Taught with COMP LIT 276; students may not earn credit for both courses with same topic.

AF ST 390-0 Topics in African Studies A general examination of topics relevant to African studies. May be repeated for credit with change in topic.

AF ST 392-1,2 Herskovits Undergraduate Research Award Courses 2-course sequence required for recipients of the Herskovits Undergraduate Research Award.

AF ST 395-0 Senior Research Seminar Capstone seminar addressing both techniques of research and the substance of a significant issue in African studies. Students develop skills at formulating a research topic and organizing research.

AF ST 398-0 Seminar in African Studies Close study and discussion of an issue or question central to African studies. May be repeated for credit with change in topic.

AF ST 399-0 Independent Study May be repeated for credit with change in topic.

AMERICAN STUDIES

www.amstp.northwestern.edu

The American Studies Program is an integrated interdisciplinary honors major involving faculty members of several departments. By drawing on a broad range of knowledge from the humanities and social sciences, the program examines the components of American culture and ways of integrating them. Students are allowed a wide-ranging yet disciplined exploration of problems that cross the boundaries of traditional academic fields. Freshmen and sophomores apply for admission to the major late in the winter or early in the spring quarter. Because this selective honors program has more applicants than available space, admission depends in part on academic distinction and on demonstrated interest in American cultural studies.

Major in American Studies

Program courses (6 units)

- 301-1,2,3 during sophomore or junior year
- 390-1,2,3 during senior year

Related courses (10 units)

- Must be at the 200 or 300 level.
- Courses are chosen from the general curricula in American studies from throughout the University.
- Courses are apportioned to satisfy the interdisciplinary purpose of a major in American studies and express each student's explicit intellectual goals.

- Every major is required to take HISTORY 210-1,2 or an approved equivalent as early as possible.

Honors in American Studies

In senior year all majors participate in the senior project seminar and work on an honors thesis on a topic of their choice. Students meet weekly with their project advisers, the seminar instructor, and fellow seniors to discuss their projects and common concerns. Interested students are encouraged to conduct part of their research off campus and may apply to Weinberg College for funding to do so. Students judged to meet program criteria are recommended for graduation with department honors. See also Honors in the Major on page 38.

Courses

AMER ST 210-0 Topics in American Culture Topics of interest to the American cultural analyst and historian — for example, early American symbols of heroism, the meaning of the frontier. Aimed at large general undergraduate enrollment. May be repeated for credit with consent of program director.

AMER ST 301-1,2,3 Seminar for Majors Yearlong sequences sharing a broad theme, integrating methods and materials from different disciplines. Change of instructor each quarter; change of theme every year. Limited to 20 students (majors only).

AMER ST 310-0 Studies in American Culture Readings and discussions of topics in American cultural life — for example, law in 19th-century America or television news in contemporary U.S. culture. Limited enrollment with emphasis on student participation. Prerequisites vary (check with program director or in program office). May be repeated for credit with consent of program director.

AMER ST 390-1,2,3 Senior Project Thesis or field study. Required of majors.

AMER ST 399-0 Independent Study Readings and conferences on special subjects for students pursuing their area of interest within the major.

ANTHROPOLOGY

www.anthropology.northwestern.edu

Anthropology studies humankind from a broad comparative and historical perspective: the biological evolution of the human species and aspects of the biology of living human populations, the origins of languages and cultures, the long-term development of human cultures over many millennia, and the social life of humans in groups — families, communities, and nations. Anthropologists attempt to describe specific cultural traditions, forms of social structures, languages, and transitions in human evolution and cultural history. They compare cultures and societies to assess what cultures are similar or different, and why. Anthropology is at once a biological science, a social science, and one of the humanities.

Anthropology's breadth and its emphasis on biological and cultural change and cross-cultural comparison make it an ideal major for anyone seeking a solid liberal education as well as for those seeking careers in academic or applied anthropology or archaeology. It serves as an excellent background for students to pursue specialized training in law, medicine, nursing, social work, education, conservation, international relations, or commerce. The world is an ever-smaller and more culturally mixed global community. Knowledge of the developmental processes that explain biological and cultural differences is relevant to a variety of careers. For example, prelaw students would profit from the cross-cultural study of conflict and conflict resolution, and premedical students from courses in human evolution and population genetics as well as the cross-cultural study of health and disease.

The department has many strengths: the application of evolutionary and other biological perspectives to the development of humankind; North American, South American, and European prehistoric archaeology; the study of African societies; the anthropology of complex societies; political economy; and gender. The department is strong in basic theory and refinements of qualitative and quantitative analysis of anthropological data as well as ethnography.

Anthropology majors are encouraged to participate in a variety of field studies programs, including the department's archaeological field training in Dominica, field training conducted with study abroad programs, and summer urban field studies in Chicago. The department is also formally affiliated with Northwestern's Chicago Field Studies Program, which offers a variety of academic internships throughout the year. Field studies that offer the opportunity to conduct original research are especially recommended as preparation for writing a senior thesis.

Major Concentrations in Anthropology

Major in Anthropology

Students are expected to complete a 15-course program (11 courses in anthropology and 4 in related fields) for a major in anthropology. The department's 4 required 200-level courses provide background in the four major subfields of anthropology. 370 examines the philosophical and historical roots of the discipline. The 5 additional 300-level courses, including an examination of appropriate methods and research design issues, develop the student's intellectual maturity in the discipline. All seniors are required to take 398 and to prepare a senior thesis. This requirement provides students with an opportunity to conduct original research and, in the process, gain valuable analytical, critical thinking, and writing skills.

Department courses (11 units)

- 4 core courses: 211, 213, 214, and 215 (students with background in anthropology may petition to substitute a 300-level course)
- 370

- 5 additional 300-level courses, usually selected from one of the subfields below in consultation with an adviser, although students may receive adviser consent to develop a focus that bridges the subfields of anthropology (e.g., culture and technology, health and human development, the institutionalization of power)
 - *Archaeology*: 322 and 4 courses chosen from 301, 302, 311, 321 (offered in summer), 325, 327, 328, 339, 362, 381, 382, 383, 390, 391, 396 (offered in summer)
 - *Biological anthropology*: 5 courses chosen from 306, 310, 312, 313, 314, 315, 317, 362, 383, 390
 - *Cultural/linguistic anthropology*: 389 and 4 courses chosen from 310, 311, 315, 320, 330, 332, 339, 340, 341, 347, 350, 354, 355, 360, 361, 365, 368, 372, 373, 374, 376, 377, 378, 383, 390, 395; CFS 393-1,2, 394-1,2, 395-1,2
 - *Human biology*: See Concentration in Human Biology for requirements.

- 1 senior seminar: 398

Related courses (4 units)

- Courses are subject to the department adviser's approval.
- 1 must be in formal or statistical methods.
- At least 2 must be 300-level courses.
- All 4 courses should relate to the student's independent research work and strengthen the focus that guided the selection of 300-level courses in anthropology.

Concentration in Human Biology

The human biology concentration is a good option for students interested in pursuing careers in the health sciences or graduate work in the biological sciences. The concentration combines a core foundation in basic science with an integrative perspective on the human organism, drawing on both the biological and social sciences. Course work emphasizes the study of human biology and health from a comparative and evolutionary perspective.

In their freshman and sophomore years students complete the introductory (200-level) anthropology requirements as well as foundational courses (which are also premedical school requirements). Junior- and senior-year course work includes 300-level courses in biological anthropology/human biology and related courses from other departments. Additionally, all seniors are required to take 398 and prepare a senior thesis.

Department courses (11 units)

- 4 core courses: 211, 213, 214, 215
- 2 advanced courses: 370, 386
- 4 concentration courses chosen from 306, 310, 312, 313, 314, 315, 317, 362, 383, 390
- 1 senior seminar: 398

Related courses (*units depend on chemistry and mathematics sequences taken; most are also premedical school requirements*)

- BIOL SCI 110-1,2,3 or 210-1,2,3
- CHEM 101, 102, and 103; or 171 and 172

- CHEM 210-1,2 or 212-1,2
- MATH 220, 224 or equivalent
- PHYSICS 130-1,2,3 or 135-1,2,3
- 4 additional related courses from other departments
 - STAT 202
 - 3 300-level courses, subject to the approval of the departmental adviser, who maintains a list of recommended courses

Minor in Anthropology

The minor in anthropology provides students in other fields with a framework to pursue a particular focus within the discipline. Such a focus might be within a subfield of anthropology (e.g., biological anthropology, archaeology, cultural anthropology, linguistic anthropology), in area studies (e.g., Africa, the Middle East, the United States), or in a specific topic (e.g., ethnicity, gender, the origins of the state, urban studies). To fulfill this goal, the minor in anthropology combines 2 of the 4 200-level courses required of majors in anthropology, 1 in the area of ethnography (211 or 215) and 1 in the area of origins (213 or 214), with 5 300-level courses that constitute a coherent focus. The 200-level courses provide a foundation for pursuit of specialized topics.

Students pursuing the minor in anthropology must consult with the department's director of undergraduate studies to establish a program and be assigned a departmental adviser.

Minor requirements (7 units)

- 211 or 215
- 213 or 214
- 5 300-level courses in anthropology constituting a coherent combination with a specific focus

Sample programs: Students majoring in biological sciences but with an interest in ecology and behavior would build a coherent minor in biological anthropology by taking 211 or 215; 213; and a focused course selection such as 306, 310, 312, 313, and 383. Students majoring in history with an interest in pre- and early history would build a coherent minor in archaeology by taking 211 or 215; 214; and a focused course selection such as 301, 302, 303, 322, and 381. Students majoring in political science with an interest in noninstitutional or nongovernmental political processes would build a coherent minor in cultural anthropology by taking 211; 213 or 214; and a focused course selection such as 311, 320, 332, 341, and 347. Other programs for the minor in anthropology may be designed to meet a student's particular needs or interests.

Honors in Anthropology

Students wishing to be considered for departmental honors should make inquiries no later than spring quarter of the junior year. For more information consult the director of undergraduate studies. See also Honors in the Major on page 38.

Minor in the Study of Evolutionary Processes

The Department of Anthropology is a contributor to the interdisciplinary minor in the study of evolutionary processes (MSEP). The minor combines essential components from anthropology, biological sciences, earth and planetary sciences, and physics and astronomy to develop graduates who understand the theoretical and practical aspects of evolution as they apply to modern society, medicine, and technology. More information about the minor can be found on page 61 and at www.wcas.northwestern.edu/evolution.

Courses

For 300-level courses in anthropology, the prerequisite is sophomore standing or 1 100- or 200-level course, unless a specific prerequisite is included in the description below. A student without the prerequisite occasionally may be admitted to a course with the consent of the instructor.

ANTHRO 105-0 Evolution and Social Behavior: The Basics

Introduction to anthropology; the biological evolution of humankind; the evolution of culture; the comparative study of existing or historically recorded societies.

ANTHRO 112-0 New Directions in Archaeology

New frontiers in archaeological perspectives of historical events, public policy, historic preservation, and prehistoric interpretation.

ANTHRO 211-0 Culture and Society Introduction to the comparative study of culture, exploring different types of social organization, their evolutionary significance, and their economic and political correlates.

ANTHRO 212-0 Global Cultures, Global Inequalities A cultural anthropological introduction to the contemporary world and the historical backdrop to contemporary globalization.

ANTHRO 213-0 Human Origins Emergence of human species through the process of organic evolution, emphasizing genetics, the fossil record, and comparison with our nearest living relatives.

ANTHRO 214-0 Archaeology: Unearthing History The evolution of culture from its earliest beginnings through the development of urbanism and the state. Principles of archaeological research.

ANTHRO 215-0 The Study of Culture through Language

The scope of linguistic anthropology, from the study of language as an end in itself to the investigation of cultures through the medium of human languages.

ANTHRO 225-0 Evolution of Human Society Theories of the long-term evolution of human social organizations; comparative analysis of different scales of organization; population, environment, technology, subsistence, political economy, social stratification.

ANTHRO 232-0 Myth and Symbolism Introduction to different approaches to the interpretation of myth and symbolism, e.g., Freudian, functionalist, and structuralist.

ANTHRO 235-0 Attending to Culture Techniques of social and cultural analysis for students planning to study or work abroad, with an emphasis on field-study exercises that treat

culture as a lived experience, society as a participatory process, and social observation as systematic and abstract.

ANTHRO 255-0 Contemporary African Worlds Use of key anthropological insights about value judgments and cultural relativism to examine the survival strategies and turbulent histories of contemporary African societies.

ANTHRO 260-0 Plagues and Peoples: The Anthropology of Global Health Introduction to global health theory and method, policy, governance, practice, and research. Medical anthropology case studies of infectious disease (malaria, HIV/AIDS, ebola), structural inequities (poverty, gender-based violence), and health systems (Cuba). Taught with GBL HLTH 260; students may not earn credit for both courses.

ANTHRO 301-0 Hunter-Gatherer Archaeology Evolution and cultural history during the Pleistocene epoch. Inter-relationship of biology, environment, and culture from earliest hominids through appearance of *Homo sapiens*. Prerequisite: 214 or equivalent.

ANTHRO 302-0 Agriculture: Its Origins, Environmental Impacts, and Social Transformations Beginnings of agriculture, one of the great revolutions in human history. Domestication of plants and animals, dispersal of domesticates, long-term intensification of agriculture, environmental consequences of agriculture, and related social and cultural transformations. Archaeological evidence from Mesopotamia, Europe, Mesoamerica, and North America. Prerequisites: 214, 225, BIOL SCI 204, or ENVR SCI 235.

ANTHRO 306-0 Evolution of Life Histories Evolved strategies for allocating resources among growth, reproduction, and maintenance; emphasis on the biological processes underlying the human life cycle and its evolution.

ANTHRO 310-0 Evolution and Culture Introduction to the application of theory from evolutionary biology to cultural anthropology; principles of evolutionary biology; application of principles to human social behavior and culture. Prerequisite: 213 or equivalent.

ANTHRO 311-0 The Indians of North America Aboriginal cultures of northern Mexico, continental United States, Alaska, and Canada. Languages, art, and social, economic, and religious life.

ANTHRO 312-0 Human Population Biology Current theory and research in human biological diversity, focusing on the impact of ecological and social factors on human biology; how adaptation to environmental stressors promotes human biological variation. Prerequisite: 213.

ANTHRO 313-0 Anthropological Population Genetics Principles of population genetics applied to primates. Mathematical models, analyses of small populations, and interaction of social and genetic processes. Prerequisite: consent of instructor.

ANTHRO 314-0 Human Growth and Development Integrated biological and cultural perspective on human growth and development from infancy through adolescence; cross-cultural variation in developmental processes and outcomes.

Prerequisite: 100- or 200-level anthropology, biology, or psychology course or consent of instructor.

ANTHRO 315-0 Medical Anthropology Theories of interactions between culture and biology that affect human health. Beliefs and practices for curing illness and maintaining well-being. Cross-cultural study of infectious and chronic diseases, mental illness, infant/maternal mortality, poverty, and gender. Prerequisite: 100- or 200-level anthropology or sociology course or consent of instructor.

ANTHRO 317-0 Human Evolution Fossil record and reconstruction of phylogeny; morphological and behavioral adaptation of early hominids and forebears.

ANTHRO 320-0 Peoples of Africa A survey of the cultures of Africa and the significant similarities and differences among the indigenous societies of the continent. Prerequisite: 211.

ANTHRO 321-0 Archaeological Field Methods Practical training in basic methods and techniques at an excavation site; given with summer Archaeology Field School.

ANTHRO 322-0 Introduction to Archaeology Research Design and Methods Regional and site-specific approaches to the description and analysis of patterns in archaeological data, including settlement survey, site characterization, vertical excavations, and horizontal household excavations.

ANTHRO 325-0 Archaeological Methods Laboratory Analysis of archaeological methods (faunal, botanical, artifact, or soil analysis) with various techniques. May be repeated for credit.

ANTHRO 327-0 The Archaeology of Ethnicity in America History of different ethnic groups in America as shown through living quarters, burials, food remains, tools, jewelry, etc. How groups have been portrayed in museums claiming to depict the American past. Focus on African Americans and Native Americans.

ANTHRO 328-0 The Maya The archaeology of the Maya in Latin America; life and society in pre-Columbian Maya civilization; history of Maya resistance to colonial and post-colonial domination (e.g., Zapatistas). Prerequisite: 100- or 200-level anthropology, history, or sociology course.

ANTHRO 330-0 Peoples of the World Comparative ethnography of a regionally or historically associated group of cultures or a type of community defined in ecological, ideological, or other terms. May be repeated for credit.

ANTHRO 332-0 The Anthropology of Reproduction Marriage and reproduction throughout the world, particularly the developing world and Africa. Conjugal strategies, fertility, contraception.

ANTHRO 339-0 Material Culture Relationship between material objects and social life; review of theoretical approaches to gifts and commodities; ethnographic collecting in colonial and postcolonial settings; relationship between culture and aesthetics. Prerequisite: 211 or consent of instructor.

ANTHRO 340-0 Visual Anthropology of Africa Anthropological analysis of techniques, visual rhetoric, and narrative

strategies embedded in images of Africa and Africans in a variety of contemporary and digital media. Course includes instruction in video production. Prerequisite: 200-level social science or African studies course or consent of instructor.

ANTHRO 341-0 Economic Anthropology Economic organization in small-scale nonindustrialized communities. Traditional structures of primitive and peasant economies.

ANTHRO 347-0 Political Anthropology Cross-cultural study of political organization in stateless and state societies. The state, its origin, and changing role in developing countries.

ANTHRO 350-0 Anthropology of Religion The human relationship with the supernatural and action patterns accompanying beliefs. Comparison of nonliterate religions and historical religions.

ANTHRO 354-0 Gender and Anthropology Cross-cultural survey of women's roles from three perspectives: biosocial, sociocultural, politicoeconomic. Theory of gender inequality. Emphasis on the third world.

ANTHRO 355-0 Sexualities Cross-cultural survey of sexuality from an anthropological perspective. Focus on first half of the 20th century, the 1970s, 1980s, and the turn of the 21st century.

ANTHRO 360-0 Language and Culture Relationship between language and culture; language as the vehicle of culture and as the manifestation of thought.

ANTHRO 361-0 Talk as Social Action Analysis of talk in interaction based on examination of audio and video recorded data and associated transcripts. Conversation, action, turn, sequence, relevance, social structure, qualitative methodologies. Prerequisite: 215 or consent of instructor.

ANTHRO 362-0 Advanced Methods in Quantitative Analysis Advanced applications of univariate and multivariate statistics to anthropological research questions. Prerequisite: 200-level statistics course.

ANTHRO 365-0 Language, Race, and Ethnicity in the U.S. Analysis of connections between language ideologies, language use, and meanings of race and ethnicity. Bilingualism, immigration, identity, accented English, African American English, language policy, "English only" movement, education, social change. Taught with ASIAN AM 365; students may not earn credit for both courses.

ANTHRO 368-0 Latino Ethnography Sociocultural analysis of U.S. Latino communities. Examines ethnographies by and about Latinos based in the United States. Draws on a broad disciplinary basis, including Latino studies and ethnic studies, to critique and elaborate on ethnographic methods and epistemologies. Prerequisite: 211, LATIN AM 251, or consent of instructor.

ANTHRO 370-0 Anthropology in Historical Perspective Major schools of thought in social, archaeological, and biological anthropology over the last century. Prerequisite: 200-level anthropology course or consent of instructor.

ANTHRO 372-0 Third World Urbanization Urbanization processes in the third world. Spatial development, wage labor, the informal sector, gender relations, rural-urban migration,

and global and transnational interactions. Effects of these processes on sociocultural practices. Prerequisite: 100- or 200-level social science course or consent of instructor.

ANTHRO 373-0 Power and Culture in American Cities

Overview of history and present realities of American urban life, with focus on ethnographic knowledge and stratifications by class, race, ethnicity, gender, nationality, and sexuality. Reconstitution of social and cultural relations, politics, and labor markets by recurrent streams of migration. Prerequisite: 100- or 200-level cultural anthropology or sociology course or consent of instructor.

ANTHRO 374-0 The Anthropology of Complex Organizations

Examination of recent research in organizational ethnography based on investigations in industrial ethnology, the anthropology of work, studies of public-sector bureaucracies, and research in multinational corporations. Prerequisite: 100- or 200-level anthropology or sociology course or consent of instructor.

ANTHRO 376-0 Socialization Cross-cultural study of the intergenerational transmission of culture; processes by which social groups pass on social tradition and behavior to succeeding generations. Prerequisite: 211, introductory psychology course, or consent of instructor.

ANTHRO 377-0 Psychological Anthropology Contemporary approaches to cross-cultural behavior: ecocultural aspects of behavior development through maturation and socialization in human and nonhuman primates. Prerequisite: introductory survey courses in psychology or anthropology or consent of instructor.

ANTHRO 378-0 Law and Culture Introduction to the anthropology of law; institutional knowledge as seen in material culture and legal documents; colonial and postcolonial settings; theoretical approaches to the relationships between law and culture, colonialism, evidence, and globalization. Prerequisite: 200-level anthropology course or consent of instructor.

ANTHRO 381-0 North American Prehistory Intensive study of cultural history of one or more areas of the continent from archaeological evidence.

ANTHRO 382-0 Households and Everyday Life The role of households and everyday life in past and present societies throughout the world. Focus on people, gender, social relations, and interpersonal relations. An archaeology course with heavy emphasis on theoretical perspectives from sociology and cultural anthropology. Prerequisite: 100- or 200-level anthropology, history, or sociology course.

ANTHRO 383-0 Environmental Anthropology How humans have changed and are changing the environment and what can be done to halt environmental deterioration. Topics include tribal lifestyles, population trends, food supplies, consumerism, environmental regulation, and ecological consciousness.

ANTHRO 386-0 Methods in Human Biology Research

Laboratory-based introduction to international research in human biology and health; methods for assessing nutritional status, physical activity, growth, cardiovascular

health, endocrine and immune function. Prerequisite: 213 or consent of instructor.

ANTHRO 389-0 Ethnographic Methods and Analysis

Descriptive, naturalistic study of the culture of human social groups. Data gathering through observation and interview. Data analysis for ethnographic reporting. Prerequisites: 211 and 215.

ANTHRO 390-0 Topics in Anthropology Advanced work in areas of developing interest and special significance. May be repeated for credit with different topic.

ANTHRO 391-0 Archaeology, Ethics, and Contemporary Society

Why study of the past is relevant to the present; examination of ethical issues in archaeology as they arise during the field work experience. Prerequisite: 321.

CFS 393-1,2, 394-1,2, 395-1,2 Chicago Field Studies See Chicago Field Studies.

ANTHRO 395-0 Field Study in Anthropology Ethnographic field experience in the United States or abroad. Offered in conjunction with summer field schools for exceptional students. Prerequisite: consent of instructor.

ANTHRO 396-0 Advanced Archaeological Field Methods

Complex excavation and survey procedures, topographic map making, excavation drawing, soil description; offered in conjunction with the summer Archaeology Field School.

ANTHRO 396-7 Junior Tutorial Intensive work on a topic not normally offered.

ANTHRO 398-0 Senior Seminar Supervised group discussion of research in preparation of senior thesis. Required of all majors.

ANTHRO 399-0 Independent Study Open with consent of department to juniors and seniors who have completed with distinction at least 2 courses or equivalent in anthropology. Under direction of individual members of department.

Relevant Courses in the Bienen School of Music

- MUSICOL 323, 326-1,2

Summer Field Schools

Archaeology Field School: Courses may include 321, 322, 325, and 396, some of which are also offered on the Evanston campus.

For additional information, contact the Department of Anthropology.

ARABIC

See African and Asian Languages.

ART HISTORY

www.wcas.northwestern.edu/arhistory

Art history explores the historical meaning of art, architecture, and visual culture in all parts of the world from antiquity to the present. It analyzes visual objects through their form, technique, design, historical context, and ideological function. It also studies individual artists or makers, cultural institutions, audiences, and intercultural exchanges. It is

inherently interdisciplinary, often requiring theoretical engagement with fields such as anthropology, philosophy, critical theory, political science, history, literature, film, performance, theater, and area studies.

The study of art history develops skills of informed and critical looking, reading, speaking, and writing. Thus, while it offers specialized knowledge of the visual world for those who want to pursue careers in the art world, academia, and the practice of art and design, the major also provides a solid foundation in the liberal arts. With its broad historical, cultural, geographic, and methodological spectrum, it offers an excellent background for students who want to specialize in areas such as law, medicine, business, international relations, politics, and education. It readily accommodates students who wish to study abroad.

All majors are required to confer with the director of undergraduate studies at the start of the academic year about their course work and are encouraged to do so before each period of registration. The director is also responsible for approving study abroad, transfer credits, and the petition to graduate. He or she communicates regularly with majors by e-mail.

Major in Art History

Department courses (12 units)

- 2 200-level courses
- 9 300-level courses, including
 - Undergraduate Methods Seminar (391)
 - At least 1 390 or 395 seminar
 - At least 1 course each in ancient-medieval, Renaissance-Baroque, modern, and non-Euro-American art history
- 1 studio art course, typically from the department of art theory and practice; other courses may be approved

Related courses (4 units)

- Choose 200- or 300-level courses from one or more of the following departments or programs: African studies, African American studies, American studies, anthropology, art theory and practice, Asian American studies, classics, comparative literary studies, English, French and Italian, gender studies, German, history, humanities, Jewish studies, Latin American and Caribbean studies, music history, performance studies, philosophy, radio/television/film, religion, Slavic languages and literatures, theater, and Spanish and Portuguese.

Minor in Art History

Minor requirements (8 units)

- A maximum of 2 courses may be at the 200 level.
- At least 1 300-level course must be in a non-Euro-American area.

Honors in Art History

Students may be nominated for honors in art history only if they have successfully completed a senior thesis

demonstrating substantial research and high quality. Students who wish to write a thesis must have a grade point average of 3.5 or better in departmental and related courses. The senior thesis requires

- Successful completion of 2 independent study courses (399), 1 of which may count toward the major (taken in the fall and winter quarters of senior year)
- Participation in the departmental senior thesis colloquium

Completed senior theses are submitted in April prior to graduation and evaluated by a departmental honors committee. For further information, please contact the undergraduate adviser. See also Honors in the Major on page 38.

Courses

ART HIST 210-0 Introduction to Art History Conceptual introduction to the problems and methods of art history. Team-taught by departmental faculty, it introduces professors and their areas of expertise as well as fundamental concepts, monuments, and objects in art history.

ART HIST 220-0 Introduction to African Art Thematic and historical survey of the major periods of art making in Africa; analysis of a few exemplary works.

ART HIST 222-0 Art History and the African Diaspora Introduction to the visual and performance art of the African diaspora, including the Caribbean, Brazil, and the United States.

ART HIST 224-0 Introduction to Ancient Art Introduction to the art and architecture of the ancient Near Eastern, Egyptian, Aegean, Greek, and Roman worlds.

ART HIST 225-0 Introduction to Medieval Art Introduction to the art and architecture of the medieval Mediterranean from the late Antique, Byzantine, and Islamic periods through the early medieval, Romanesque, and Gothic artistic traditions.

ART HIST 228-0 Introduction to Pre-Columbian Art Introduction to pre-Columbian and Native American art and architecture, from tribal societies, such as the Iroquois, Mandan, and Kwakiutl, to complex states, such as the Aztec, Maya, and Inca.

ART HIST 230-0 Introduction to American Art Survey of art and architecture in cultural context, from the art of conquest to contemporary issues.

ART HIST 232-0 Introduction to the History of Architecture and Design The theory and history of architecture in relation to cities and landscape; the history of design, 1850 to today.

ART HIST 235-0 Introduction to Latin American Art Survey of the work of artists and groups from throughout the various countries of Central and South America from colonial times to the present.

ART HIST 240-0 Introduction to Asian Art Introduction to the art and architecture of India, China, and Japan from ancient cultures to contemporary developments, including religious, court, and popular genres.

ART HIST 250-0 Introduction to European Art Leading centers and artists of Europe from the Middle Ages to the 20th century. Architecture, sculpture, painting, and graphic arts in relation to their social and cultural settings.

ART HIST 255-0 Introduction to Modernism Conceptual introduction to modernism, covering art and visual culture from the late 19th century to the late 20th century, with a focus on Europe and the United States.

ART HIST 260-0 Introduction to Contemporary Art Conceptual and thematic introduction to art since the 1960s, with attention to the impact of new technologies, social and political change, globalization, and the ongoing transformation of artistic production and distribution.

ART HIST 310-1,2 Ancient Art Art and architecture of the Ancient Greco-Roman world. **1.** Art and architecture of Greece from the prehistoric Aegean to the Hellenistic periods. **2.** Art and architecture of the Roman world from Etruscan forerunners to the High Empire. Prerequisite: 1 200-level art history course.

ART HIST 320-1,2,3 Medieval Art Art and architecture of the Middle Ages. **1.** Byzantine. **2.** Early medieval. **3.** Late medieval. Prerequisite: 1 200-level art history course.

ART HIST 330-1,2,3 Renaissance Art Painting, sculpture, architecture, and the graphic arts in Europe from the late Middle Ages through the 16th century. **1.** Italian art from c. 1300 to the sack of Rome (1527). **2.** Italian art from Mannerism to the High Baroque in Rome. **3.** France, Germany, and/or the Netherlands from the 14th through the 16th centuries. Prerequisite: 1 200-level art history course.

ART HIST 340-1,2 Baroque Art Painting, sculpture, and the graphic arts in Europe from the late 16th through the 17th centuries. **1.** Art and visual culture of the Mediterranean regions (Italy, Spain, France). **2.** Northern Baroque art and visual culture. Prerequisite: 1 200-level art history course.

ART HIST 350-1,2 19th-Century Art Survey of European painting and sculpture. **1.** The late 18th century to 1848. **2.** 1848–1900. Prerequisite: 1 200-level art history course.

ART HIST 360-1,2 20th-Century European Art European painting, sculpture, architecture, design, and visual culture of the 20th century. **1.** Pre–World War II. **2.** Post–World War II. Prerequisite: 1 200-level art history course.

ART HIST 365-1,2 American Art Survey of the arts and visual culture in the United States, encompassing architecture, painting, sculpture, photography, prints, film, and popular culture. **1.** Colonial times to the Civil War. **2.** Post–Civil War. Prerequisite: 1 200-level art history course.

ART HIST 366-0 Contemporary Art In-depth study of art since 1960 as seen from a global perspective and with attention to concurrent developments in critical theory. Prerequisite: 1 200-level art history course.

ART HIST 370-1,2 Modern Architecture and Design 1. The history and theory of architecture in relation to cities and landscape, 1800 to today. **2.** The history of design, 1850 to today. Prerequisite: 1 200-level art history course.

ART HIST 372-1,2 Japanese Art Survey of Japanese art.

1. Arts of Japan pre-Meiji Restoration (1868), including painting, calligraphy, ceramics, architecture, sculpture, textiles, and gardens in religious and secular settings.

2. Modern Japanese art and architecture, 1868–present. Prerequisite: 1 200-level art history course.

ART HIST 378-0 Architecture and Urbanism of the World City in the 20th Century Critical examination of the modern city as a socioeconomic system. Prerequisite: 1 200-level art history course.

ART HIST 380-1,2 Tibetan Buddhist Art Survey of Tibetan art. **1.** Art of the Imperial period (7th–9th centuries) through the end of the 14th century, including regional developments in western Tibet. **2.** Art of the 15th–19th centuries, including regional developments in eastern and northeastern Tibet. Prerequisite: 1 200-level art history course.

ART HIST 382-1,2 Chinese Painting Survey of Chinese painting, 7th–17th centuries. **1.** Visual culture of the Tang and Song dynasties. **2.** Yuan and Ming dynasties. Prerequisite: 1 200-level art history course.

ART HIST 384-0 African American Art Art of the African-descended cultures of North and South America and the Caribbean. Prerequisite: 1 200-level art history course.

ART HIST 385-0 Black Visual Culture: Race and Representation Examination of how visual representations and technologies of vision have been used to create, transform, or destabilize the idea of race as it pertains to people in the African diaspora at specific historical moments. Prerequisite: 1 200-level art history course.

ART HIST 386-0 Art of Africa Thematic examination of art and art historiography of sub-Saharan Africa from the 15th century to the present. Prerequisite: 1 200-level art history course.

Special Topics Courses

ART HIST 319-0 Special Topics in Ancient Art Content varies — for example, picturing the gods; monument and commemoration in antiquity; narrative in ancient art; and the Roman provinces. Prerequisite: 1 200-level art history course.

ART HIST 329-0 Special Topics in Medieval Art Content varies — for example, the early Christian church; history of illuminated manuscripts; pilgrimage and saints' cults; the cathedral; Spain; art and crusade. Prerequisite: 1 200-level art history course.

ART HIST 339-0 Special Topics in Renaissance Art Content varies — for example, the art of Bosch and Brueghel; the history of collecting; art at court; portraiture; gender and representation. Prerequisite: 1 200-level art history course.

ART HIST 349-0 Special Topics in Baroque Art Content varies — for example, French art of the 16th and 17th centuries; art and the New World; early modern prints and drawings; art and science. Prerequisite: 1 200-level art history course.

ART HIST 359-0 Special Topics in 19th-Century Art Content varies — for example, the art of Edouard Manet; orientalism; the spaces of 19th-century art; French painting in the south of France. Prerequisite: 1 200-level art history course.

ART HIST 367-0 Special Topics in American Art Content varies — for example, nationalism and internationalism in American art; the myth of America; the artist in American society; elite and popular visual traditions. Prerequisite: 1 200-level art history course.

ART HIST 368-0 Special Topics in 20th-Century Art Content varies — for example, art of the Russian Revolution; the avant-garde; totalitarian art; art during war; modernism and its discontents; art and decolonization; medium specificity. Prerequisite: 1 200-level art history course.

ART HIST 369-0 Special Topics in Contemporary Art Content varies and may coincide with local exhibitions — for example, art and activism, utopia and dystopia in recent practice; participatory art; the Sixties; video art; art criticism; globalization; visual cultural studies; photography in/as art; installation art; truth and fiction in recent practice. Prerequisite: 1 200-level art history course.

ART HIST 379-0 Special Topics in Architecture Content varies — for example, Chicago architecture, including the work of Sullivan and Wright; Beaux Arts architecture in Europe and America; modernism in architecture; American architecture from Thomas Jefferson to Frank Lloyd Wright. Prerequisite: 1 200-level art history course.

ART HIST 389-0 Special Topics: Arts of Asia and the Middle East Content varies — for example, aspects of painting in the Indian subcontinent: Mughal and Rajput; issues of gender and sexuality in Japan and China from the 18th through the 20th century; art in/about the Middle East. Prerequisite: 1 200-level art history course.

Courses Primarily for Majors

ART HIST 390-0 Undergraduate Seminar Content varies — for example, video's first decade; readings in medieval art; Frank Lloyd Wright and Mies Van der Rohe, 1937–50; Bosch and Brueghel; Japanese prints; Jerusalem; the spaces of Chicago. Prerequisite: 1 300-level art history course.

ART HIST 391-0 Undergraduate Methods Seminar An introduction to the history of the discipline of art history and to the different methodological approaches to the study of art and visual culture. Prerequisite: 1 300-level art history course.

ART HIST 395-0 Museums Museum studies seminars. Content varies — for example, the history of museums, their ethical basis, community responsibilities, educational prerogatives, and future directions. Prerequisite: 1 300-level art history course.

ART HIST 396-0 Internship in the Arts Direct participation, with oversight by a faculty member, in the curatorial/educational activities of the Block Museum or another established arts organization. By petition, on a limited

basis; may be taken only once. Prerequisite: 1 300-level art history course.

ART HIST 399-0 Independent Study Special projects involving reading and conferences with a supervising professor. Arranged in exceptional circumstances. 2 quarters required for students writing a senior thesis in art history. Prerequisite: 1 300-level art history course.

ART THEORY AND PRACTICE

www.art.northwestern.edu

As its name suggests, the Department of Art Theory and Practice explores both the making of contemporary art and the ideas and theories that drive it. Faculty and students pursue the visual arts as a theoretical discipline that pushes the boundaries of aesthetic and cultural experience. The department offers a range of courses that apply traditional approaches, adopt newer media, or use alternative strategies. The study of art practice in traditional media, such as painting, drawing, sculpture, and photography, is the core of the undergraduate course structure, enabling students to develop a solid foundation in the field's traditions and established forms. Studio art classes address both technique and critical thinking about contemporary art; these are complemented by classes in contemporary art theory. Other courses expressly look forward, exposing students to experimental approaches and a foretaste of future developments in visual art making. This dynamic curriculum incorporates digital technology, video, and conceptual art practice, thus blending new trends with traditional practices.

Major in Art Theory and Practice

Students majoring in art theory and practice plan a program of study in consultation with and subject to the approval of a department adviser.

Major requirements (15 units)

- 3 introductory courses: 125, 130, and 140
- 3 history and theory courses: 270, 272, and either 372 or a course in the art history department, excluding freshman seminars
- 280 in the junior year
- 380 in the senior year
- 7 additional courses
 - 3 must be at the 300 level.
 - 4 must be studio art courses at any level.
 - A course may count toward both requirements, but the total number of courses must be at least 7.

Honors in Art Theory and Practice

Outstanding students may qualify for departmental honors in their senior year through exceptional work in the studio critique course (380). Honors candidates' work, including a final presentation, is judged by a faculty committee. See also Honors in the Major on page 38.

The Teaching of Art

Weinberg College students pursuing a major in art who also wish to be certified for secondary teaching must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Courses

ART 120-0 Introduction to Painting Introduction to problems in oil painting and visual thinking. Includes surface preparation, color mixing, and composition. No previous experience necessary.

ART 124-0 Color Theory Introduction to color theory with emphasis on its application to the visual arts. Key terms, the basics of color physics, the physiology of visual perception, and theories of color relationships.

ART 125-0 Introduction to Drawing Introduction to basic drawing techniques and problems in line, space, perception, and the expressive use of various graphic media. No previous experience necessary.

ART 130-0 Introduction to Time-Based Arts Introduction to a wide range of time-based art practices as used in the visual arts, including performance, sound, and video. No previous experience necessary.

ART 140-0 Introduction to Sculpture Introduction to basic sculptural materials and techniques and issues of three-dimensional form. No previous experience necessary.

ART 150-0 Introduction to Photography Extensive dark-room instruction focusing on aesthetic problems and the production of high-quality black-and-white prints. No previous experience necessary.

ART 210-0 Digital Tools for Artists Introduction to basic digital tools including Adobe Photoshop and Illustrator and their use in the production of both traditional media and digital works. Prerequisite: 1 100-level course in the department.

ART 222-0 Intermediate Painting Development of visual language and technical skills in oil painting. Prerequisite: 120.

ART 225-0 Intermediate Drawing Continued development of drawing skills, perceptual abilities, content, and creative thought. Prerequisite: 120 or 125.

ART 230-0 Alternatives to the Object Alternative approaches to making and understanding visual art. Rather than approaching the work of art as an object, students explore it as gesture, idea, or experience. Prerequisite: 1 100-level course in the department.

ART 231-0 Relief Printmaking The design and production of prints from wood, linoleum, and plastic surfaces; also collograph and monoprint techniques. Prerequisite: 120 or 125.

ART 232-0 Intaglio Printmaking Etching, engraving, aquatint, mezzotint, and drypoint. Prerequisite: 120 or 125.

ART 240-0 Intermediate Sculpture Concepts, forms, and processes in sculpture, with an emphasis on developing a personal artistic direction. Prerequisite: 140 or consent of instructor.

ART 250-0 Intermediate Photography Large-format, studio lighting techniques, conceptual approaches, introduction to digital photography. Prerequisite: 150.

ART 252-0 Color Photography Techniques and issues of contemporary color photographic process; digital printing. Prerequisite: 150.

ART 260-0 Video Art Methods of the studio-based production of video art, including shooting, editing, and presentation. Prerequisite: 1 100-level course in the department.

ART 270-0 Contemporary Art Survey Forms and concerns of art from the 1960s to the present, introduced in slide-lecture format.

ART 272-0 Critical Methods for Contemporary Art Introduction to basic key terms, concepts, and analytical categories of theoretical discourses relevant to an informed and critical engagement with contemporary art.

ART 280-0 Studio Practice Exploration of varied techniques and strategies geared toward the development of an individualized and self-directed studio practice. Prerequisite: junior standing in the major.

ART 290-0 Intermediate Special Topics in Art Studio course focusing on a topic or theme of special interest in contemporary art. Content varies. Prerequisites vary with topic.

ART 310-0 Digital Art Exploration and production of digital art including web-based works and/or computer-based interactive works. Prerequisite: 210 or consent of instructor.

ART 322-1,2 Advanced Painting Development of painting skills and personal artistic vision. Prerequisite: 222.

ART 325-0 Advanced Drawing Problems in form, technique, and content in drawing for the advanced student. Prerequisite: 225.

ART 340-0 Installation Art Exploration of installation art in any media, including video, photography, painting, light, sound, and sculptural materials, in works that expand the physical boundaries of art beyond the discrete object. Prerequisite: 140 or consent of instructor.

ART 372-0 Art Theory and Practice Seminar Variable topics addressed in a seminar format. Prerequisites: vary with topic.

ART 380-0 Studio Critique Development of a self-motivated individual studio practice, a strong portfolio, and critical skills. Students learn to give articulate verbal and written expression to the concerns their art explores. Prerequisite: junior or senior status in the major or consent of instructor.

ART 390-0 Special Topics in Art Studio course focusing on a topic or theme of special interest in contemporary art. Content varies. Prerequisites: vary with topic.

ART 399-0 Independent Study For advanced majors pursuing projects outside the context of regularly offered courses. Prerequisite: consent of department chair.

ASIAN AMERICAN STUDIES

www.asianamerican.northwestern.edu

Asian American studies is a vital component of a liberal arts education that seeks to broaden awareness and appreciation of the world. Asian American studies deepens understanding of the multiracial history and character of the United States and also provides an opportunity to place the American experience within a larger global context.

Northwestern's Asian American Studies Program aims to provide students with an understanding of Asian American experience as fundamental to the ongoing development of American society and linked to the experiences of other racial minorities in the United States and of Asian migrants across the world. The program thus encourages students to develop informed, far-reaching perspectives that facilitate responsible participation in a rapidly changing world. As an interdisciplinary program, Asian American studies develops traditional investigative, analytic, and critical skills while also promoting the intellectual and creative powers students need to meet the challenges of the 21st century.

Minor in Asian American Studies

The minor in Asian American studies offers an opportunity to pursue a coherent study of Asian American communities and the experiences of Asian Americans in the United States. It also provides a foundation for the interdisciplinary study of race, ethnicity, and migration within the modern global historical development of nationalism, imperialism, and colonialism.

Minor requirements (7 units)

- 6 courses in Asian American studies
 - Must include introductory survey (210), history survey (214), or literature survey (275).
 - At most 2 courses from other programs and departments with significant coverage of Asian American issues may be counted toward the 6 courses with permission of the program director.
- 1 course in a discipline other than Asian American studies that focuses on race and ethnicity. The course should provide conceptual and comparative breadth concerning a topic related to Asian American studies.
- At least 3 of the 7 courses must be at the 300 level.

Courses

ASIAN AM 201-0 Topics in Asian American Studies Varying topics in Asian American religion, literature, politics, and culture. May be repeated for credit with different topic.

ASIAN AM 210-0 Introduction to Asian American Studies Origins of the field, emerging trajectories, core concepts, theories and methodologies. Analyzes race, gender, immigration, diaspora, class, labor, and sexuality as primary subjects of the field.

ASIAN AM 214-0 Introduction to Asian American History

Introduction to the history of Asians in the United States, with a focus on their impact on American society as well as their experiences within the United States. Taught with HISTORY 214; students may not earn credit for both courses.

ASIAN AM 218-0 Cracking the Color Lines: Asian-Black

Relations in the U.S. Comparative historical analysis of Asian-black relations in the United States, including racialized and sexualized discourses structuring interracial relations and social, political, and economic location.

Slavery, immigration, model minority myth, cross-racial politics. Taught with AF AM ST 218; students may not earn credit for both courses.

ASIAN AM 225-0 Contemporary Issues in Asian American Communities

Critical examination of post-1965 Asian American communities in light of demographic, social, racial, and economic trends in the United States and Asia.

ASIAN AM 236-0 Introduction to Asian American Politics

Examination of how increased Asian American political participation and presence have changed racial politics in the United States.

ASIAN AM 247-0 Asian Americans and Popular Culture

Examination of the place of Asian Americans within American popular culture, historically and today.

ASIAN AM 250-0 Multiracial Asian Americans Causes and consequences of increase in multiracial Asian Americans and impacts on notions of “race.” Racialization and sexualization of Asian immigrants, post-1960s boom in interracial marriage, and identity formation of Asian biracials.

ASIAN AM 275-0 Introduction to Asian American Literature

Introduction to Asian American literature from the early 20th century to the present, covering a range of genres and ethnicities. Taught with ENGLISH 275; students may not earn credit for both courses.

ASIAN AM 304-0 Asian American Women’s History

Exploration of race, gender, and the contours of U.S. history from the perspective of Asian American women’s experiences. Considers migration, exclusion, labor, marriage, family, sexuality, and cross-racial alliance. Taught with HISTORY 304; students may not earn credit for both courses.

ASIAN AM 310-0 Contemporary Asian-Black Relations:

Conflict and Cross-Cultural Collaboration in Urban America Divides between Asians and blacks; areas of positive cross-cultural collaboration. Historical analysis of reparations, the 1992 Los Angeles riots, and affirmative action. Cross-racial exchange in youth expressions, popular culture, hip-hop. Taught with AF AM ST 310; students may not earn credit for both courses.

ASIAN AM 350-0 Asian American Religions Analysis of the role of religion in Asian American communities; how experiences as immigrants and as racial and ethnic minorities shape religious practices, communities, theologies, and identities.

ASIAN AM 360-0 Asian American Women and Gender

Exploration of the intersections of gender, race, and ethnicity, the construction of masculinity and femininity, and the relationship with feminism in the life experiences of Asian American women.

ASIAN AM 365-0 Language, Race, and Ethnicity in the U.S.

Analysis of connections between language ideologies, language use, and meanings of race and ethnicity. Bilingualism, immigration, identity, accented English, African American English, language policy, “English only” movement, education, social change. Taught with ANTHRO 365; students may not earn credit for both courses.

ASIAN AM 370-0 Diaspora in Asian American Studies

Exploration of the ideas of diaspora and homeland and their implications for rethinking immigration and migration as they relate to the experiences of Asian Americans.

ASIAN AM 380-0 Topics in Asian American Arts and Performance

Analysis of Asian American contributions to the art and culture of the United States. Exploration of the dynamics of race, gender, and class in Asian American dance, theater, and film. May be repeated for credit with different topic.

ASIAN AM 392-0 Seminar in Asian American Studies

Seminar on a topic in areas related to Asian American social structure and culture. May be repeated for credit with different topic.

ASIAN AM 399-0 Independent Study in Asian American

Studies Readings and conferences on special subjects for students pursuing areas of interest in Asian American studies.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

ASIAN AND MIDDLE EAST STUDIES

www.asianandmiddleeast.northwestern.edu

The Asian and Middle East Studies Program accommodates the diverse levels of preparation and interests of students attracted to the study of Asia and the Middle East. Majors, adjunct majors, and minors are offered both in Asian languages and civilizations and in Middle East languages and civilizations. While concentrating on the Middle East or Asia, students are able to do some comparative work.

Study of a relevant language is required for the stand-alone majors and encouraged but not required for the adjunct majors and the minors.

Approved courses are listed on the Asian and Middle East studies web site. Students should see the program director for further information about requirements.

Major in Asian Languages and Civilizations**Major requirements (17 units)**

- Courses must be chosen from the approved list in consultation with the program director.

- 6 language courses beyond the first year in Chinese, Hindi, Japanese, or Korean. Native-speaker proficiency does not count for course credit.
- 11 additional courses
 - 9 courses distributed among the three disciplinary categories:
 - 3 in history
 - 3 in social sciences (including anthropology, economics, linguistics, political science, psychology, and sociology)
 - 3 in humanities (including art history, art theory and practice, comparative literary studies, philosophy, and religious studies)
 - 2 additional courses from any of the three disciplinary categories
 - At least 6 of these 11 courses must focus on one of three culturally differentiated areas: East Asia, Southeast Asia, or South Asia. The focus typically corresponds to the language specialization.
 - At least 2 courses must be research courses — including seminars, independent study, or a senior thesis — related to the major.
- At most 2 courses may be double-counted toward another major.
- The major also requires a study abroad experience in Asia, although students may petition for a waiver of this requirement.

Major in Middle East Languages and Civilizations **Major requirements (17 units)**

- Courses must be chosen from the approved list in consultation with the program director.
- 6 language courses beyond the first year in Arabic, Hebrew, Persian, or Turkish. Native-speaker proficiency does not count for course credit.
- 11 additional courses
 - 9 courses distributed among the three disciplinary categories:
 - 3 in history
 - 3 in social sciences (see above)
 - 3 in humanities (see above)
 - 2 additional courses from any of the three disciplinary categories
 - At least 6 of these 11 courses must relate to the Middle East, including North Africa.
 - At least 2 courses must be research courses — including seminars, independent study, or a senior thesis — related to the major.
- At most 2 courses may be double-counted toward another major.
- The major also requires a study abroad experience in the Middle East (including North Africa), although students may petition for a waiver of this requirement.

Adjunct Major in Asian Studies

Adjunct major requirements (11 units)

- Courses must be chosen from the approved list in consultation with the program director.
- 3 social science courses
- 3 history courses
- 3 humanities courses
- 2 additional courses from any of the three disciplinary categories
- At least 6 courses must relate to one of three culturally differentiated areas: East Asia, Southeast Asia, or South Asia.
- An Asian language is not required.
- All adjunct majors require completion of a stand-alone major as well. Courses may not be double-counted toward the Asian studies adjunct major and other majors or minors.

Adjunct Major in Middle East Studies

Adjunct major requirements (11 units)

- Courses must be chosen from the approved list in consultation with the program director.
- 3 social science courses
- 3 history courses
- 3 humanities courses
- 2 additional courses from any of the three disciplinary categories
- At least 6 courses must relate to the Middle East, including North Africa.
- A Middle Eastern language is not required.
- All adjunct majors require completion of a stand-alone major as well. Courses may not be double-counted toward the Middle East (including North Africa) studies adjunct major and other majors or minors.

Minor in Asian Studies

Minor requirements (8 units)

- Courses must be chosen from the approved list in consultation with the program director.
- Typically at least 2 courses are selected in each of the three disciplinary categories: social sciences, history, and humanities.
- At least 4 courses must relate to one of three culturally differentiated areas: East Asia, Southeast Asia, or South Asia.
- Only 1 course may be double-counted toward the student's major. None may be double-counted toward another minor.
- Students who satisfactorily complete two years of language study in Chinese, Hindi, Japanese, or Korean may complete the minor with only 6 disciplinary courses. (Native-speaker proficiency does not count for course credit.)

Minor in Middle East Studies

Minor requirements (8 units)

- Courses must be chosen from the approved list in consultation with the program director.

- Typically at least 2 courses are selected in each of the three disciplinary categories: social sciences, history, and humanities.
- At least 4 courses must relate to the Middle East, including North Africa.
- Only 1 course may be double-counted toward the student's major. None may be double-counted toward another minor.
- Students who satisfactorily complete two years of language study in Arabic, Hebrew, Persian, or Turkish may complete the minor with only 6 disciplinary courses. (Native-speaker proficiency does not count for course credit.)

Honors in Asian or Middle East Languages and Civilizations

The honors programs for majors in Asian languages and civilizations and in Middle East languages and civilizations allow outstanding students to take on the exciting and rewarding intellectual challenge of actively investigating and writing about the fields. Students recommended for departmental honors must complete their major courses with distinction (generally, with a cumulative GPA above 3.5, although imagination, analytical acuity, fluency, and initiative also matter), as well as an honors thesis. The program normally requires 3 quarters of senior-year independent study (399) with faculty, although exceptions may be made. Independent study will count for credit in the relevant disciplinary category.

Interested students should secure a faculty adviser and submit an honors application. Those on the Evanston campus should submit a brief research proposal to the program office by the first week of spring quarter of junior year. Those studying abroad have another two weeks. For more detailed information consult the program web site or office. See also Honors in the Major on page 38.

Courses

AMES 271-1,2,3,4 Japanese Literature in Translation A set of 4 courses surveying Japanese literature from the eighth century to the present. Taught with COMP LIT 271; students may not earn credit for both courses.

AMES 274-1,2,3 Introduction to Chinese Literature Survey of Chinese poetry and fiction from the fifth century B.C.E. to the present. Taught with COMP LIT 274; students may not earn credit for both courses.

AMES 275-0 Arabic Literature in Translation Introduction to Arabic literary background, surveying literary genres from the pre-Islamic period to the present. Taught with COMP LIT 275; students may not earn credit for both courses.

AMES 290-0 Special Topics in Asian and Middle East Studies Content and prerequisites vary. May be repeated for credit with change in topic.

AMES 390-0 Advanced Topics in Asian and Middle East Studies Content and prerequisites vary. May be repeated for credit with change in topic.

AMES 391-0 Advanced Topics in Literature and Fine Arts

Advanced exploration of aspects of literature and/or fine arts relating to Asia and/or the Middle East. Content and prerequisites vary. May be repeated for credit with change in topic.

ASTRONOMY

See Physics and Astronomy.

BIOLOGICAL SCIENCES

www.biosci.northwestern.edu

The science of biology constitutes the study of organisms at all levels of complexity and in all their diversity. The Program in Biological Sciences provides a broad, modern curriculum in the life sciences leading to a bachelor of arts degree. To majors it offers focused concentrations and the potential to do laboratory research projects. The program also houses an interdisciplinary minor in evolutionary processes; see page 61.

The goal of a baccalaureate degree program in biological sciences at a research university is to develop and enhance the intellectual and creative potential of life sciences students. To this end, the program includes the following:

- a foundation in mathematics, chemistry, and physics
- a core curriculum introducing fundamental areas of biological science
- concentrations that subsequently focus students' interests
- opportunities to participate in research

Because biology is grounded in the principles of chemistry, mathematics, and physics, all majors must complete the courses listed under related courses below. During the freshman year students usually complete 100-level chemistry and most or all of the mathematics requirements. In the fall quarter of sophomore year students start 210-1 concurrently with CHEM 210-1. The program's 210 sequence addresses the central topics in contemporary biology with the goal of preparing students for further study in either the biological sciences or professional school. It includes laboratories that provide students with an appreciation of the discipline as an experimental science.

The continuing expansion of knowledge in biology makes it difficult to master all areas in a four-year curriculum. Thus, the junior and senior years are designed to permit students to explore a focused area in the biological sciences that builds on the principles of the 200-level core. To provide a variety of coherent pathways, six areas of concentration have been designed. A student's concentration will be noted on the transcript; only one concentration can be noted.

Students have the opportunity to conduct a research project in the laboratory of a faculty sponsor with whom they design a plan of study. Registration in 399 is required. The sponsor may be a Northwestern faculty member in any department who is engaging in biological research. Research interests of many faculty are discussed on the biological sciences web site.

Sophomores with declared biological sciences majors are assigned specific faculty advisers. Juniors and seniors pursuing independent research also have research supervisors.

Major in Biological Sciences

Program courses (10 units)

- 3 core courses: 210-1,2,3
- 4 advanced courses
 - 301 or 309
 - 315
 - 2 additional 300-level courses
- 3 concentration courses
 - *Biochemistry*: 321, 361; CHEM 210-3
 - *Evolutionary and developmental biology*: 342, 344, 391
 - *Genetics and molecular biology*: 353, 390, 395
 - *Neurobiology*: 302, 305, 306
 - *Physiology*: 325, 356, 358
 - *Plant biology*: 330, 349, 350

Related courses (*units depend on chemistry and mathematics sequences taken*)

- CHEM 101, 102, and 103 (or 171, 172)
- CHEM 210-1,2 (or 212-1,2)
- MATH 220 and 224 or 212, 213 and 214
- 1 statistics course
- PHYSICS 130-1,2,3 (or 135-1,2,3)

Biological Sciences Second Major for ISP Students

The Integrated Science Program (ISP) is a highly selective BA program in Weinberg College (see Integrated Science Program). Students majoring in ISP who wish to complete a second major in biological sciences should fulfill the following requirements instead of those listed above. They may not substitute ISP 398 for any biological sciences or chemistry course in the ISP curriculum and must take the following courses:

- CHEM 212-2
- The 3 relevant courses for the chosen concentration in biological sciences

Honors Program in Medical Education Students

For information on the Honors Program in Medical Education, see page 29. Waiver of the 300-level core lab course is the only HPME waiver that may be applied toward the biological sciences major.

Honors in Biological Sciences

Seniors may be recommended for graduation with honors if they have completed at least 2 quarters of 399, written an approved honors thesis based on the independent study, and have a GPA of at least 3.3 in courses required for the major. For further information consult the biological sciences web site. See also Honors in the Major on page 38.

The Teaching of Biological Sciences

Weinberg College students pursuing a major in biological sciences who also wish to be certified for secondary teaching must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Minor in the Study of Evolutionary Processes

The interdisciplinary minor in the study of evolutionary processes (MSEP) can be tailored to meet the needs of both natural science majors and students majoring in other areas such as humanities, education, and social science. It combines essential components from anthropology, biological sciences, earth and planetary sciences, and physics and astronomy to develop graduates who understand the theoretical and practical aspects of evolution as they apply to modern society, medicine, and technology.

Minor requirements (8 units)

- 4 core courses
 - 1 introductory course in genetics and evolution: 110-1, 210-1, or ANTHRO 213
 - 1 introduction to earth systems and history: EARTH 203
 - 1 upper-level course on evolution: 342
 - 1 capstone seminar: 397
- 4 elective courses
 - At least 1 must be an approved collection, field, or laboratory course.
 - See www.wcas.northwestern.edu/evolution/minor/courses.htm for a list of approved elective courses.

Courses

BIOL SCI 101-0 Biology in the Information Age Fundamentals of the scientific process. Choice of term project or tutorial. May not be taken for credit while or after taking any part of 110-1,2,3 or 210-1,2,3.

BIOL SCI 102-0 Human Abilities How technology, biology, and psychology interface to determine neuropsychological performance.

BIOL SCI 103-0 Diversity of Life Comparative survey of organisms, emphasizing adaptation and phylogenetic relationships. Particular emphasis on animals.

BIOL SCI 104-0 Plant-People Interactions Biology and history of the interaction of humans and flowering plants.

BIOL SCI 109-0 The Nature of Plants Plant adaptations for growth, survival, and reproduction. Plant defense against herbivory, pollination, and seed dispersal.

BIOL SCI 110-1 Biology: Genetics and Evolution Principles of genetics and evolution and their application. With laboratory. May not be taken for credit while or after taking 210-1. Prerequisite: CHEM 101 recommended.

BIOL SCI 110-2 Biology: Molecular and Biochemical

Biology How genes direct synthesis of proteins; biochemistry. With laboratory. Prerequisite: 110-1. No credit while or after taking 210-2 or 210-3.

BIOL SCI 110-3 Biology: Physiology and Cell Biology

How cells, tissues, and organ systems function. With laboratory. Prerequisite: 110-2. No credit while or after taking 210-2 or -3.

BIOL SCI 112-0 Biotechnology and Society Examination of modern biotechnology and its interaction with human society. May not be taken for credit while or after taking any part of 110-1,2,3 or 210-1,2,3.

BIOL SCI 160-0 Human Reproduction Basic biology of reproduction; relation between hormones, emotions, intelligence, and behavior; related policy issues. May not be taken for credit while or after taking any part of 110-1,2,3 or 210-1,2,3.

BIOL SCI 164-0 Genetics and Evolution Principles of inheritance as they apply to evolution. May not be taken for credit while or after taking any part of 110-1,2,3 or 210-1,2,3.

BIOL SCI 210-1 Genetics and Evolutionary Biology

Transmission and demic genetics; evolutionary biology. With laboratory. Prerequisites: MATH 224, CHEM 103 or 172.

BIOL SCI 210-2 Biochemistry and Molecular Biology

Lectures and laboratories in molecular and biochemical biology. Prerequisite: CHEM 210-1.

BIOL SCI 210-3 Physiology and Cell Biology Lectures and laboratories in how cells, tissues, and organ systems function. Prerequisites: 210-2 (grade of C- or better) and CHEM 210-2.

BIOL SCI 212-1 ISP Biochemistry Synthesis and metabolism of organic molecules; structure and function of proteins. With laboratory. Prerequisite: CHEM 212-1.

BIOL SCI 212-2 ISP Molecular and Cell Biology Cell biology, transcription, translation, regulation of gene expression. With laboratory. Prerequisite: 212-1.

BIOL SCI 301-0 Biochemistry Biochemistry with focus on metabolism, energetics, and control mechanisms. Prerequisites: 110-2,3 or 210-2,3; CHEM 210-2. Credit not allowed for both 301 and 309.

BIOL SCI 302-0 Fundamentals of Neurobiology I Cellular and biochemical approaches to the nervous system, focusing on neuron structure and function. Prerequisites: 210-1,2,3; PHYSICS 130-2 or 135-2.

BIOL SCI 303-0 Molecular Neurobiology Mechanisms of signal transduction and synaptic plasticity; basic neurochemistry. Prerequisite: 302.

BIOL SCI 304-0 Developmental Neurobiology Cellular aspects of nervous system development; relationship between structure and function. Prerequisites: 210-1,2,3.

BIOL SCI 305-0 Neurobiology Laboratory Hands-on experience in the performance of experiments in cellular neurophysiology. Prerequisite: 302.

BIOL SCI 306-0 Fundamentals of Neurobiology II Integrative approach toward understanding functioning of mammalian central nervous system. Prerequisite: 302.

BIOL SCI 309-0 Principles of Biochemistry Biochemistry with focus on macromolecular structure and function, relevant gene expression, and photosynthesis. Prerequisites: 210-1,2,3, CHEM 210-1,2. Credit not allowed for both 301 and 309.

BIOL SCI 310-0 ISP Quantitative Biochemistry and Molecular Biology Protein interaction with small molecules; protein tertiary structure determination. Prerequisite: 212-1.

BIOL SCI 311-0 ISP Neurobiology Detailed look at membrane properties of single neurons and synaptic transmission. Prerequisites: 212-1,2.

BIOL SCI 312-0 Ecosystem Ecology Fundamental processes of ecosystem ecology, with an emphasis on terrestrial ecosystems in the context of global change. Prerequisites: 210-1,2,3.

BIOL SCI 313-0 Quantitative Methods for Ecology and Conservation Approaches, methods, and techniques for analyzing datasets in ecology and conservation biology. Prerequisites: 210-1,2,3, STAT 202.

BIOL SCI 314-0 Mind and Brain Neural transmission; how neural dysfunction can translate into cognitive abnormality. Prerequisites: 110-1,2,3 or 210-1,2,3.

BIOL SCI 315-0 Cell Biology Relationship of shape, structural dynamics, and function with the cellular state and gene expression; cell-to-cell communication. Prerequisites: 110-1,2,3 or 210-1,2,3.

BIOL SCI 316-0 Spring Flora Life cycles, vegetative and reproductive structures, and adaptations for pollination and fruit/seed dispersal of the wildflowers, trees, and shrubs of oak woodland. Prerequisite: 110-1 or 210-1.

BIOL SCI 317-0 Molecular Ecology Ecological processes and concepts in the context of evolutionary theory, population genetics, and molecular biology. Prerequisites: 210-1,2,3.

BIOL SCI 318-0 Assembly of Neural Circuits Cellular and molecular processes in the generation of selective connections in the developing brain, including the role of activity-dependent plasticity. Prerequisite: 302.

BIOL SCI 319-0 Biology of Animal Viruses Virus structure, synthesis of viral nucleic acids and proteins, the interaction of the viral and cellular genomes. Prerequisites: 210-1,2,3.

BIOL SCI 320-0 Animal Behavior Evolutionary study of animal behavior, emphasizing theory but using field data to test or illustrate aspects of theory. Prerequisites: 110-1,2,3 or 210-1,2,3; 1 course in statistics.

BIOL SCI 321-0 Physical Biochemistry Thermodynamic laws, diffusion, chemical equilibria, kinetics, and statistical thermodynamics. Prerequisites: 210-1,2,3; CHEM 103 or 172; MATH 224; PHYSICS 130-1 or 135-1.

BIOL SCI 323-0 Bioinformatics: Sequence and Structure Analysis Utilization of informational and modeling techniques to explore evolutionary and other problems related to the genome. Prerequisites: 210-1,2,3; 1 course in statistics.

BIOL SCI 324-0 Neurobiology of Biological Clocks Daily and circadian biological clocks: research regarding their causation and adaptive significance. Prerequisites: 110-1,2,3 or 210-1,2,3.

BIOL SCI 325-0 Animal Physiology Physiological principles and mechanisms responsible for the ability of animals to regulate variables in the steady state. Prerequisites: 110-1,2,3 or 210-1,2,3.

BIOL SCI 326-0 Neurobiology of Learning and Memory Molecular and neural bases of memory. Prerequisite: 302.

BIOL SCI 327-0 Biology of Aging Biological aspects of aging, from molecular to evolutionary. Prerequisites: 110-1,2,3 or 210-1,2,3.

BIOL SCI 330-0 Plant Biology Plant structure, physiology, photosynthesis, evolutionary diversity, and ecology. Prerequisites: 110-1,2,3 or 210-1,2,3.

BIOL SCI 331-0 Soil Ecology Laboratory and field methods of soil analysis to understand terrestrial ecosystem functions and processes. Prerequisites: 210-1,2,3.

BIOL SCI 332-0 Conservation Genetics Critical issues in the management and understanding of endangered populations. Prerequisites: 210-1,2,3.

BIOL SCI 333-0 Plant-Animal Interactions An exploration of the complex mutualisms (e.g., pollination, seed dispersal) and antagonisms (e.g., herbivory, parasitism) among members of these two kingdoms. Prerequisite: 110-1 or 210-1.

BIOL SCI 334-0 Soils and the Environment Soil development and morphology; physical, chemical, hydrologic, and biological properties of soils. Prerequisites: 210-1,2,3; CHEM 103 or 172.

BIOL SCI 335-0 Fundamentals of Plant Biology and Conservation Seminar consolidating diverse aspects of this field. Prerequisites: 210-1,2,3, 330, 332, and senior standing.

BIOL SCI 338-0 Field Methods in Plant Conservation Hands-on experience in plant conservation practices with professionals in the Chicago area. Exposure to many conservation issues and field techniques. Prerequisite: 210-1.

BIOL SCI 341-0 Population Genetics Processes that affect allele frequency change and thus cause evolution. Prerequisites: 210-1,2,3; 1 course in statistics.

BIOL SCI 342-0 Evolutionary Processes Natural selection, patterns of descent, methods of classification, origin of species and higher taxonomic categories, and evolutionary developmental biology. Prerequisites: 110-1, 164, or 210-1; 1 course in statistics.

BIOL SCI 344-0 Vertebrate Morphology and Ontogeny Laboratory Vertebrate phylogeny illustrated via comparative morphology; anatomical/functional and ontogenetic considerations; dissections. Prerequisites: 110-1,2 or 210-1,2.

BIOL SCI 345-0 Topics in Evolutionary Biology Topics vary but always deal with the biology of a major group of organisms. With laboratory. May be repeated for credit with different topic. Prerequisites: 110-1,2 or 210-1,2.

BIOL SCI 346-0 Field Ecology An intensive experience in field ecological research. Prerequisites: 110-1, 164, or 210-1; 1 course in statistics.

BIOL SCI 347-0 Conservation Biology Evolution, ecology, and conservation of patterns of biological diversity. Prerequisites: 110-1, 164, or 210-1; 1 course in statistics.

BIOL SCI 348-0 Plant Population Genetics Evolutionary processes at the plant population level. Prerequisites: 210-1,2,3 and 330.

BIOL SCI 349-0 Plant Community Ecology Abundance, distribution, diversity, and scaling in plant communities in space-time. Prerequisites: 210-1,2,3 and 330.

BIOL SCI 350-0 Plant Evolution and Diversity Laboratory Introduction to the diversity and evolutionary history of land plants. Prerequisites: 210-1,2,3 and 330.

BIOL SCI 353-0 Molecular Biology Laboratory Project-based approach to learning lab skills in eukaryotic molecular biology. Prerequisites: 210-1,2,3.

BIOL SCI 355-0 Immunobiology Nature of host resistance; characteristics of antigens, antibodies; basis of immune response; hypersensitivity. Prerequisites: 210-1,2,3.

BIOL SCI 356-0 Endocrinology Physiology and biochemistry of hormones and glands of internal secretion in vertebrates; endocrine glands. Prerequisites: 210-1,2,3.

BIOL SCI 358-0 Physiology Laboratory Experiments in several physiological systems. Design, techniques, data analysis, and report writing emphasized. Prerequisite: 325.

BIOL SCI 359-0 Environmental Physiology Laboratory Experiments investigating how physiological systems of humans and other organisms respond to environmental variables. Data analysis and report writing emphasized. Prerequisites: 210-1,2,3.

BIOL SCI 361-0 Protein Structure and Function Structure and function of proteins; X-ray crystallography and NMR. Prerequisites: 301 or 309; PHYSICS 130-1,2,3 or 135-1,2,3.

BIOL SCI 377-0 Sensory Neurobiology Physiological processes in sensory receptor cells; chemical senses, vision, hearing, and lateral line organs. Prerequisites: 210-1,2,3.

BIOL SCI 378-0 Functional Genomics Patterns of gene expression and their causes. Prerequisites: 210-1,2,3.

BIOL SCI 380-0 Biology of Cancer The disease of cancer: causation at the cell and molecular levels; treatment. Prerequisites: 210-1,2, 3; 315 or 390.

BIOL SCI 389-0 Biology of Reproduction Molecular aspects of gametogenesis and fertilization; signal transduction/receptors involved in fertilization. Prerequisites: 210-1,2,3.

BIOL SCI 390-0 Molecular Biology Nucleic acid structure; DNA mutation, repair, recombination, replication, restriction, and modification; translation. Prerequisites: 210-1,2,3.

BIOL SCI 391-0 Developmental Biology Molecular mechanisms underlying early embryonic development, including establishment of the body and organogenesis. Discussion of original literature. Prerequisites: 210-1,2,3.

BIOL SCI 395-0 Molecular Genetics Exploration of recent advances that have revolutionized the fields of gene expression and cell regulation. Discussion of articles and primary research papers. Prerequisite: 390.

BIOL SCI 397-0 Capstone Seminar in Evolutionary Processes A highly interactive, upper-level seminar for all seniors in the evolutionary processes minor and for biological sciences seniors intensely interested in evolutionary processes.

BIOL SCI 398-0 Tutorial in Biology Supervised reading and discussion. P/N only.

BIOL SCI 399-0 Independent Research Supervised research, normally lasting 2 or more quarters.

BUSINESS INSTITUTIONS

www.wcas.northwestern.edu/bip

The Harvey Kapnick Business Institutions Program approaches the study of business through a thoughtful investigation of the cultural, political, philosophical, literary, and social consequences of business institutions. Therefore, the program is not meant to serve as narrowly conceived preprofessional training or to function as a business concentration within any single departmental major. Instead the program is conceived as a means to a broad multidisciplinary perspective on a significant area of inquiry in 21st-century society. Students who wish to pursue the minor in business institutions should be open to inquiries grounded in the intellectual approaches of many disciplines.

Minor in Business Institutions

The minor in business institutions requires the successful completion with a grade of C– or above of 10 courses: 4 prerequisite courses, a business tools class, and 5 elective courses. Students must complete at least 2 of the social science prerequisites before declaring the minor.

Interested students should consult with a program adviser. Information is available in the program office, 2010 Sheridan Road.

Prerequisites (4 units)

- 2 economics courses: ECON 201, 202
- 1 course on regulation: ECON 250 or 350, POLI SCI 341, 348, or 375
- 1 course on organizations: SOCIOL 302, 331, or 335
- At least 2 prerequisites must be completed before declaring the minor.

Minor requirements (6 units)

- 1 business tools course: BUS INST 239 or 260
- 5 electives from the approved list on the program web site
 - At most 1 internship-related credit
 - At most 2 professional linkage seminar credits
 - With approval of the program director, other courses with a business institutions emphasis may be counted toward this requirement.

- None of the 6 courses may be double-counted toward any major, minor, or certificate, except as a related course for a major.

Courses

BUS INST 239-0 Marketing Management Basic principles and applications of marketing management; market segmentation, target marketing, brand positioning; survey of market research and consumer behavior; marketing of services, nonprofits, the arts.

BUS INST 260-0 Accounting and Business Finance Accounting and managerial finance, including the principles of accounting, the elementary concepts of the theory of capital and its relationship to the objectives and problems of managing the firm. Prerequisites: ECON 201, 202, or consent of instructor.

BUS INST 390-0 Special Topics in Business Institutions

Investigation of topics of current interest to faculty and students — for instance, arts management.

BUS INST 392-0 Business Institutions Program Internship Seminar Allows students to relate scholarship concerning an aspect of corporate culture to experience gained from an internship. Prerequisite: consent of department.

BUS INST 394-0 Professional Linkage Seminar Content varies. Possible topics include sports marketing and entrepreneurship. Up to 2 professional linkage seminars on different topics may be counted toward the minor.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

CATHOLIC STUDIES

See Religious Studies.

CHEMISTRY

www.chem.northwestern.edu

Chemistry is the study of molecular structure, chemical reactions, and the molecular basis of solids, liquids, and gases. Training in chemistry blends descriptive, conceptual, and mathematical elements in both lectures and laboratory work. While developing chemical knowledge is essential, the progressive honing of analytical abilities and application of this knowledge to research are just as important. Courses are carefully designed to give a rigorous introduction to chemistry for both science and nonscience students.

The broad applicability of phenomena and rigorous methodology of chemistry provide a wide range of career options for majors. By offering a foundation in mathematics, physics, and related sciences; a core curriculum introducing the fundamental areas of organic, inorganic, physical, and analytical chemistry; concentrations in six different areas of chemistry; and opportunities to participate in research, the department meets the needs of students with diverse career objectives, including professional chemistry, graduate

training, medicine, and teaching. Options are also provided for Northwestern's engineering, biological sciences, and prehealth professional programs.

The chemistry faculty is actively engaged in a wide spectrum of original research in which undergraduates are encouraged to participate along with graduate students and visiting scholars from around the world. Undergraduates have opportunities to use modern instrumentation and to participate in seminars, colloquia, and informal contacts with scholars.

Major in Chemistry

The major is recommended for students planning careers in chemistry. It is suitable preparation for graduate study in chemistry or medical school and for work as a professional chemist. The curriculum includes related courses in mathematics and physics as well as core courses and a concentration in chemistry.

Department courses (16–17 units)

- 13–14 core courses providing a solid basis in chemistry
 - 101, 102, 103 *or* 171, 172
 - 220
 - 212-1,2,3 *or* 210-1,2,3
 - 333
 - 342-1,2,3
 - 350-1,2,3
- 3 concentration courses
 - Areas of concentration draw upon courses within the department as well as in other departments.
 - Concentration courses are typically taken during the final year of undergraduate study.
 - The concentration areas, along with eligible courses, are
 - *Biochemistry*: 305, 314, 316, 329, 435; BIOL SCI 301, 309, 321
 - *Environmental chemistry*: 306, 329, 393; CIV ENV 360, 365, 367
 - *Inorganic chemistry*: 302, 329, 411, 433, 434, 435
 - *Organic chemistry*: 301, 314, 316, 329, 410, 412, 413-1,2, 415, 418
 - *Physical chemistry*: 303, 329, 442-1,2, 443, 444, 445, 448
 - *Materials/nanotechnology*: 307, 329, 360; MAT SCI 201, 331, 333, 335, 370
 - *Self-designed concentration*: If the concentrations above do not meet their interests, students may design a concentration with approval of the director of undergraduate studies in chemistry. A concentration may consist of 3 courses from the areas above or with a common theme.

Related courses (*units depend on mathematics courses taken*)

- MATH 220 and 224 *or* 212, 213, and 214; 230 and 234 *or* 281-1,2 *or* 285-2,3 *or* 290-2,3 *or* 291-2,3
- PHYSICS 125-1,2,3 *or* 135-1,2,3

Minor in Chemistry

The minor in chemistry allows majors in other fields to complete a significant portion of the course work required for the chemistry major. It allows the flexible selection of course work from the traditional subdisciplines of organic, inorganic, physical, and analytical chemistry.

Prerequisites

- 103 or 172 or equivalent
- Chemistry courses at the 300 level may have additional chemistry, physics, and/or mathematics prerequisites.

Minor requirements (6 units)

- 6 200- or 300-level courses exclusive of 201 or 399
 - Life science majors and premedical students are advised to take 210-1,2,3 or 212-1,2,3 and 3 additional courses.
 - Physical science majors are advised to take 342-1,2,3 and 3 additional courses.
 - Students with interests in materials science, earth and planetary science, or environmental science should take 210-1,2 and 333 and 3 additional courses.
 - Other programs for the minor may be designed with departmental approval to suit individual needs; interested students should contact the director of undergraduate studies in chemistry.

Chemistry Second Major for ISP Students

The Integrated Science Program (ISP) is a highly selective BA program in Weinberg College (see Integrated Science Program). Students majoring in ISP who wish to complete a second major in chemistry must take these courses:

- Core program: 212-1,2,3, 220, 333, 348, 350-1,2,3
- Concentration: 2 courses from a selected area

Honors Program in Medical Education Students

Chemistry majors who are also participating in the HPME program are permitted two waivers in their major. Only one of these waivers may be used for a core program course; the second waiver may be used for a concentration course.

Four-Year BA/MS

Students who have done outstanding work during their first three years and who have a professional interest in chemistry are eligible to apply for the four-year BA/MS program. Applications should be made during spring quarter of junior year. By the end of the third year the applicant should have completed nearly all of the 300-level course requirements, all or nearly all of the Weinberg College requirements, and at least 1 term of independent study. To fulfill the MS requirements, students must take 9 graduate courses. Applicants should submit to the director of undergraduate studies in chemistry a course plan for the fourth year, a brief description of proposed research, an unofficial transcript, and a letter of support from the

research adviser. For more information see Accelerated Master's Programs on page 39.

Honors in Chemistry

Seniors who have done outstanding work in the classroom and research laboratory are eligible for graduation with honors in chemistry. To be recommended by the department for honors, a student must have completed the courses required for a chemistry major, have a grade point average of 3.3 or above in chemistry, and have engaged in original research during at least 2 quarters of 399. A senior thesis written about the research activities and a strong recommendation from the research adviser are also necessary. For more information consult the director of undergraduate studies in chemistry. See also Honors in the Major on page 38.

The Teaching of Chemistry

Weinberg College students pursuing a major in chemistry who also wish to be certified for secondary teaching must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Advanced Placement

Entering students may receive advanced placement in chemistry by means of the College Board's AP Chemistry examination or the department's placement examination taken on entry to Northwestern. Depending on their scores, they will be advised to register in 101; 171 (with credit for 101); or 210 or 212 (with credit for 101, 102, and 103). Students may not start any general chemistry sequence with 102 or 172 regardless of their AP credit. Questions should be directed to the director of undergraduate studies in chemistry.

Courses Primarily for Freshmen and Sophomores

CHEM 101-0 General Chemistry Descriptive chemistry, elements and compounds; basic chemical calculations, mole problems, stoichiometry, and solution concentrations; gas laws; thermochemistry; quantum theory and electronic structure of atoms; periodic properties of the elements; nuclear chemistry; chemical bonding. With laboratory.

CHEM 102-0 General Inorganic Chemistry Descriptive chemistry, inorganic reactions; chemical bonding; condensed phases; introduction to chemical equilibria; phase equilibria; solutions and colligative properties; metal complexes. With laboratory. Prerequisite: 101 (C– or better). AP credit for 101 does not allow registration for 102.

CHEM 103-0 General Physical Chemistry Chemical equilibrium; equilibria in aqueous solution; thermodynamics; chemical kinetics; electrochemistry and oxidation-reduction reactions; solid-state chemistry; industrial chemical

processes. With laboratory. A grade of C– or better in 103 required to enroll for any higher-level chemistry course. Prerequisites: 102 (C– or better); MATH 220.

CHEM 171-0 Accelerated General Inorganic Chemistry

Review of mole problems and stoichiometry; descriptive chemistry, elements, compounds, and inorganic reactions; gas laws; phase equilibria and colligative properties; chemical equilibrium; aqueous equilibria; topics in chemical bonding and molecular structure. With laboratory. Prerequisite: department placement exam or appropriate AP credit.

CHEM 172-0 Accelerated General Physical Chemistry

Thermodynamics and equilibrium; chemical kinetics and mechanism; electrochemistry; electronic structure of the atom and quantum theory; advanced topics in chemical bonding; coordination compounds; solid-state chemistry; nuclear chemistry. With laboratory. Prerequisites: 171 (C– or better); MATH 220.

CHEM 201-0 Chemistry of Nature and Culture Chemistry for the nonscientist. Chemicals commonly encountered in everyday life. With laboratory.

CHEM 210-1,2,3 Organic Chemistry **1.** Basic concepts of structure, stereochemistry, and reactivity of organic compounds. The chemistry of hydrocarbons and alcohols. With laboratory. No P/N registration. Prerequisite: 103 or 172 (C– or better). **2.** The chemistry of aromatic, carbonyl, and nitrogen compounds; characterization of organic substances by chemical and spectral methods; reaction mechanisms. With laboratory. No P/N registration. Prerequisite: 210-1 (C– or better). **3.** The chemistry of polyfunctional compounds of biological and medicinal interest. Modern organic synthesis, bioorganic chemistry, and recent developments in organic chemistry. With laboratory. No P/N registration. Prerequisite: 210-2 (C– or better).

CHEM 212-1,2,3 Organic Chemistry Primarily for chemistry majors and students in ISP. Similar to 210-1,2,3 except with laboratory only in the first and second quarters. No P/N registration. Prerequisites: 103 or 172 (C– or better) and consent of department, enrollment in ISP, or department placement.

CHEM 220-0 Introductory Instrumental Analysis An introduction to basic laboratory techniques in analytical chemistry and spectroscopy. Topics include infrared and UV-visible spectroscopy, gas and liquid chromatography, elemental and thermal analysis, simple X-ray diffraction, error analysis, and literature-searching techniques. Prerequisite: 103 or 172 or equivalent.

Courses Primarily for Juniors and Seniors

CHEM 301-0 Principles of Organic Chemistry An introduction to the field of physical organic chemistry. Topics include bonding and structure, conformational analysis, stereochemistry, acids and bases, reactivity, and reaction

mechanisms. Taught with 401. Prerequisite: 212-3; or 210-3 and 1 quarter of physical chemistry; or consent of instructor.

CHEM 302-0 Principles of Inorganic Chemistry Topics in advanced inorganic chemistry. Taught with 402. Prerequisite: 333 or consent of instructor.

CHEM 303-0 Principles of Physical Chemistry An overview of advanced topics in physical chemistry. Taught with 403. Prerequisite: 342-1,2,3.

CHEM 305-0 Chemistry of Life Processes Topics in the chemistry and biochemistry of life processes. Taught with 405. Prerequisite: 210-3; or 212-2 and 1 biochemistry course; or consent of instructor.

CHEM 306-0 Environmental Chemistry Topics in the physical chemistry of the environment. Taught with 406. Prerequisites: 210-3 or 212-3; MATH 234, 250; PHYSICS 135-1,2; or consent of instructor.

CHEM 307-0 Materials and Nanochemistry Introduction to frontier research at the interface of chemistry and materials science. Taught with 407. Prerequisite: 212-3 or 210-3.

CHEM 314-0 Bioorganic Chemistry Biosynthetic chemistry as basis for survey of major classes of biomolecules, carbohydrates, amino acids, lipids, nucleotides, nucleic acids, and proteins. Current topics in bioorganic chemistry. Prerequisite: 210-3, 212-3, or consent of instructor.

CHEM 316-0 Medicinal Chemistry: The Organic Chemistry of Drug Design and Action Introduction to principles of drug design and mechanisms of drug action from a chemical viewpoint. Historical introduction, drug design and development, receptors, enzymes and enzyme inhibitors, DNA, drug metabolism, and prodrugs. Prerequisite: 210-3, 212-3, or consent of instructor.

CHEM 329-0 Analytical Chemistry Principles and applications of analytical methods, with emphasis on advanced separation science, dynamic electrochemistry, and advanced mass spectrometry. No P/N registration. Prerequisites: 342-1 or -2.

CHEM 333-0 Inorganic Chemistry Descriptive chemistry of some important elements. Current concepts and models of chemical bonding. Prerequisites: 2 units of 200- or 300-level chemistry.

CHEM 342-1 Thermodynamics Laws of applications of thermodynamics. Thermochemistry, chemical potentials, solution thermodynamics, nonideal gases. Prerequisites: 103 or 172 (C or better); MATH 230; PHYSICS 135-1,2 (students may take PHYSICS 135-2 concurrently).

CHEM 342-2 Quantum Mechanics and Spectroscopy Quantum mechanics with emphasis on atomic and molecular electronic structure. Electronic, vibrational, rotational, and magnetic resonance spectroscopy. Prerequisites: MATH 230 (234 recommended also); PHYSICS 135-1,2.

CHEM 342-3 Kinetics and Statistical Thermodynamics Chemical kinetics, including experimental techniques and theories of rate processes. Statistical mechanics, including Boltzmann distribution, partition functions, and applications to thermodynamics. Prerequisites: 342-1,2.

CHEM 348-0 Physical Chemistry for ISP Gas laws and properties; kinetic theory; first, second, and third laws; phase equilibria; mixtures, phase diagrams, statistical thermodynamics, kinetics. Prerequisites: ISP enrollment; 172; MATH 281-1,2,3; or consent of department.

CHEM 350-1 Advanced Laboratory 1 Advanced laboratory techniques in synthetic and analytical chemistry and spectroscopy: mass spectrometry, chromatography, NMR spectroscopy, and organic synthesis techniques. Prerequisites: 220 and 212-3 or equivalent.

CHEM 350-2 Advanced Laboratory 2 Advanced laboratory techniques in synthetic and analytical chemistry and spectroscopy, polymer characterization methods, electrochemistry, X-ray crystallography, atomic spectroscopy, and inorganic synthesis techniques. Prerequisites: 333 and 350-1 or equivalent; 342-2 corequisite.

CHEM 350-3 Advanced Laboratory 3 Advanced laboratory techniques in synthetic and analytical chemistry and spectroscopy: infrared and Raman spectroscopy, electronic spectroscopy, fast kinetics, organic and inorganic synthesis techniques in a self-guided project. Prerequisites: 342-2 or equivalent and 350-2; 342-3 or 348 corequisite.

CHEM 360-0 Nanoscale Patterning: Top-down Meets Bottom-up Introduction to current problems in nanoscale science and technology; hands-on experience with nanoscale characterization tools and bench-top nanoscale experiments. With laboratory. Prerequisite: 103 (C- or better) or 172.

CHEM 380-0 Cooperative Chemistry Education Participation in approved industrial work experience away from the campus. No credit; no tuition. Prerequisite: consent of department.

CHEM 393-0 Green Chemistry Practices of environmentally benign chemistry as applied to the chemical industry. Introduction to the concept and discipline of green chemistry; growth and expansion of the discipline in historical context from its origins in the early 1990s to the present. Prerequisite: 210-3 or 212-3.

CHEM 398-0 Undergraduate Seminar Advanced work for superior students through supervised reading, research, and discussion. Prerequisite: consent of department.

CHEM 399-0 Independent Study Faculty-directed research. Must be taken P/N for first 2 quarters. Prerequisite: consent of department.

CHICAGO FIELD STUDIES

www.wcas.northwestern.edu/cfs

Affiliated with many Weinberg departments, the Center for Civic Engagement, and the Undergraduate Leadership Program, Chicago Field Studies (CFS) offers programs that combine Northwestern seminars with internships at Chicago area organizations. For more than 40 years CFS has helped students secure internships at more than 350 organizations. It offers programs every quarter on a variety of subjects, such as social justice, law, civic education, business, and organizational behavior. Depending on the program, students intern

up to 36 hours per week and earn 1 to 4 credits. Internship organizations are treated as sites for original research on which seminar discussions and assignments are based.

CFS programs are open to students in any school and major. Admission is by application only, and students must attend an information session before applying. More information can be found on the Chicago Field Studies web site at www.wcas.northwestern.edu/cfs.

Major/Minor Credit

A number of departments and programs allow students to use CFS courses to fulfill major or minor requirements. The type and number of credits applicable, if any, are determined by the student's department.

Programs

Field Studies in the Modern Workplace

This full-time program focuses on organizational behavior and workplace culture. Students intern 24 to 36 hours a week in a variety of professional fields (including law and business, although CFS also offers specific legal and business field studies programs). It is offered every quarter, including summer. The program has 2 required courses worth 2 units of credit each: 393-1,2.

Legal Field Studies

This full-time program focuses on contemporary issues and workplace culture in the legal field. Students intern 24 to 36 hours a week in legal organizations. It is offered 1 or 2 quarters a year. The program has 2 required courses worth 2 units of credit each: 394-1,2.

Business Field Studies

This full-time program focuses on contemporary issues and workplace culture in business. Students intern 24 to 36 hours a week in business organizations (primarily finance and marketing). It is offered every quarter, including summer. The program has 2 required courses worth 2 units of credit each: 395-1,2.

Field Studies in Civic Engagement

This program focuses on forms of civic engagement in Chicago and Evanston during an era of renewal of citizenship and public work. Students intern 10 to 30 hours per week in civic, educational, legal, governmental, nonprofit, or community-based organizations. It is offered 1 or 2 quarters a year. The program has 1 required course, 397, for variable units of credit.

Field Studies in Community Research

This full-time program focuses on the field of community research. Students intern 10 to 30 hours per week in a community-based organization. It is offered 1 or 2

quarters per year. The program has 1 required course, 396, for which credit is variable.

Field Studies in Social Justice

This part-time program focuses on the social justice field. Topics vary by quarter (e.g., immigration, affordable housing, environmental justice, homelessness, poverty, etc.). Students intern 10 to 30 hours per week in social justice organizations. It is offered 1 or 2 quarters per year. The program has 1 required course, 293, for which credit is variable.

Other Programs

CFS periodically develops new programs focusing on different fields and topics, some of which are part-time and carry 1 to 2 units of credit. These programs are described on the CFS web site.

Courses

CFS 293-0 Field Studies in Social Justice (variable units of credit)

CFS 393-1 Modern Workplace Culture (2 units)

CFS 393-2 Contemporary Issues in the Workplace (2 units)

CFS 394-1 Legal Culture and Process (2 units)

CFS 394-2 Contemporary Issues in Law (2 units)

CFS 395-1 Business Workplace Culture (2 units)

CFS 395-2 Contemporary Issues in Business (2 units)

CFS 396-0 Field Studies in Community Research (variable units of credit)

CFS 397-0 Field Studies in Civic Engagement (variable units of credit)

CHINESE

See African and Asian Languages.

CLASSICS

www.classics.northwestern.edu

Classics majors and minors study the language, literature, history, and culture of Greek and Roman antiquity. The department offers a wide range of topics and has strengths in literature, theater, mythology, Greek history, and the history of medicine. Students may also study the reception of classical antiquity in medieval through contemporary Western cultures by taking classical traditions courses offered by other departments. The wide range of choices includes philosophy, religion, political theory, art history, film studies, English, and comparative literature.

Classics majors may pursue a concentration in Latin, Greek, or both. For a classics minor, students may choose from a concentration with readings in Latin or Greek or classical studies with sources in English translation only. Additional information about classics programs and courses is available on the department web site or in the department office.

Major in Classics

The major in classics offers students three different paths of study. Although no previous knowledge of Latin or Greek is required, all students generally are required to achieve competence in one of these ancient languages in order to work with primary sources in the original. Some may choose to complete advanced work in both languages.

With concentrations in Latin, Greek, or both, the major requirements allow some flexibility. Classics majors develop familiarity with the broad sweep of ancient history and literature and key analytical skills necessary to examine the record of Greek and Roman culture. They complete a demanding and distinctive course of study that stresses the development of important intellectual sensibilities — close reading, analytical clarity, thorough research, evaluation of evidence, logical analysis, effective writing, appreciation of nuance and subtleties, historical variability, and cultural differences. All majors complete a research project under the direction of a faculty member in a small 1-quarter seminar. Seniors pursuing honors will undertake an additional 2 quarters of research.

Each of the three tracks — Greek and Latin, Latin, or Greek — requires a minimum of 12 courses beyond the language prerequisites.

All majors are required to undertake a research project in connection with 395 Research Seminar. Topics vary from year to year. Instruction in the use of traditional as well as digital research tools will be included. Students may petition the director of undergraduate studies to substitute research conducted for a study abroad program.

Major requirements: Greek and Latin concentration (12 units)

- Prerequisites: Either GREEK 201-2 and LATIN 101-3 or LATIN 201-2 and GREEK 101-3 (or equivalent placements — see page 70)
- 3 first-language foundation courses in Greek or Latin at the 201-3 level or above
- 3 second-language foundation courses at the 200 or 300 level
- 6 additional courses
 - CLASSICS 211, 212, 395
 - 3 additional Greek, Latin, or classics courses (excluding CLASSICS 110), at least 2 of which must be at the 300 level (may include 1 classical traditions course with consent of the director of undergraduate studies)

Major requirements: Latin concentration (12 units)

- Prerequisite: LATIN 201-2 or equivalent placement (see page 70)
- 3 language foundation courses in Latin at the 201-3 level or above
- 9 additional courses
 - CLASSICS 211, 212, 395
 - 6 additional Latin, Greek, or classics courses (excluding CLASSICS 110), at least 3 of which must be at

the 300 level (may include Greek language courses at any level and up to 2 classical traditions courses with consent of the director of undergraduate studies)

Major requirements: Greek concentration (12 units)

- Prerequisite: GREEK 201-2 or equivalent placement (see page 70)
- 3 language foundation courses in Greek at the 201-3 level or above
- 9 additional courses
 - CLASSICS 211, 212, 395
 - 6 additional Latin, Greek, or classics courses (excluding CLASSICS 110), at least 3 of which must be at the 300 level (may include Latin language courses at any level and up to 2 classical traditions courses with consent of the director of undergraduate studies)

Minor Concentrations in Classics

Students may earn a minor in Latin, Greek, or classical studies. Each option allows students either to survey aspects of classical culture and traditions or to take a more focused cluster of courses. Unlike the Greek and Latin minors, the classical studies minor does not require study of an ancient language. Instead, it provides a framework for examining any aspect of Greek and Roman antiquity or its traditions and reception in medieval through contemporary Western culture.

Students majoring in classics may also earn a minor in classical studies, provided they do not double-count courses toward both the major and the minor.

Minor requirements: Latin concentration (6 units)

- Prerequisite: LATIN 101-3 or equivalent placement (see page 70)
- 3 Latin courses at the 200 and 300 level
- 3 additional Latin and/or classics courses (excluding CLASSICS 110), 1 of which must be at the 300 level (may include 1 classical traditions course with consent of the director of undergraduate studies)

Minor requirements: Greek concentration (6 units)

- Prerequisite: GREEK 101-3 or equivalent placement (see page 70)
- 3 Greek courses at the 200 and 300 level
- 3 additional Greek and/or classics courses (excluding CLASSICS 110), 1 of which must be at the 300 level (may include 1 classical traditions course with consent of the director of undergraduate studies)

Minor requirements: classical studies (6 units)

- 2 courses from CLASSICS 210, 211, 212, 260 (classics majors may substitute additional 200- or 300-level courses in classics, classical traditions, Greek, or Latin)
- 4 additional classics, classical traditions, Greek, or Latin courses, at least 2 of which must be at the 300 level and none at the 100 level

Honors in Classics

Students who have a grade point average of 3.3 in the major at the end of the winter quarter of their junior year are encouraged to write a senior thesis under the direction of a faculty member. Those who write theses of sufficiently high quality may be recommended for departmental honors.

Interested students should discuss their plans with a member of the faculty and the director of undergraduate studies during the spring quarter of their junior year. During their senior year they should enroll in 2 quarters of CLASSICS 399, which may count toward the major. Both the department and Weinberg College have research funds available to facilitate independent student research during the summer between the junior and senior years. Students completing a junior year abroad are eligible and should remain in contact with their intended faculty advisers during the spring quarter of the junior year. For more information see Honors in the Major on page 38.

The Teaching of Latin

Weinberg College students pursuing a major in classics who also wish to be certified for secondary teaching of Latin are urged to contact the Office of Student Affairs in the School of Education and Social Policy as early as possible in their academic careers. For information about teaching careers in Latin and opportunities for mentoring and classroom observation, see the director of undergraduate studies in the Department of Classics.

Study Abroad

The department strongly encourages students to undertake study abroad for a summer, a term, or the academic year at, for example, the Intercollegiate Center for Classical Studies in Rome, Arcadia University in Athens, or the summer program at the American School of Classical Studies in Athens. Interested students should consult with the director of undergraduate studies in the fall of the previous year to ensure sufficient time to prepare applications and plan for appropriate credit toward the major.

Language Placement

Students either must complete the 100-level language sequence before enrolling in GREEK 201 or LATIN 201 or test into the 200-level courses. Completion of 201-3 or permission of the instructor is a prerequisite for enrollment in 300-level language courses. Placement results may not be counted for credit toward the total number of courses required, e.g., the 6 additional courses for the major. More advanced course work must be completed instead.

Department Courses

Courses in Latin

LATIN 101-1,2,3 Elementary Latin Classical Latin vocabulary, grammar, and syntax with graded readings for translation.

LATIN 201-1,2,3 Introduction to Latin Literature Grammar and vocabulary review. Readings in Cicero, Virgil, and Catullus; emphasis on literary analysis. Prerequisites: 101-1,2,3 or department placement.

LATIN 310-0 Readings in Latin Literature Selected topics and authors including Plautus, Cicero, Horace, Ovid, Tacitus, and Apuleius. Prerequisites: 201-1,2,3 or consent of instructor. May be repeated for credit with different topics.

LATIN 399-0 Independent Study Individual program of study under the direction of a faculty member. For advanced students only. Permission of department required.

Courses in Greek

GREEK 101-1,2,3 Elementary Greek Vocabulary, forms, and syntax of Attic Greek.

GREEK 201-1,2,3 Introduction to Greek Literature Review of basic grammar and vocabulary. Representative selections from Greek authors in their historical and cultural contexts.

GREEK 301-0 Readings in Greek Literature Selected authors and topics. Topics recently offered include Aeschylus's *Oresteia*, the Greek novel, Hellenistic epigrams, Herodotus, Thucydides, and Aristophanes. Prerequisites: 201-1,2,3 or consent of instructor. May be repeated for credit with different topics.

GREEK 399-0 Independent Study Individual program of study under the direction of a faculty member. For advanced students only. Permission of department required.

Courses with Readings in English

These courses offer an understanding of classical culture and its influence in history, literature, and art. There are no prerequisites in Greek or Latin.

CLASSICS 110-0 Scientific Vocabulary through Classical Roots Greek and Latin etymology in the vocabulary of the sciences. Designed primarily for science or medical students. Self-paced independent study.

CLASSICS 210-0 Early Western Civilization Comparative study of early Greek and Hebrew cultures against the background of other civilizations of the ancient Near East.

CLASSICS 211-0 Classical Greece History, literature, philosophy, and art in ancient Athens.

CLASSICS 212-0 Roman Civilization Development and character of the Roman Republic and Empire, emphasizing political and social institutions. Roman origins of Europe's politics, religion, literature, and ideas.

CLASSICS 245-0 Classics and the Cinema Analysis of how literary and social/political assumptions intersect in the reception of two related dramatic forms, one originating in 5th-century Greece, the other in the 20th-century United States.

CLASSICS 260-0 Classical Mythology An introduction to Greek and Roman traditional narratives. Emphasis on the social, political, and religious values that they engage.

CLASSICS 321-0 Roman History Selected topics in Republican or Imperial history.

CLASSICS 330-0 Ancient Economy Preindustrial Mediterranean economies of ancient Greece and Rome. Farming, transportation, settlement patterns, capitalism and trade, slavery; course ends with a rustic Roman banquet.

CLASSICS 342-0 Early European Medicine Greco-Roman origins of European medical thought from the cult of Asclepius through the Renaissance to Harvey; emphasis on ethical ideas, strengths, and weaknesses of Greek science.

CLASSICS 345-0 Greek Tragedy Readings in the plays of Aeschylus, Sophocles, and Euripides. Emphasis on Greek drama's social and political context and treatment of mythical material.

CLASSICS 360-0 The Origins of Greek Democracy Emergence of the world's first democracies in archaic Greece, 750–460 B.C.E. Topics include the rise of the city-state, tyranny, Sparta, the effects of military reform, the invention of written law, and the development and consequences of democratic ideology.

CLASSICS 390-0 Topics in Greco-Roman Civilization

Content varies; may be repeated for credit with different topic. Recent topics include Greek music and the city, Aristotle and democracy, and ancient Greek law.

CLASSICS 392-0 Topics in Ancient History Content varies; may be repeated for credit with different topic. Recent topics include staging Greek drama, ancient Greek sanctuaries, and law and rhetoric in ancient Rome.

CLASSICS 394-0 Topics in Greek and Latin Literature

Content varies; may be repeated for credit with different topic. Recent topics include metamorphosis from Homer to Kafka, Roman comedy, and Roman literature and imperialism.

CLASSICS 395-0 Research Seminar Development of critical reading and writing skills and acquisition of information literacy as applied to resources in classics. Topics vary and typically include both a Greek and a Roman focus. May be repeated for credit with a different topic. Required for the major. Prerequisite: junior or senior standing.

CLASSICS 399-0 Independent Study Individual program of study under the direction of a faculty member. For advanced students only. Permission of department required.

Classical Traditions Courses

Offered in departments other than classics, classical traditions courses give significant attention to Greek and/or Roman antiquity (history or literature) in translation. They may be used to satisfy certain major and minor requirements. Recently offered courses include

- ART HIST 224 Introduction to Ancient Art
- ART HIST 310-1 Ancient Art: Greek Art and Archaeology
- COMM ST 394 Rhetoric: Democracy and Empire
- COMP LIT 211 Topics in Genre
- COMP LIT 390 Topics in Comparative Literature
- ENGLISH 311 Studies in Poetry: Theory and Practice of Poetry Translation

- ENGLISH 312 Studies in Drama: Ancient Greek Theater and the Modern Stage
- ENGLISH 383 Literary Theory from Plato to Sidney
- GERMAN 325 The Greeks in German Culture
- HISTORY 333 The Age of the Renaissance
- HUMANITIES 201 Thinking Through and Across Traditions: Epic Literature and Orature
- ITALIAN 265 Body and Soul from Rome to the Renaissance
- PHIL 210 History of Philosophy: Ancient Philosophy
- PHIL 310 Studies in Ancient Philosophy
- POLI SCI 301 Ancient Political Thought
- THEATRE 341-1 Acting II: Analysis and Performance: Greek Tragedy

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

COGNITIVE SCIENCE

www.cogsci.northwestern.edu

Cognitive science is the scientific study of the mind with the goal of understanding the nature of thought. Students learn the ways in which converging sources of evidence may be integrated to discover the mechanisms underlying the complex adaptive properties of human cognition. The major in cognitive science gives a broad foundation in this interdisciplinary field, encompassing cognitive psychology, linguistics, artificial intelligence, neuroscience, and related disciplines. Required introductory courses survey basic phenomena and approaches; basic methodology courses impart the required methods of cognitive science; core courses provide foundations of disciplines within cognitive science; and elective courses allow students to pursue more advanced study in particular disciplines. A junior proseminar focuses on ongoing research in the field by Northwestern faculty. Qualified seniors may achieve honors by taking a senior seminar, conducting independent research under the guidance of department faculty, and writing a senior thesis. Interested students should contact the director of undergraduate studies prior to starting their senior year.

For additional information about the Program in Cognitive Science, see the program director.

Major in Cognitive Science

Major requirements (16 units)

- 3 introductory courses: 207, 210, 211
- 3 basic methodology courses: EECS 110 or 111; PSYCH 201, 205
- 3 core courses: 1 course each from three of the following areas:
 - *Artificial intelligence*: EECS 348
 - *Cognitive neuroscience*: PSYCH 212, 361
 - *Cognitive psychology*: PSYCH 228

- *Learning sciences*: LOC 213, 313
- *Linguistics*: LING 250, 260, 270
- 1 advanced proseminar: 366 (ideally should be taken in the sophomore year)
- 6 advanced electives, at least 3 in the major emphasis and at least 2 outside that area, chosen from
 - *Anthropology*: ANTHRO 363, 389; 390; 395 or 595; 471
 - *Artificial intelligence*: EECS 325, 337, 338, 348, 349, 432, 435 (Contact the cognitive science program for an approved list of certain sections of EECS 395 that may also count toward this area.)
 - *Cognitive neuroscience*: PSYCH 312-2, 321, 324, 342, 358, 363, 364, 460, 470; CSD 303, 310; BIOL SCI 302, 306, 314, 377 (See the Program in Biological Sciences for prerequisites for these courses.)
 - *Cognitive psychology*: PSYCH 333, 334, 335, 358, 362, 460, 461, 466
 - *Communication sciences and disorders*: CSD 303, 306, 309, 350, 392, 406, 492, 495-1
 - *Learning and instruction*: CSD 303, 306, 350, 392, 492; LOC 313 (if not counted as a core course); LRN SCI 401, 402, 429, 451; MUSIC ED 437
 - *Linguistics*: LING 310, 311, 330, 331, 333, 334, 341, 350, 360, 361, 370, 371
 - *Music cognition*: MUS THRY 351; MUSIC ED 437, 438
 - *Philosophy*: PHIL 325, 327, 330, 335, 350, 426
 - Other 300- and 400-level courses may be counted as advanced electives with consent of the cognitive science adviser.
 - Independent study (399) in cognitive science or in one of the departments listed above, which is strongly recommended, may count as an advanced elective.
 - For students pursuing honors, the second quarter of the honors seminar (398-2) may count as an advanced elective.
- At most 5 courses counted toward the cognitive science major may be double-counted toward another major. Courses used to meet major requirements may not be double-counted toward a minor.

Minor in Cognitive Science

The minor in cognitive science broadens the academic background of students majoring in related fields, providing them with the methods and foundations for understanding cognitive issues in an interdisciplinary framework.

Minor requirements (8 units)

- 2 introductory courses chosen from 207, 210, 211
- 2 basic methodology courses, at least 1 from outside the student's major area, chosen from PSYCH 201, 205; EECS 110, 111
- 4 additional courses
 - Must be chosen from at least two areas. (For available areas, see the advanced electives for the major.)

- At least 3 must be at the 300 level.
- At least 3 must be outside the major department or program.
- At least 1 must be chosen from these courses:
 - *Artificial intelligence*: EECS 348
 - *Cognitive neuroscience*: PSYCH 212, 361
 - *Cognitive psychology*: PSYCH 228
 - *Learning sciences*: LOC 213, 313
 - *Linguistics*: LING 250, 260, 270

Honors in Cognitive Science

Enrollment in honors requires a grade point average of at least 3.5 in courses for the major or permission of the honors coordinator. The honors project must be approved by a faculty adviser. Candidates enroll in 398-1,2 in the fall and winter quarters of senior year and may take 399 in the spring quarter. Early in spring quarter they present to the cognitive science community a paper demonstrating an appropriate level of research. The undergraduate studies committee approves nominations for honors. For more information consult the director of undergraduate studies. See also Honors in the Major on page 38.

Courses

COG SCI 207-0 Introduction to Cognitive Modeling

Introduction to artificial intelligence and cognitive science from a nontechnical perspective. Fundamental questions concerning thinking, beliefs, language understanding, education, and creativity.

COG SCI 210-0 Language and the Brain The study of language and its biological basis from linguistic, psychological, and neuroscientific perspectives.

COG SCI 211-0 Learning, Representation, and Reasoning

Interdisciplinary study of the nature of the mind with emphasis on learning, representation, and reasoning.

COG SCI 366-0 Cognitive Science Proseminar New and ongoing research by Northwestern faculty. Prerequisite: consent of instructor.

COG SCI 398-1,2 Senior Thesis Seminar Independent research for a senior thesis under the direction of department faculty. By invitation only.

COG SCI 399-0 Independent Study Faculty-directed research. Consent of instructor required.

COMPARATIVE LITERARY STUDIES

www.complit.northwestern.edu

The Comparative Literary Studies (CLS) Program is an interdepartmental, interdisciplinary program for the study of literature across national and linguistic lines. Those who work in the field of comparative literature are committed to the proposition that language is not an indifferent medium of expression but an integral dimension of every expressive act. Drawing on faculty from the various literature departments as well as from other disciplines (such as art history, film studies, music, and philosophy), the CLS program

reflects the belief that literary texts can best be understood within the context of diverse literary traditions and other cultural phenomena. CLS encourages students not only to read and interpret works of literature but also to reflect on the assumptions, methods, and goals that shape literary and other humanistic studies.

In contrast to literature departments in which students trace the development of one literature in a particular culture over a specific time period, CLS juxtaposes literatures of different cultures and epochs in a variety of ways. Comparative literature studies the themes, conventions, and movements shared by distinct literary traditions as well as the features that differentiate them. Though the field has traditionally dealt with the canonical texts of Western literature, Northwestern's CLS program strongly encourages students to explore literatures outside the European and American canon, especially those of Africa and Asia, as well as to expand the Western canon to include the literatures of excluded or marginalized groups.

CLS students also examine literary theories and critical approaches to literature. In considering texts ranging from the classics of ancient Greek and Roman civilizations to contemporary critical theory, students not only learn to understand specific literary works but also to raise questions about their relations to other forms of discourse (e.g., historical, scientific, and philosophical) and about the nature of literature itself. To this end, the CLS program emphasizes both the study of various types of specifically literary theory (such as structuralist, poststructuralist, psychoanalytic, sociopolitical, and New Historical) and the examination of the theoretical and methodological concerns of other disciplines (such as anthropology, history, philosophy, gender studies, and sociology).

Finally, comparative literary studies considers literary texts in relation to other forms of creative production. The relationship of literature to other arts such as music, the fine arts, and new media is an important focus of interest in many comparative literature courses, and students of comparative literary studies are also encouraged to take courses in other fields and disciplines.

Major in Comparative Literary Studies

Students pursuing a program in comparative literature need to be acquainted with at least two literary traditions. They choose a first literature, normally that written in their native tongue, and a second literature written in another language. They take at least 2 courses in each, as well as at least 1 course in non-Western literature (either in translation or in the original language).

Introductory CLS courses provide students with a range of theoretical approaches to literary texts in particular and the study of culture in general. Advanced CLS courses allow students to use their linguistic skills to further explore literary themes, movements, genres, and periods on a comparative basis.

Majors in CLS choose a concentration by the spring of their junior year in consultation with the director of undergraduate studies. Each concentration consists of 3 courses, of which 1 is a CLS "gateway" to the concentration. Examples of concentrations include the following; others may be created in consultation with the director of undergraduate studies.

- Literature and media (202 or 206 plus 2 courses on media from radio/television/film or any literature department)
- Literature and philosophy (207 plus 2 relevant philosophy courses)
- Critical theory (202 or 207 plus 2 courses in theory from CLS, other literature departments, or political science)
- Literature and the arts (375 plus 2 courses in music, art history, theater, or performance)
- Translation studies (311 plus 2 courses dealing with the practice of translation and/or issues related to translation)
- Advanced comparative literature (3 additional 300-level courses in the first or second literature, CLS, or any mix thereof)
- Gender, sexuality, and literature (205 plus 2 courses on the representation of gender in literature and film from gender studies or any literature department)

All majors are required to take 398 in the fall quarter of their senior year, during which they write a substantial senior paper (often based on a previous paper written for another course).

Major requirements (14 units)

- 3 core COMP LIT courses chosen from 201, 202, 206, 207, 211
- 2 courses in the student's first literature, at least 1 at the 300 level
- 2 courses in the student's second literature taught in the original language, at least 1 at the 300 level
 - A modification may be approved if the relevant department or program does not offer a course at that level.
 - Students whose first language is one other than English may fulfill this requirement with English or American literature courses.
- 1 course in a non-Western literature (either in translation or in the original)
- 3 COMP LIT courses at the 300 level, of which 1 must be 398
- 3 courses in an area of concentration, of which 1 is a "gateway" to the concentration (see examples above)
- Courses may count in more than one category but must total at least 14.
- At most 2 courses counted toward the comparative literary studies major may be double-counted toward another major.

Minor in World Literature

The minor in world literature, like the major in comparative literary studies, examines literature beyond the

boundaries of one national or linguistic tradition. It is designed for students who either do not have the language skills necessary for the major or are particularly interested in non-Western literatures, which currently are taught at Northwestern primarily in translation. Unlike the major in comparative literary studies, the minor in world literature does not have a language requirement. Students are encouraged to read literary texts in the original language but can also take courses where literature is read in English translation.

The minor allows students to study literatures from different parts of the world as well as different periods. Students take courses from at least two different cultural traditions and are encouraged to examine the relations between them — particularly between traditions of Europe and North America and those of the Middle East, Asia, Africa, and South America. In so doing students discover how literary texts cross national boundaries and thus become part of “world literature.” This crossing very often involves some kind of translation, so the minor, while allowing students to read literary texts in English translation, also makes translation one of its objects of investigation.

Minor requirements (7 units)

- At least 2 COMP LIT courses, of which 1 is 201 and the other is a 300-level course.
- 5 additional literature courses from at least two different cultural and linguistic traditions.
 - Courses may be from CLS, English, or any of the foreign language departments or area-studies programs.
 - At least 2 courses must be at the 300 level.

Honors in Comparative Literary Studies

Students who meet the minimum GPA requirement may pursue honors by formulating a project and identifying an honors adviser by the spring of their junior year. They develop their research project during the senior seminar (398) and complete it during 1 quarter of independent study (399), preferably in the winter quarter of senior year. Senior theses often grow out of the area of concentration and are normally 25 to 30 pages long. They are evaluated by the student's adviser and by a member of the CLS honors committee. The independent study course does not count toward the 14 courses required for the major.

Study Abroad

The Program in Comparative Literary Studies encourages all majors who qualify to consider a year or a term of study abroad as juniors.

Courses Primarily for Freshmen and Sophomores

COMP LIT 201-0 Reading World Literature Team-taught introduction to a diverse range of important works of world literature and central debates and questions about the idea of “world literature.” Content varies.

COMP LIT 202-0 Interpreting Culture Introduction to the theory and practice of interpreting “cultural texts” — the literary and other texts through which human culture imposes structures of meaning on the world.

COMP LIT 205-0 Gender, Sexuality, and Representation

Representations in literature and film within their historical, social, and political contexts. Theories of reading and spectatorship in relation to gender and sexuality. Taught with GNDR ST 231; students may not earn credit for both courses.

COMP LIT 206-0 Literature and Media Examination of the relationship between “literature” and “media” with particular focus on material changes to the production of literature and the impact of new technologies of transmission on the production and definition of literature.

COMP LIT 207-0 Introduction to Critical Theory Focus on the related ideas of crisis, criticism, and critique in philosophical, literary, social, political, and cultural contexts. Taught with PHIL 220; students may not earn credit for both courses.

COMP LIT 211-0 Topics in Genre Analysis of major literary genres, such as epic, drama, lyric poetry, novel, and autobiography. Study of particular examples, with focus on historical development, formal features, and social context. May be repeated for credit with change in topic.

COMP LIT 250-0 The Bible as Literature Selected books of the Hebrew bible and New Testament studied from a literary perspective; issues of plot, character, genre, narrative strategy, and theories of interpretation.

Courses Primarily for Juniors and Seniors

Comparative literary studies and language majors read the texts in their language of expertise whenever the course material allows.

COMP LIT 301-0 Practices of Reading Theory and practice of reading literature through the juxtaposition of critical, theoretical, and literary texts; special emphasis on the conflict of interpretations between competing practices of reading.

COMP LIT 302-0 Major Periods in World Literature Literary writings of a historical period, such as the European Renaissance; classical Chinese or Japanese; or the “Age of Empires.” Content varies; may be repeated for credit with different topic.

COMP LIT 303-0 Literary Movements Study of movements, such as realism, modernism, futurism, or postmodernism, with special attention to their broad cultural and historical contexts. Content varies; may be repeated for credit with different topic.

COMP LIT 304-0 Studies in Theme Use and variation of a literary theme (such as the city) or topos (such as recognition) in various times and cultures. Content varies; may be repeated for credit with different topic.

COMP LIT 311-0 Theory and Practice of Poetry Translation Introduction to theoretical approaches to literary translation and to the practice of poetry translation.

COMP LIT 312-0 Authors and Their Readers Study of the work of a major author in terms of its critical reception. Content varies; may be repeated for credit with different topic.

COMP LIT 313-0 Texts and Contexts Intensive study of a major work in relation to an array of different kinds of contextual material. Content varies; may be repeated for credit with different topic.

COMP LIT 375-0 Literature and Its Others Study of the relation of literature to other arts, media, or disciplines. Content varies; may be repeated for credit with different topic.

COMP LIT 383-0 Special Topics in Theory For students with previous study of criticism and literary theory. Content varies. May be repeated for credit with different topic.

COMP LIT 390-0 Topics in Comparative Literature Content varies — for example, problems of literary translation, literature and psychoanalysis. May be repeated for credit with different topic.

COMP LIT 398-0 Senior Seminar Students learn the tools and techniques needed for writing sustained scholarly essays. Required of senior majors in comparative literary studies. Prerequisite: consent of program adviser.

COMP LIT 399-0 Independent Study (1–3 units)

Courses on Non-Western Literature in Translation

COMP LIT 271-1,2,3,4 Japanese Literature in Translation

A set of 4 courses surveying Japanese literature from the eighth century to the present. Taught with AMES 271; students may not earn credit for both courses.

COMP LIT 274-1,2,3 Introduction to Chinese Literature

Survey of Chinese poetry and fiction from the fifth century B.C.E. to the present. Taught with AMES 274; students may not earn credit for both courses.

COMP LIT 275-0 Arabic Literature in Translation Introduction to Arabic literary background; survey of literary genres from the pre-Islamic period to the present. Taught with AMES 275; students may not earn credit for both courses.

COMP LIT 276-0 African Literature in Translation

Continental African literature. Content varies. May be repeated for credit with different topic. Taught with AF ST 276; students may not earn credit for both courses.

COMP LIT 278-1,2 Modern Hebrew Literature in Translation

History of Hebrew literature. **1.** The European period. **2.** The Israeli period. Taught with JWSH ST 278; students may not earn credit for both courses.

COMP LIT 279-0 Modern Jewish Literature A study of modern European, American, and Israeli Jewish literature in its historical context. Taught with JWSH ST 279-0; students may not earn credit for both courses.

JWSH ST 379-0 Storytelling in Modern Jewish Literature See Jewish studies.

Relevant Courses in Other Departments

For descriptions of the following courses in literature in translation, consult the relevant department listings.

- CLASSICS 211, 212, 244, 245, 260, 340, 345, 394

- FRENCH 277, 279, 375, 376, 378
- GERMAN 226, 228, 230, 232, 234, 236, 238, 240, 322, 326, 328, 330
- ITALIAN 275, 380
- SLAVIC 210-1,2,3, 310, 311, 314, 318
- SPANISH 323, 397

COMPUTER SCIENCE

www.eecs.northwestern.edu/academics/undergraduate/degrees/cscurriculum/weinberg-cs

The Program in Computer Science (CS) offers students the opportunity to study computer science within the context of Weinberg College's focus on liberal arts and sciences, as distinct from the engineering context in the McCormick School's Department of Electrical Engineering and Computer Science (EECS). The computer science requirements are identical in the two programs. Faculty and courses for the program are drawn from the McCormick EECS department, which has extensive computing facilities for student use.

Computer science is a highly interdisciplinary field, as the numerous links with other programs at Northwestern reflect. These include cognitive science, psychology, learning sciences, communication studies, radio/television/film, computer engineering, and the Transportation Center.

The computer science requirements include the following five parts. Undergraduates are encouraged to participate in research projects and to take advanced courses.

- Background or related courses: fulfill the general requirements of the University and school and provide the necessary background for study in computer science
- Core courses: what the faculty expects every CS graduate to know
- Breadth requirements: areas of computer science to which every CS graduate should be exposed
- Depth requirements: opportunities to explore one or two areas in detail
- Project: exposure to significant development and/or research work

For more information on the EECS department and its course offerings, see the McCormick School chapter of this catalog. Students are urged to speak regularly with advisers and to consult the EECS web site (www.eecs.northwestern.edu) for a detailed curriculum document.

This major was formerly known as computing and information systems (CIS).

Major in Computer Science

Program courses (19 units)

- 6 core courses: EECS 101, 111 (students without programming experience may want to first take 110, ideally in the Python programming language), 211, 213, 310, 311
- 5 breadth courses, 1 from each of the following five areas (see the EECS web site for changes to this list):

- *Theory*: EECS 328, 335, 336, 356
- *Systems*: EECS 303, 322, 339, 340, 343, 345, 346, 350, 358, 361, 397, 440, 441, 442, 443, 450, 464
- *Artificial intelligence*: EECS 325, 337, 344, 348, 349, 360
- *Interfaces*: EECS 330, 332, 351, 352, 370
- *Software development*: EECS 338, 394
- 6 depth courses: 3 each from two of the following areas (see the EECS web site for changes to this list):
 - *Theory*: EECS 328, 335, 336, 356, 357, 457, 459, MATH 308
 - *Systems*: EECS 322, 339, 340, 343, 345, 350, 358, 361, 440, 441, 442, 443, 450, 464
 - *Artificial intelligence*: EECS 325, 337, 344, 348, 349, 360
 - *Interfaces*: EECS 330, 332, 351, 352, 370
 - *Security*: EECS 322, 339, 340, 343, 345, 350, 440, 441, 443, 450
- Students should consult with advisers about depth areas. It is possible to petition for a single 6-course depth area.
- 2 project courses: 2 quarters of 399 or others from the department's project course list
- EECS 395 and 399 sections may be used for breadth and depth requirements if appropriate; consult program advisers for information.

Related courses (*units depend on mathematics sequence taken*)

- *Mathematics*: MATH 220 and 224 (or 212, 213, and 214), 230, and 240
 - *Probability and statistics*: STATS 210 or MATH 310-1
- Physics or biological sciences courses are recommended to satisfy the Weinberg College natural sciences distribution requirement.

Computer Science Second Major for ISP Students

The Integrated Science Program (ISP) is a highly selective program in Weinberg College. Students majoring in ISP may complete a second major in computer science through a curriculum tailored specifically to their needs:

- Core requirements: same as for major (6 courses)
- Breadth requirements: same as for major (5 courses)
- Project: 2 quarters of ISP 398 or EECS 399 (Projects must be approved by advisers in both ISP and CS.)

Minor in Computer Science

The program offers a minor in computer science for students who wish to develop a strong competence in computer science while majoring in another area.

Prerequisites

- MATH 220 and 224 (or 212, 213, and 214), 230, and 240

Minor requirements (9 units)

- 6 core courses: same as for major
- 3 breadth courses: 1 in each of three breadth areas listed under the major

CRITICAL THEORY

www.wcas.northwestern.edu/criticaltheory

Over the past three decades the term “critical theory” has come to designate, particularly in the United States, a type of study that cuts across disciplines to examine the premises, concepts, and categories that structure academic discourse in areas such as literary studies, art history, film studies, history, philosophy, and political theory, to name just a few. Critical theory is therefore not limited to a particular field or even to specific content; it is involved wherever methods, concepts, and social formations are not simply taken for granted but subjected to systematic and rigorous critical reflection.

The minor in critical theory is an interdisciplinary program of study enabling undergraduates to acquire understanding of critical theory's many dimensions and fields of application. It aims to give students a chance to develop their interests in various dimensions of critical theory, with particular emphasis on literary theory, continental philosophy, and political theory.

Minor in Critical Theory

Minor requirements (6 units)

- COMP LIT 207
- 5 interdisciplinary 300-level courses approved by the program, including
 - At least 1 course, usually COMP LIT 390, taught by a visiting professor in critical theory
 - At least 1 course each in literary theory, political theory, and philosophy
 - A list of approved courses may be obtained from the program director or by consulting the program web site.

DRAMA

www.drama.northwestern.edu

The Program in Drama offers undergraduates the opportunity to combine the study of dramatic literature in classics, comparative literary studies, English, and modern languages with performance studies and theater courses in the School of Communication. Recognizing the uniqueness of drama among literary genres as a performing art, the program seeks to develop an understanding and appreciation of dramatic literature informed by the study of acting, interpretation, design, playwriting, and/or directing. Major requirements ensure a balance of historical, literary, and theatrical approaches to drama; they are flexible enough to allow for special interests and concentrations, including study abroad and the study of non-English drama in the original language. All students electing this major must work out a long-range plan of study with a program adviser.

Major in Drama

Program courses (14 units)

- At least 9 courses must be at the 300 level.

- No more than 2 courses may be at the 100 level.
- No more than 9 should be from one school to maintain a balance between literary and theatrical approaches to the study of drama.
- At least 7 courses must be in the history and criticism of drama, including 3 courses in drama before 1850 (but not all in Shakespeare) and 2 courses in drama after 1850. Eligible courses include the following:
 - AF AM ST 259, 357
 - CLASSICS 245, 345
 - DANCE 215, 315
 - ENGLISH 212, 234, 312, 322, 332, 334-1,2, 339, 342
 - FRENCH 272, 279, 360
 - GEN CMN 103
 - GERMAN 329
 - GNDR ST 362, 372
 - ITALIAN 202, 230, 378
 - MUSICOL 330, 343
 - PERF ST 224, 310, 311, 336
 - SLAVIC 318, 369
 - SPANISH 321
 - THEATRE 244-1,2, 307, 345-1,2,3, 351, 354, 365-1,2, 366, 367, 368, 374
 - Other courses may be substituted with the permission of a program adviser.
- At least 3 of these performance practices courses must be chosen:
 - ART 130
 - DANCE 250, 260, 270, 280, 326, 350, 360, 370, 380
 - GEN CMN 110
 - PERF ST 210-1,2,3, 216, 224, 307-1,2, 308, 309-1,2,3, 315, 318-1,2, 322, 326-1,2, 327, 328, 329, 330, 332, 338
 - THEATRE 140-1,2, 143, 210, 243-1,2, 253, 310, 312, 340-1,2, 341-1,2,3, 346-1,2, 347-1,2, 348-1,2, 352-1,2
 - Other courses may be substituted with the permission of a program adviser; 100-level performance practices courses not on this list will not normally be considered for the major.
 - 1 course must be an advanced seminar, normally a 400-level course approved by a program adviser.

Related courses (4 units)

- Must be at the 200 or 300 level.
- Subjects must relate to the study of drama; applicable areas include aesthetics, art history, criticism, film, history, humanities, music, literature, and sociology of culture.
- Courses must be approved by the program director.

Honors in Drama

Seniors with distinguished records in major courses who wish to be candidates for honors in drama do so by completing an independent project. Interested students should consult with the program director in the spring quarter of the junior year. See also Honors in the Major on page 38.

Course

DRAMA 399-0 Independent Study in Drama Project for senior drama majors who have completed the required seminar and wish to be candidates for honors in drama. Prerequisite: approval of program director.

EARTH AND PLANETARY SCIENCES

www.earth.northwestern.edu

The earth and planetary sciences study the complex interacting physical, chemical, and biological processes that have shaped the earth and other planets throughout geologic time and will control their environmental conditions into the future. They therefore address fundamental scientific questions important for human society.

The degree program includes a highly interdisciplinary set of courses that investigate research questions spanning spatial scales from the submolecular to the interplanetary and time scales from the origin of the earth and solar system to the future evolution of our planet. Upper-level courses address both internal processes of the earth and other planets (studies of earthquakes, volcanoes, and plate tectonics) and surface processes that regulate environmental conditions in the oceans, on land, and in the atmosphere (studies of the carbon cycle and its role in climate change).

The goal of the Department of Earth and Planetary Sciences is to train young scholars who can make a difference for the future of science and society. Undergraduates select individual programs reflecting their interests and career goals, whether these are graduate study in the earth and planetary sciences, professional employment, or advanced study in areas such as environmental consulting, management, or law.

Majors are involved in the full spectrum of departmental activities beyond class work, including research, seminars, field trips, and social functions. Many do research projects with faculty and graduate students that lead to honors theses and scientific publications.

Major in Earth and Planetary Sciences

The major offers two tracks. Track 1 is designed to provide a structured overview of the discipline. Track 2 is designed to accommodate individual interests of students seeking a more quantitative course of study. Requirements for each track are listed below.

Chemistry, mathematics, and physics prerequisites for 200- and 300-level courses should be taken at the earliest opportunity.

Track 1

Department courses (9 units)

- 8 core courses
 - 3 200-level courses: 201, 202, 203
 - 5 300-level courses: 300, 310, 320, 330, 340
- 1 research course: 1 quarter of 398 or 399

Related courses (*units depend on chemistry or mathematics sequences taken*)

- CHEM 101, 102, and 103 *or* 171 and 172
- MATH 220 and 224 *or* 212, 213, and 214; 230
- PHYSICS 135-1,2,3
- 2 additional courses at the 200 level or higher in math, science, or social science, 1 of which may be 326

Track 2**Department courses** (8 units)

- 7 core courses
 - 3 200-level courses: 201, 202 (350 may be substituted for 202), 203
 - 4 300-level courses chosen in consultation with an adviser
- 1 research course: 1 quarter of 398 or 399

Related courses (*units depend on chemistry or mathematics sequences taken*)

- CHEM 101, 102, and 103 *or* 171 and 172
- MATH 220 and 224 *or* 212, 213, and 214; 230, 234, and 240 *or* 285-1,2,3 *or* 290-1,2,3 *or* 291-1,2,3; and 250; 281-1,2,3 substitutes for all of these requirements
- PHYSICS 135-1,2,3

Minor in Earth and Planetary Sciences

The minor offers students in any major outside the department a flexible path to improved knowledge of earth and planetary sciences. With faculty advisers, students select paths that emphasize such fields as physical geology, geochemistry, geophysics, or a combination of these.

Minor requirements (6 units)

- 201, 202 (350 may substitute for 202)
- 4 300-level courses in the department, 1 of which may be 398 or 399; 1 400-level course may substitute with permission

Earth and Planetary Sciences Second Major for ISP Students

The Integrated Science Program (ISP) is a highly selective BA program within Weinberg College. Students majoring in ISP who wish also to complete a major in earth and planetary sciences must take 201 and 3 300-level courses in addition to 350. These requirements replace the usual major requirements noted above.

Four-Year BA/MS

Students with a professional interest in the earth sciences and a grade point average of 3.5 or above may be eligible for the four-year BA/MS honors program offered by the department, which recommends students for this program subject to final acceptance by the Graduate School. Students may apply in the spring quarter of their junior year. By the end of that year, applicants should complete all courses required for

the major in earth and planetary sciences and all (or nearly all) the Weinberg College BA requirements.

To fulfill the MS requirements, students must complete

- 12 courses approved by the student's advisory committee and bearing graduate credit in science or engineering (MATH 250, CHEM 342-1, and the 4 300-level courses taken for the BA may be counted)
- a final independent research report (not necessarily a formal thesis)

For more information see Accelerated Master's Programs on page 39 and consult with a department adviser.

Honors in Earth and Planetary Sciences

Students with GPAs of 3.3 or above in their major courses are encouraged to discuss possible honors projects with an appropriate faculty member. After a proposed project is approved by the undergraduate adviser, the research is conducted as 2 quarters of 399 or in 1 quarter of 399 and 1 quarter of a 400-level course. The project is evaluated by the departmental honors committee and, if it is approved, the student will be nominated for honors. See also Honors in the Major on page 38.

Minor in the Study of Evolutionary Processes

The Department of Earth and Planetary Sciences is a contributing department to the interdisciplinary minor in the study of evolutionary processes (MSEP). The minor combines essential components from anthropology, biological sciences, earth and planetary sciences, and physics and astronomy to develop graduates who understand the theoretical and practical aspects of evolution as they apply to modern society, medicine, and technology. More information can be found on page 61 and at www.wcas.northwestern.edu/evolution.

Introductory Courses

EARTH 101-0 Earth Systems Revealed Replaced by 201.

EARTH 103-0 Geologic Hazards Examination of the principal sources of natural hazards (earthquakes, volcanoes, tsunamis, hurricanes, tornadoes) in the framework of modern geological theories. Lectures and discussion.

EARTH 105-0 Climate Catastrophes in Earth History Introduction to the fundamental components of the earth system that control climate and an exploration of how climate is changing today and how it has changed (sometimes catastrophically) in the geologic past. Lectures and discussion.

EARTH 106-0 The Ocean, the Atmosphere, and Our Climate The role of the world's oceans in the earth's climate system. Properties of the oceans and marine life. Interaction of oceans, atmosphere, and land. Lectures and discussion.

EARTH 107-0 Our Dynamic Planet How plate tectonics controls our planet's evolution, shapes its surface, fosters life, provides natural resources, and threatens society with natural disasters, including earthquakes, tsunamis, and volcanic eruptions. Lectures and discussion or lab.

EARTH 108-0 Geological Impacts on Civilization Impacts of geological processes and materials upon human civilizations. Geological, archaeological, and historical records. Societal responses to disasters, environmental changes, resource distributions, etc. Ancient and modern examples. Lectures and discussion.

EARTH 110-0 Exploration of the Solar System Origin of the solar system; accretion and differentiation of planets and satellites; early history of the moon; missions and discoveries; exoplanets. Lectures and discussion or lab.

EARTH 111-0 Human Dimensions of Global Change Natural and human causes of climate and environmental changes on land, in waters, and in the atmosphere. The earth system on long and short timescales. Lectures and discussion.

EARTH 114-0 Evolution and the Scientific Method Review of evolutionary theory and its scientific, philosophical, social, and religious impacts. Lectures and tutorials.

EARTH 201-0 Earth Systems Revealed Introduction to fundamental earth processes and their products, with emphasis on surface processes and climate. Field trip. Formerly 101.

EARTH 202-0 Earth's Interior The earth as a planet: origin, composition, and evolution of the solar system and the earth; internal structure of the earth; plate tectonics. Prerequisites: MATH 224, PHYSICS 135-1, and CHEM 101; or consent of instructor.

EARTH 203-0 Earth System History Evolution of the earth system and its record through geological time. Interactions among the atmosphere, hydrosphere, sediments, and life on earth. Prerequisite: 201.

Advanced Courses

EARTH 300-0 Earth and Planetary Materials Mineralogy of the earth and planets from atomic to continental scales, focusing on structure, composition, identification, and physical properties of minerals as they pertain to geological and societal applications. Prerequisites: 201, CHEM 103, MATH 220, and PHYSICS 135-1; or consent of instructor.

EARTH 301-0 Petrology: Evolution of Crustal and Mantle Rocks Origin, composition, and classification of igneous, metamorphic, and sedimentary rocks. Application of laboratory characterization and basic thermodynamics to interpreting observed rock textures and mineral assemblages in terms of geological processes. Prerequisite: 300 or consent of instructor.

EARTH 302-0 Physics and Thermochemistry of the Earth's Interior Finite strain theory, solid solution thermodynamics, phase transitions, subduction zone processes, seismic velocity structures, mineral equations of state. Prerequisite: 301 or consent of instructor.

EARTH 310-0 Introductory Aqueous Geochemistry The geochemistry of rivers, groundwater, lakes, and seawater. Topics include thermodynamics, kinetics, acids and bases, pH and alkalinity, carbonate equilibria, redox chemistry, chemical weathering, and numerical modeling. Prerequisites: 201 and CHEM 103; or consent of instructor.

EARTH 311-0 Sedimentary Geochemistry Formation and diagenesis of carbonates; geochemistry of organic matter; petroleum formation; evaporite precipitation; paleo-environmental reconstruction; isotope, organic, and trace and major element geochemistry. Prerequisites: 201, 330, and CHEM 103; or consent of instructor.

EARTH 312-0 Stable Isotope Geochemistry Fractionation and distribution of stable isotopes (C,H,N,O,S) in the biosphere, hydrosphere, atmosphere, and geosphere. Isotopic biogeochemistry, environmental problems, and global climate change. Prerequisite: 201 and 310; or consent of instructor.

EARTH 313-0 Radiogenic Isotope Geochemistry The application of radiogenic isotopes to problems in geochemistry, groundwater hydrology, oceanography, ecology, and environmental science. Includes radioactive decay, nucleosynthesis, cosmochemistry, geochronology, and isotope mixing models. Prerequisite: 201 and CHEM 103; or consent of instructor.

EARTH 314-0 Organic Geochemistry The sources and fates of organic matter in the natural environment; global cycling of organic carbon; applications to the study of modern and ancient environments. Prerequisites: 1 quarter of earth or environmental science and 1 quarter of chemistry.

EARTH 315-0 Geochemistry of Global Environments Surficial processes and their geological and biological driving forces (atmosphere-land-water interactions, weathering, geochemical transport, sedimentation). Biogeochemical cycles and their role in the global environment. Prerequisite: 201 or consent of instructor.

EARTH 316-0 Earth's Changing Climate Fundamental controls on earth's climate system; global warming and cooling; atmospheric chemistry and role of biogeochemical cycles of land, ocean, and biosphere; major paleoclimatic events, such as Pleistocene glaciations. Prerequisite: 201 or consent of instructor.

EARTH 317-0 Biogeochemistry The cycling of biogenic elements (C,N,S, Fe, Mn) in surficial environments. Emphasis on microbial processes and isotopic signatures. Prerequisites: 1 quarter of chemistry plus 1 quarter of geoscience, environmental science, or biology. Taught with CIV ENV 447; students may not earn credit for both courses.

EARTH 320-0 Global Tectonics Kinematics of plate tectonics. Geometry, determination, and description of plate motions. Paleomagnetism, marine magnetism, and hot spots. History of ocean basins and mountain-building processes. Prerequisites: 202, MATH 240, and PHYSICS 135-2; or consent of instructor.

EARTH 321-0 Reflection Seismology Acquisition, processing, and interpretation of reflection data. Hydrocarbon prospecting, structural geology, tectonics, stratigraphy, and deep continental reflection profiling. Prerequisites: 202, MATH 230, and PHYSICS 135-1; or consent of instructor.

EARTH 323-0 Seismology and Earth Structure Elastic theory, seismic waves, seismometers and seismograms, ray paths, travel times; internal structure of the earth; field seismology. Prerequisites: 202, MATH 250, and PHYSICS 135-2; or consent of instructor.

EARTH 324-0 Earthquakes and Tectonics Earthquakes: location, characteristics, origin, mechanism, and relation to plate motions; seismic hazard. Prerequisites: 202, MATH 250, and PHYSICS 135-2; or consent of instructor.

EARTH 325-0 Tectonophysics Quantitative kinematics of distributed deformation within plate boundary zones; gravity field and geoid; principle of isostasy; flexure of the crust and lithosphere. Prerequisites: MATH 250 and PHYSICS 135-2; or consent of instructor.

EARTH 326-0 Data Analysis for Earth and Planetary Sciences Types and characteristics of earth science data, development and applications of model types, observational and systematic sources of uncertainties and their characterization, spatial and temporal predictions.

EARTH 327-0 Geophysical Time Series Analysis and Inverse Problems Analysis of seismic and other geophysical data. Sampling, windowing, discrete and fast Fourier transforms, z-transforms, deconvolution, filtering, and inverse methods. Prerequisites: 202 and MATH 250; or consent of instructor.

EARTH 328-0 Tectonics and Structural Geology Deformation of rock masses: strain, fracture, slip, stress, and rheologic regimes; rock structures; folds, faults, foliations; seismic parameters in tectonic studies; orogenic belts and their tectonic evolution. Lectures and lab. Prerequisites: 201, MATH 240, and PHYSICS 135-1; or consent of instructor.

EARTH 330-0 Sedimentary Geology Sedimentary rocks; stratigraphy; local, regional, and global correlation. Ancient depositional systems; facies analysis in context of tectonic, eustatic, and climatic controls on deposition. Prerequisite: 201 or consent of instructor.

EARTH 331-0 Field Problems in Sedimentary Geology Field methods in stratigraphy and sedimentology; interpretation of depositional systems, facies models, and sequence stratigraphy based on field observations. Continuation of 330; 3½-week field trip to Colorado and Utah in late August to mid-September, returning in time for fall classes. Prerequisite: 330.

EARTH 340-0 Paleobiology Major fossil groups; origin and evolution of life; speciation and mass extinction; evolution of communities and ecosystems. Application of paleobiologic methods to paleoenvironmental reconstruction. Prerequisite: 105, 106, 201, or 203; or consent of instructor.

EARTH 341-0 Quaternary Climate Change: Ice Ages to the Age of Oil Methods for reconstructing and dating past environmental changes, causes of natural climate change, and major climate events of the Quaternary through the present. Their relevance for understanding current climate change. Prerequisite: 201 or consent of instructor.

EARTH 350-0 Physics of the Earth for ISP Solid-earth geophysics: the earth's gravity field, the earth's magnetic field,

interior of the earth, heat flow, elementary wave propagation, plate tectonics. Prerequisite: second-year standing in ISP or comparable background in mathematics and physics.

EARTH 360-0 Instrumentation and Field Methods Theory and practicum on electronic instrumentation for monitoring and measurement in earth sciences, including data loggers, conceptual design and construction of electronic sensors, signal processing, data management, and network design. Prerequisite: 201 or 202; or consent of instructor.

EARTH 398-0 Undergraduate Seminar Opportunity for advanced work through supervised reading, research, and discussion. Open only by invitation of the department.

EARTH 399-0 Independent Study Special problems under direct supervision of one or more staff members. Comprehensive report and examination required. Open with consent of department to juniors and seniors who have completed field of concentration in the department.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

ECONOMICS

www.econ.northwestern.edu

The program in economics enables students to understand the basic concepts, theories, and techniques of economics as they apply to economic problems and policies. These may focus on macroeconomics, applied microeconomics, quantitative economics, or economic history. Whatever courses students take, they will become familiar with the way economists think about problems and devise solutions to them. Although the program does not offer specialized professional training in economics, it provides excellent preparation for graduate work in economics, the study of law, and careers in business or government. Students should consult a department adviser about field courses that fit their needs.

Major in Economics

The introductory courses 201 and 202 must be taken first and in that order. STAT 210 and MATH 220 should also be taken early in the program; the former is a prerequisite for 281 and the latter for 310-1. 281 and the intermediate theory courses should be completed before 300-level field courses are taken. Although only MATH 220 is required, some 300-level field courses may require MATH 224 and 230, both of which majors are strongly urged to take. Majors considering graduate work in economics are strongly advised to take additional mathematics courses and perhaps a double major in mathematics. Students wishing to pursue in-depth study of econometrics may take 381-1,2 without taking 281 first. For students who complete 381-1, 281 will be waived.

Department courses (12 units)

- 3 introductory courses: 201, 202, 281
- 3 intermediate theory courses: 310-1,2, 311
- 6 additional field courses at the 300-level

Related courses (*units depend on mathematics sequence taken*)

- MATH 220 (or 212 and 213)
- STAT 210
- 3 additional courses in the social sciences, mathematics, history, or statistics, no more than 1 at the 100 level

Minor in Economics

The minor offers training in economic theory through the intermediate level, instruction in quantitative methods of econometrics, and opportunity for advanced work in students' areas of interest. The introductory and intermediate courses are the same as those in the major, except that only 2 of the intermediate theory courses are required (310-1 and 310-2 or 311). As in the major, MATH 220 and STAT 210 must be taken early in the program because they are prerequisites for required courses. Students wishing to pursue in-depth study of econometrics may take 381-1,2 without taking 281 first. For students who complete 381-1, 281 will be waived.

Minor requirements (8 units)

- 3 introductory courses: 201, 202, 281
- 2 intermediate theory courses: 310-1; 310-2 or 311
- 3 additional field courses at the 300 level

Four-Year BA/MA

The department offers a four-year BA/MA for outstanding students in economics. Graduate-level courses in economic theory are required. Interested students should consult the director of undergraduate studies in their sophomore year. For more information see Accelerated Master's Programs on page 39.

Honors in Economics

By invitation only, superior students in economics may pursue departmental honors by completing, in addition to the regular requirements of the major, one of the following three options: 398-1,2; 2 quarters of 399; or 2 400-level field courses in economics. Under each option, candidates must submit an honors thesis presenting original research. Interested students should consult with the director of undergraduate studies. See also Honors in the Major on page 38.

The Teaching of Economics

Weinberg College students pursuing a major in economics who also wish to be certified for secondary teaching of economics with history must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the

SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Courses Primarily for Freshmen and Sophomores

ECON 201-0 Introduction to Macroeconomics Scarcity and choice; elements of demand and supply, determinants of aggregate output, employment, inflation, growth, and international balance of payments.

ECON 202-0 Introduction to Microeconomics Consumers' and producers' influence on structure of output and prices and distribution of income. Social efficiency in resource allocation. Government impact on allocative efficiency and distributive equity. Prerequisite: 201.

ECON 213-0 Economics of Gender Analysis of gender differences in employment and earnings. Family, labor market, discrimination, segregation, historical and international conditions, and antidiscrimination legislation.

ECON 250-0 Business and Government Survey of the functions, origins, and evolution of government control over business decisions in the American economy. Emphasis on the modern structure of government regulation with attention to remote origins. Prerequisite: 202.

ECON 281-0 Introduction to Applied Econometrics Estimation and analysis of a variety of empirical econometric models. Descriptive statistics, univariate regression, multiple regression, simultaneous equations, and forecasting. Prerequisites: 201; 202; MATH 220; STAT 210 or equivalent.

ECON 310-1,2 Microeconomics 1. Consumer behavior and the theory of demand; production, cost, supply functions; choices under uncertainty, insurance; competitive equilibrium; subsidies, taxes, price controls; monopoly and monopsony. Prerequisites: 201, 202, MATH 220. **2.** Price discrimination and public utility pricing; monopolistic competition, oligopoly, duopoly models; game theory; factor demands; general equilibrium theory and welfare economics; information theory; externalities and public goods. Prerequisite: 310-1.

ECON 311-0 Macroeconomics Macroeconomics and monetary policy. Behavior of the economy as a whole. Income, inflation, unemployment, and growth; consumption, investment, and rate of interest; monetary and fiscal policy. Prerequisites: 201, 202, MATH 220.

Courses Primarily for Sophomores, Juniors, and Seniors

ECON 305-0 Comparative Economic Systems Economic structure, policy, and performance in advanced industrialized nations; examination of economies in transition from socialism to capitalism in central and Eastern Europe. Prerequisites: 281, 310-1, 311.

ECON 307-0 Economics of Medical Care Effects of medical care on health; health insurance, public and private demand for medical care, and the market for medical care; regulation of hospitals and physicians; roles of nonprofit

and for-profit organizations; technological change. Prerequisites: 281, 310-1.

ECON 308-0 Money and Banking Nature of money and bank credit. Development, functions, and operation of monetary standards and credit systems. Banking and credit policies; price levels. Interrelationships of domestic and foreign monetary systems. Prerequisites: 281, 310-1, 311.

ECON 309-0 Elements of Public Finance Theory and practice of public finance. Welfare aspects of taxation and public expenditure decisions. Budgeting, public investment, external costs and benefits, and public debt. Prerequisites: 281, 310-1,2.

ECON 315-0 Topics in Economic History Topics vary: for example, the decline of European feudalism, Malthusianism, convertibility and free trade, constant wage shares during growth, the origins of the welfare state. Prerequisites: 281, 310-1, 311.

ECON 316-0 Advanced Topics in Macroeconomics Topics may include growth, business cycles, unemployment and job search, monetary economics, macroeconomic policy, intertemporal choice, and general equilibrium. Prerequisites: 281; 310-1,2; 311; MATH 224 and 230.

ECON 318-0 History of Economic Thought Development of economic thought from the advent of the mercantilists to the formation of current schools of economics. Prerequisites: 281, 310-1,2, 311.

ECON 322-0 Evolution of the Global Economy Global integration and growth in the 19th and 20th centuries: historical perspectives and current controversies. Topics include international capital movements; mass migration; commercial policy and the growth of trade; evolution of the payments system; instability and war; comparative economic growth; development and underdevelopment. Prerequisites: 281, 310-1, 311.

ECON 323-1,2 Economic History of the United States Economic development of the United States with emphasis on changing structure and performance of the economy. **1.** Colonial period to 1865. **2.** 1865 to the present. Prerequisites: 281, 310-1, 311.

ECON 324-0 Western Economic History Western European developments, 1750 to the present: demographic, technical, social, and economic change. Prerequisites: 281, 310-1, 311.

ECON 325-0 Economic Growth and Development Macroeconomic aspects of long-term patterns of economic development. The effects of investment, education, population, and technological change on economic growth. Prerequisites: 281, 310-1,2, 311.

ECON 326-0 The Economics of Developing Countries Structure, performance, and problems of developing economies. Topics may include land use, labor, migration, credit, insurance, and famine. Prerequisites: 281, 310-1,2, 311.

ECON 330-0 Behavioral Economics Understanding how people make choices in economic situations. Incorporation of psychology and/or sociology into economics. Topics

may include perceptions, judgment, biases, and social pressure. Prerequisites: 281, 310-1,2.

ECON 331-0 Economics of Risk and Uncertainty Models of decision making under uncertainty. Use of these models to understand economic phenomena such as investment in financial assets, insurance, contracting, and auctions. Prerequisites: 281, 310-1,2.

ECON 335-0 Political Economics Social choice theory. Voting theory. The analysis of political motivations and policy outcomes. Application of formal theory to contemporary and historical public-policy decisions. Prerequisites: 281, 310-1,2.

ECON 336-0 Analytic Methods for Public Policy Analysis Formulation of objectives, structuring decision problems, choices under uncertainty, interactive decisions, and the impact of organizational structure on project outcomes. Prerequisites: 281, 310-1,2.

ECON 337-0 Economics of State and Local Governments Economic functions and financing of state and local governments in theory and practice; costs and demands for local public services; role of government finance in urban and regional growth. Prerequisites: 281, 310-1,2.

ECON 339-0 Labor Economics Survey of economic problems growing out of employment relationships; theories and processes of wage and employment determination, income distribution, and the role of trade unions and issues of economic security. Prerequisites: 281, 310-1,2, 311.

ECON 340-0 Economics of the Family Application of microeconomic theory to the analysis of family issues: marriage, cohabitation, the decision to have children, divorce, credit and insurance, and legacies. Prerequisites: 281, 310-1,2.

ECON 341-0 Economics of Education The economic analysis of education, including return to schooling, education and economic growth, education production functions, school financing, vouchers, charter schools, and accountability. Prerequisites: 281, 310-1,2.

ECON 349-0 Industrial Economics Price and efficiency performance of American industries representative of various types of market structures and practices. Prerequisites: 281, 310-1,2.

ECON 350-0 Monopoly, Competition, and Public Policy Present public policy and unsettled issues with respect to structure and practices of industrial markets; concentration, vertical integration, and forms and effectiveness of competition. Prerequisites: 281, 310-1,2.

ECON 351-0 Law and Economics The impact of judicial decisions and statutory enactments — including corporate law and antitrust and regulation statutes — on economic behavior and markets. Prerequisites: 281, 310-1,2.

ECON 354-0 Issues in Urban and Regional Economics Factors affecting the spatial distribution of economic activity. Applications of economic analysis to problems of urban areas such as housing markets, zoning restrictions, and racial patterns of employment and housing. Prerequisites: 281, 310-1,2.

ECON 355-0 Transportation Economics and Public Policy

The demand for alternative modes by passengers and shippers. Cost of providing transportation, competition, regulation, optimal pricing, subsidies, congestion pricing, and urban transit. Prerequisites: 281, 310-1,2.

ECON 359-0 Economics of Nonprofit Organizations The economic rationale for the nonprofit sector in a mixed economy. Topics include the objectives and behavior of nonprofit organizations, competition with commercial firms, volunteerism, and charitable donation. Prerequisites: 281, 310-1,2.

ECON 360-0 Foundations of Corporate Finance Theory How corporations allocate resources over time as facilitated by capital markets. Theory of asset evaluation, economic analysis of uncertainty, and capital budgeting and capital structure decisions. Prerequisites: 281, 310-1, 311.

ECON 361-0 International Trade International and inter-regional trade. Factors influencing trade in goods and services between areas. Reasons for and effects of impediments to trade, such as transport costs, tariffs, quotas, and voluntary export restrictions. Prerequisites: 281, 310-1,2; 311.

ECON 362-0 International Finance Determination of exchange rates, balance of payments, and international asset flows and prices; international transmission of macro-economic disturbances. Prerequisites: 281, 310-1, 311.

ECON 370-0 Environmental and Natural Resource Economics Externalities and the role of property rights, pollution, waste disposal, common property problems, renewable resource management, nonrenewable resource use and depletion, recyclable resources, water allocation, and management of public lands. Prerequisites: 281, 310-1,2.

ECON 380-1,2 Game Theory 1. Noncooperative game theory, with applications to industrial organization, auctions, and theories of the firm. Prerequisites: 310-1,2; 311; MATH 224 and 230. **2.** Cooperative and noncooperative game theory and decision making under uncertainty. Prerequisite: 380-1 or consent of instructor.

ECON 381-1,2 Econometrics 1. Probability and distribution theory, statistical inference, simple and multiple regression, specification error and multicollinearity, heteroskedasticity and serial correlation, measurement error, dummy variables. Prerequisites: 310-1, 311; STAT 210 or equivalent; MATH 224 and 230. **2.** Hypothesis testing, estimation with deficient data, distributed lags, panel data, simultaneous equation systems, limited dependent variables. Prerequisite: 381-1.

ECON 395-0 Junior Seminar Small seminars led by different department members on their special interests. Advanced work through supervised reading, research, or discussion. Prerequisites: 281; 310-1,2; 311; MATH 224 and 230.

ECON 398-1,2 Senior Honors Seminar For students of superior ability. Original research on a topic of interest to the student, culminating in a senior honors thesis. By department invitation only. Grade of K given in 398-1. Prerequisites: 281; 310-1,2; 311; MATH 224 and 230; at least 4 300-level economics electives.

ECON 399-0 Independent Study Advanced work through reading, research, and discussion to build on economics course work taken by the student. Project to be decided by mutual agreement with a faculty member.

ENGLISH

www.english.northwestern.edu

The Department of English values various kinds of critical inquiry and creativity. While some courses emphasize the formal qualities of literary works, other courses address questions such as what counts as “literary” and/or how we might characterize the relationships among literature, culture, and politics. Classes might discuss psychoanalysis, race and gender, or the history of the book. The particular kinds of texts examined also vary a good deal, as do their assumptions, methods, and emphases. The unity underlying this variety is a common emphasis on close reading and careful analysis of texts in general and the written word in particular. The department’s curriculum reflects both this range and specificity, and it enables each student to pursue a particular area of interest within a broader understanding of literary history and the range of literary study. In its creative writing courses, the department offers students disciplined training in the writing of verse, fiction, and creative nonfiction. Virtually all of its courses also include practice in the writing of clear, concise, and persuasive expository prose. Rigorous training in thinking and writing is valuable for any career that an undergraduate may ultimately pursue and makes English an attractive major for students preparing for careers in law, IT, finance, and business as well as in writing, publishing, and the teaching of English at all levels. So too, courses in English and American literature may help students to hone their skills as critical citizens of global communities.

The department takes pride in the diversity of perspectives afforded by its courses. In addition to teaching classes in the department, English faculty contribute substantially to the course offerings in theater, drama, comparative literature, and American, African American, Asian American, Latina and Latino, and gender studies.

University Library is a valuable resource for advanced studies of British and American literature, maintaining notable collections and databases in 19th- and 20th-century materials and notable holdings in African literature. English majors also often profit from the University’s study abroad programs. Professors have taught courses in conjunction with the Newberry Library and other Chicago institutions.

Majors in English

A complete description of undergraduate English major programs may be obtained from the department office and the department web site. Detailed descriptions of courses offered each quarter are published in “English Notes,” available from the department office three times a year in advance of registration, and available year-round from the

department web site. In addition, a tentative list of course offerings for the following year is available each spring. Writing courses (206, 207, and 208) and other courses whose content varies (e.g., 313, 348, 378) may be repeated, but only with the consent of the department. It is strongly recommended that every major and minor meet with one of the official English advisers before registering each quarter.

English Major in English and American Literature **Department courses (13 units)**

- 2 introductory courses: any 1 of 210-1,2, 270-1,2, followed by 298
- 11 additional courses
 - 1 course must be the remaining part of introductory series 210 or 270 (210-1,2, 270-1, 2, as appropriate).
 - 9 must be at the 300 level or above.
 - At least 8 must be English department courses, or literature courses offered by related departments, or courses taught by English department faculty through other departments or programs and dealing substantially with literary works originally written in English (i.e., not in English translation).
 - At least 3 must be on works written before 1798.
 - At least 3 must be on works written after 1798.
 - At least 1 must be in American literature.
 - At least 1 must be in literary criticism or theory.

Related courses (2 units)

- Chosen from fields outside of literature but still related to the student's demonstrated interests within the major.

English Major in Writing

Students may also apply to major in writing. Admission to the writing major is competitive, based on a manuscript of creative work from 206, 207, or 208. The major offers an apprenticeship in the writing of poetry, fiction, and creative nonfiction, but it is not restricted to "creative" writing alone. A strong literature component and a course in the history and culture of literary production anchor the writing done in the practical workshop courses in poetry, fiction, and creative nonfiction within a context of general literacy.

Students may apply for admission to the writing major through the department in early spring of each year.

Department courses (13 units)

- 2 introductory courses: 206; 207 or 208
- 11 additional courses
 - 1 yearlong theory and practice sequence counting as 3 units: 393, 394, or 395
 - 392
 - 207 or 208, whichever the student has not taken
 - 6 300-level English department literature courses
 - 2 must be on works written before 1798.
 - 2 must be on works written after 1798.

Related courses (2 units)

- Chosen from fields outside of literature but still related to the student's demonstrated interests within the major.
- Selected with the advice and consent of the student's writing major adviser.

Minors in English

The department offers a minor in literature and two minor tracks in writing; all offer experience in reading literary texts and writing critical analysis. Students pursuing any minor will be permitted to preregister in the department after declared English majors do so.

Requirements: minor in literature (7 units)

- 2 introductory courses: any 1 of 210-1,2, 270-1,2, followed by 298
- 5 other courses
 - 1 must be the remaining part of introductory series 210 or 270, as appropriate.
 - 4 300-level courses
 - 2 must be on works written before 1798.
 - 2 must be on works written after 1798.
 - 1 may be in comparative literary studies.

Requirements: sequence-based minor in writing (7 units)

- 206; 207 or 208
- 1 advanced writing sequence counting as 3 units: 393, 394, or 395 (admission by application only)
- 2 300-level English department literature courses
 - 1 on works written before 1798
 - 1 on works written after 1798

Requirements: cross-genre minor in writing (7 units)

- 206; 207 or 208
- 3 courses (2 from one genre and 1 in a cross-genre) chosen from 306, 307, 308, WRITING 301, 302, 303
- 2 300-level English department literature courses
 - 1 on works written before 1798
 - 1 on works written after 1798

Honors

Honors in Literature

Literature majors who wish to earn honors may apply during the spring of their junior year for admission to the 2-quarter senior honors sequence (398-1,2), which meets the following fall and winter quarters. All students admitted are expected to produce an honors essay. The sequence is under the general direction of the departmental honors coordinator, while individual students work directly under the guidance of a faculty specialist of their own choosing.

A number of collective meetings for students participating in the honors sequence in literature are held in the fall

and winter, first for training in research methods and later for presenting works in progress and discussing common problems. (When special circumstances make participation in the fall-winter sequence impossible, the department may offer several alternative routes, in compliance with Weinberg College guidelines. See the director of undergraduate studies.) Admission to honors candidacy is competitive; candidates should be reasonably certain of attaining at least a 3.4 departmental average by the end of winter quarter of senior year. Students interested in honors through the writing major should consult with the director of that program. See also Honors in the Major on page 38.

To prepare to apply to the honors program, all literature majors are encouraged to write at least one 12- to 15-page essay in their upper-division course work. Independent study courses, as well as designated 300-level English courses including 390, offer the opportunity to complete substantive research papers.

Honors in Writing

Students who are completing the yearlong theory and practice sequence in poetry, fiction, or creative nonfiction and who have kept up with their other writing major requirements may apply to work toward honors during their senior year. Over two quarters of 399 (fall and winter) admitted students work one-on-one with a faculty mentor to complete a significant writing, creative media, or literary translation work that may be submitted for departmental honors. For more information see Honors in the Major on page 38.

The Teaching of English

Weinberg College students pursuing a major in English who also wish to be certified for secondary teaching must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Related Programs

Literature courses appear in the curricula of African American studies, American studies, Asian American studies, comparative literary studies, drama, and gender studies. Students also may pursue creative writing in courses offered by the Center for the Writing Arts.

Courses in Composition

See also the Writing Program.

ENGLISH 105-0 Expository Writing Emphasizes all phases of the composition process, research methods, and critical thinking. Careful review of student papers and reports.

ENGLISH 106-1,2 Writing in Special Contexts (.5 unit)
An introduction to expository writing similar to 105 but paired with a course in another discipline.

ENGLISH 205-0 Intermediate Composition Expository writing at an intermediate level. Emphasis on techniques for writing clearly, precisely, and persuasively.

ENGLISH 304-0 Practical Rhetoric The theory of writing and skills that underlie good writing; primarily for teachers in secondary schools and universities.

ENGLISH 305-0 Advanced Composition For students with previous formal training in composition. Admission by consent of department.

Courses Primarily for Freshmen and Sophomores

Prospective writing majors must take 206 and either 207 or 208.

ENGLISH 206-0 Reading and Writing Poetry Forms and techniques of verse. May not be taken earlier than spring quarter of freshman year. Seniors may enroll only with department consent.

ENGLISH 207-0 Reading and Writing Fiction Forms and techniques of fiction. Prerequisite: 206.

ENGLISH 208-0 Reading and Writing Creative Nonfiction Forms and techniques of creative nonfiction. Prerequisite: 206.

ENGLISH 210-1,2 English Literary Traditions Chronological survey of British literature in its cultural contexts from Chaucer to the 20th century. 1. Chaucer to the late 18th century. 2. Late 18th century through the 20th century.

ENGLISH 211-0 Introduction to Poetry Elements of lyric and narrative poetry, with emphasis on the ways these can create meaning and elicit response.

ENGLISH 212-0 Introduction to Drama Fundamental elements of drama as perceived in performance. How a play communicates from text to stage to audience.

ENGLISH 213-0 Introduction to Fiction How prose fiction, as practiced by various British and American authors from the 18th century to today, creates and communicates meaning.

ENGLISH 234-0 Introduction to Shakespeare Representative Shakespearean plays.

ENGLISH 260-0 Introduction to 20th-Century British Literature Principal writers and works from 1900 to World War II.

ENGLISH 270-1,2 American Literary Traditions Representative writers and works of American literature in cultural context. 1. Puritans to *Moby Dick*. 2. Mid-19th century to the present.

ENGLISH 273-0 Introduction to 20th-Century American Literature Principal writers and works since World War I.

ENGLISH 275-0 Introduction to Asian American Literature From the early 20th century to the present, covering a range of genres and ethnicities. Taught with ASIAN AM 275; students may not earn credit for both courses.

ENGLISH 277-0 Introduction to Latina/o Literature Survey of major writers and movements from Spanish colonial era to the present, covering a range of genres and ethnicities.

ENGLISH 298-0 Introductory Seminar in Reading and Interpretation Close reading of literary works in the light of various perspectives in literary study. Prerequisites: any 1 of 210-1,2, 270-1,2.

Courses Primarily for Juniors and Seniors**WRITING 301-0 The Art of Fiction** See Writing Arts.**ENGLISH 302-0 History of the English Language**

The English language from the earliest times to today.

WRITING 302-0 The Art of Poetry See Writing Arts.**WRITING 303-0 The Art of Nonfiction** See Writing Arts.**ENGLISH 306-0 Advanced Poetry Writing** For nonwriting majors with previous formal training in creative writing. May be repeated for credit with different topic. Prerequisite: 206.**ENGLISH 307-0 Advanced Creative Writing** For nonwriting majors with previous formal training in creative writing. May be repeated for credit with different topic. Prerequisite: 206.**ENGLISH 308-0 Advanced Creative Nonfiction Writing** For nonwriting majors with previous formal training in creative writing. May be repeated for credit with different topic. Prerequisite: 206.**ENGLISH 310-0 Studies in Literary Genres** Content varies.**ENGLISH 311-0 Studies in Poetry** Content varies.**ENGLISH 312-0 Studies in Drama** Content varies.**ENGLISH 313-0 Studies in Fiction** Content varies.**ENGLISH 320-0 Medieval English Literature** Representative works in their intellectual and cultural contexts.**ENGLISH 322-0 Medieval Drama** Study of 15th-century English mystery cycles, miracle plays, and moralities in their cultural context.**ENGLISH 323-1,2 Chaucer** 1. *The Canterbury Tales*.2. *Troilus and Criseyde* and other works.**ENGLISH 324-0 Studies in Medieval Literature**

Content varies.

ENGLISH 331-0 Renaissance Poetry English poetry from the Elizabethan period to 1660.**ENGLISH 332-0 Renaissance Drama** A survey of English drama (1590–1630) and its cultural contexts.**ENGLISH 333-0 Spenser** Spenser's major poetry, with emphasis on *The Faerie Queene*.**ENGLISH 334-1,2 Shakespeare** 1. Principal plays up to 1600. 2. Principal plays after 1600.**ENGLISH 335-0 Milton** Milton's poetry, with those parts of his prose that illuminate his poetical and intellectual development.**ENGLISH 338-0 Studies in Renaissance Literature**

Content varies.

ENGLISH 339-0 Special Topics in Shakespeare Content varies.**ENGLISH 340-0 Restoration and 18th-Century Literature** Representative works in their intellectual and cultural contexts.**ENGLISH 341-0 Restoration and 18th-Century Poetry**

Dryden, Pope, and other poets of the period 1660–1744.

ENGLISH 342-0 Restoration and 18th-Century Drama

English drama from 1660 to the end of the 18th century.

ENGLISH 343-0 18th-Century Prose Swift, Johnson, Burke, Gibbon, Wollstonecraft, and other nonfiction prose writers.**ENGLISH 344-0 18th-Century Fiction** Writers such as Defoe, Richardson, Smollett, Fielding, Sterne, Burney, Radcliffe, and Austen.**ENGLISH 348-0 Studies in Restoration and 18th-Century Literature** Content varies — for example, biography and autobiography, literary careers, literature and social criticism.**ENGLISH 350-0 19th-Century British Literature** Representative works in their intellectual and cultural contexts.**ENGLISH 351-0 Romantic Poetry** Writers such as Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats.**ENGLISH 353-0 Studies in Romantic Literature** Content varies.**ENGLISH 356-0 Victorian Poetry** The principal British poets from Tennyson to Hopkins.**ENGLISH 357-0 19th-Century British Fiction** Important and representative novels written between 1800 and 1900.**ENGLISH 358-0 Dickens** Representative major works of Charles Dickens.**ENGLISH 359-0 Studies in Victorian Literature** Content varies.**ENGLISH 360-0 20th-Century British and American Literature**

Representative works in their intellectual and cultural contexts.

ENGLISH 361-1,2 20th-Century Poetry 1. Major British poets such as Yeats, Eliot, and Auden. 2. Major American poets from Frost and Robinson to Crane.**ENGLISH 363-1,2 20th-Century Fiction** 1. Major British novelists from Conrad to World War II. 2. Major American novelists from James to World War II.**ENGLISH 365-0 Studies in Postcolonial Literature** Themes, antecedents, and contexts of selected literature produced in societies emerging from colonial rule.**ENGLISH 366-0 Studies in African American Literature** Content varies.**ENGLISH 367-0 Postwar British Fiction** Representative British novels since 1945.**ENGLISH 368-0 Studies in 20th-Century Literature** Content varies.**ENGLISH 369-0 Studies in African Literature** 20th-century African literature in English.**ENGLISH 370-0 American Literature before 1914**

Intellectual and cultural contexts of American literature from the Puritans to 1914.

ENGLISH 371-0 American Novel Writers such as Cooper, Alcott, Chopin, Hawthorne, Melville, Poe, Twain, James, Howells, Crane, Dreiser, and Wharton.**ENGLISH 372-0 American Poetry** Writers such as Freneau, Bradstreet, Bryant, Poe, Whitman, Dickinson, Robinson, and Frost.**ENGLISH 375-0 Topics in Asian American Literature** Content varies.**ENGLISH 377-0 Topics in Latina/o Literature** Content varies.**ENGLISH 378-0 Studies in American Literature** Content varies.

ENGLISH 383-0 Special Topics in Theory Topics in theory and criticism related to the study of literature and culture. Content varies.

ENGLISH 385-0 Topics in Combined Studies Special topics in literature and related disciplines. Content varies.

ENGLISH 386-0 Studies in Literature and Film Content varies.

ENGLISH 390-0 Directed-Research Tutorial Research-oriented projects with direction and support from advanced graduate students, culminating in a substantial paper. Open to junior or senior English majors. Prerequisite: permission of director of undergraduate studies.

ENGLISH 392-0 The Situation of Writing The sociology of writers, writing, publication, dissemination of literature, and reading. Prerequisite: admission to writing major.

ENGLISH 393-F,W,T,S Theory and Practice of Poetry (3 units total) Sequence of 2 15-week courses. **1.** Theory of prosody, including the major forms of poetry in English (accentual-syllabic verse) and minor forms (accentual, syllabic, and free verse). **2.** Intensive writing practice culminating in the production of a long poem. Prerequisite: admission to sequence or writing major.

ENGLISH 394-F,W,T,S Theory and Practice of Fiction (3 units total) Sequence of 2 15-week courses. **1.** Tenets of fictional realism and its substitutes, with practice in different applications of plot, narrative technique, and point of view. **2.** Culminates in the writing of a novella. Prerequisite: admission to sequence or writing major.

ENGLISH 395-F,W,T,S Theory and Practice of Creative Nonfiction (3 units total) Sequence of 2 15-week courses. **1.** Tenets of creative nonfiction, with practice in different styles, form, and modes. **2.** Culminates in the writing of a long creative nonfiction project. Prerequisite: admission to sequence or writing major.

ENGLISH 398-1,2 Senior Sequence (literature major) For seniors preparing an honors essay in the literature major. Students pursue individual topics under the direction of a faculty adviser and the departmental honors coordinator. Admission by application. K grade given each quarter pending completion of essay.

ENGLISH 399-0 Independent Study Individual projects with faculty guidance. Open to majors with junior or senior standing and to senior minors. May be elected three times, but only 1 unit at a time. Prerequisite: consent of department or director of writing major.

ENVIRONMENTAL POLICY AND CULTURE

www.wcas.northwestern.edu/epc

The Environmental Policy and Culture Program (EPC) is for students interested in the interdisciplinary study of how people affect and are affected by the natural environment. The minor in environmental policy and culture provides opportunities to engage in scholarly inquiry about issues and problems related to managing the natural environment. Courses address issues such as global warming, efforts to

maintain and restore biodiversity, and the reconciliation of development with environmental protection. Courses that fulfill the minor requirements include both those offered by EPC (identified as ENVR POL.) and courses from different departments and programs. They fall into three categories: the humanities (largely courses in history, philosophy, and religion), policy (largely courses in the social sciences), and the natural sciences. Although all students who minor in environmental policy and culture take at least 1 relevant course in the natural sciences, the emphasis is on courses in the humanities and social sciences. Students are encouraged to design and conduct independent research projects on environmental issues.

Weinberg College requirements do not generally allow a student to count the same course toward both a major and a minor requirement.

Minor in Environmental Policy and Culture

Minors in environmental policy and culture may choose to concentrate in the humanities or social sciences or to take courses in both areas. A list of courses counting toward the minor is available from the program office and the web site.

Minor requirements (7 units)

- At least 2 courses chosen from the following:
 - HISTORY 215
 - PHIL 268
 - RELIGION 261
 - POLI SCI 329 or 367 (or sections of ENVR POL 390 cotaught with these courses)
 - GEOG 211
- At least 1 natural sciences course chosen from the following (no more than 2 natural sciences courses will be automatically approved for the minor):
 - BIOL SCI 333, 346, 347
 - EARTH 106, 111
 - ENV SCI 201, 202, 203
 - GEOG 235
- At least 4 of the 7 courses must be at the 300 level; 2 of these must be ENVR POL courses.
- Only 1 quarter of 399 may be counted toward the requirements.
- Exceptions must be approved by the program director.

Courses

ENVR POL 390-0 Special Topics in Environmental Policy and Culture Lecture course on environmental issues of current interest to students and faculty. May be repeated for credit with different topic.

ENVR POL 395-0 Special Topics Seminar Seminar on current environmental issues and problems. Topics vary. May be repeated for credit with different topic.

ENVR POL 398-0 Environmental Policy and Culture Research Seminar For EPC minors. Students choose topic for original research under guidance of course instructor.

ENVR POL 399-0 Independent Study Independent project in student's area of interest. Readings and conferences. Comprehensive term paper required. Prerequisite: consent of program director.

ENVIRONMENTAL SCIENCES

www.wcas.northwestern.edu/esep

A major challenge facing our species is to learn to understand and coexist with the natural environment. The environmental sciences major is designed to provide students with an understanding of the biological, chemical, and physical environment and the relations of humans to it. Environmental sciences necessarily differs from the more traditional divisions of scientific inquiry. The intellectual approach is that of synthesis, where the focus is concentrated on the integration of knowledge across disciplines, coupled with further refinement of knowledge within a particular scientific field. Also, the concern for translating theory into practice requires a strong association with engineering. With this approach, environmental sciences provides a mechanism for motivated students to work in an interdisciplinary framework with a common theme.

The major gives students the expertise to address issues of environmental concern, such as energy alternatives, environmental law, the relation of society to resources, and health problems of air and water pollution, from a scientific basis. It provides a background for employment in environmentally oriented firms or for graduate study in any of several different environmental sciences disciplines as well as an exceptional preprofessional experience for students interested in law or business. The program is co-administered by the Judd A. and Marjorie Weinberg College of Arts and Sciences and the Robert R. McCormick School of Engineering and Applied Science as part of the Program in Environmental Science, Engineering, and Policy.

Students should consult with an environmental sciences adviser soon after identifying their interests in environmental sciences, policy, and/or engineering to plan their academic paths and programs. They should try to complete the foundations courses by the end of their sophomore year.

Premedical students and students interested in advanced study in environmental biology are advised to take the 200-level sequence in biological sciences and 1 or 2 additional quarters of organic chemistry.

Major in Environmental Sciences

The major in environmental sciences has two tracks: one in science and one in policy. Foundation courses in science, the core curriculum, and senior-year research courses are the same for both tracks. Advanced course work differs depending on the track.

Program courses (11 units)

- 3 core courses: 201, 202, 203
- 6 advanced studies courses
 - At least 4 must be at the 300 level.

- Students in the science track choose 4 courses from the science list and 2 from the environment and society list.
- Students in the policy track take ECON 281, 310-1, and 370 plus 3 additional courses, including 2 from the science list.

– Science list

ANTHRO 312, 313, 315
 BIOL SCI 341, 343, 345, 346, 347, 348, 349
 CHEM 329, 342-1, 393
 CIV ENV 358, 359, 360, 361, 363, 364, 366, 367
 EARTH 201, 311, 312, 315, 330, 331, 340
 GEOG 211, 235, 341, 343
 PHYSICS 301

– Environment and society list

390
 ANTHRO 306, 310, 383
 CIV ENV 303, 368
 ECON 370
 GEOG 328
 HISTORY 215
 PHIL 268
 POLI SCI 329, 349, 367
 SOCIOL 312

- 2 senior-year research courses: 398-1,2 or CIV ENV 398-1,2

Foundations in science and math (*units depend on chemistry and mathematics sequences taken*)

Students should complete the following courses in their first two years:

- MATH 220, 224 *or* 212, 213, 214
- CHEM 101, 102, 103 *or* CHEM 171, 172
- 5 courses chosen from
 - BIOL SCI 210-1, 164
 - CHEM 210-1,2
 - ECON 201, 202
 - PHYSICS 135-1,2 (PHYSICS 130-1,2 may be substituted with consent of program director.)
 - STAT 210

Environmental Sciences Second Major for ISP Students

The Integrated Science Program is a highly selective BA program in Weinberg College (see Integrated Science Program). Students majoring in ISP who wish to complete a second major in environmental sciences should fulfill the following requirements instead of those listed above. They may not substitute 398 or ISP 398 for the ISP-required course MATH 383 and must take the following additional courses:

- EARTH 201
- BIOL SCI 210-1
- 2 of the following courses: BIOL SCI 204; GEOG 235; GEOL SCI 202
- 2 courses from the environment and society list above
- 2 courses, not in the same department, from the two advanced studies lists above, except CHEM 342-1
- 2 quarters of 398 may be taken instead of ISP 398.

Honors in Environmental Sciences

Superior students may qualify for departmental honors by enrolling in either ENVR SCI 398-1,2 or CIV ENV 398-1,2 during their senior year and completing a research paper of honors quality. The program recommends qualified students to the college for graduation with honors. See also Honors in the Major on page 38.

Core Courses

ENVR SCI 201-0 Earth: A Habitable Planet Chemical and physical perspective on the evolution of the planet; the emergence of life and the nature of biogeochemical cycles; the role of human activities that are now part of these cycles. Prerequisite: CHEM 103 or equivalent.

ENVR SCI 202-0 The Health of the Biosphere Population processes in nature; role of human population growth; interactions between populations; major impacts of human populations on the environment. Prerequisite: CHEM 103 or equivalent.

ENVR SCI 203-0 Energy and the Environment: The Automobile Integrated study of fundamental chemistry, industrial production, energy use, and public policy, using the automobile as an example. Prerequisite: CHEM 103 or equivalent.

Other Courses

ENVR SCI 390-0 Internship in Environmental Sciences (1–2 units) Participation in off-campus research activities of public and private environmental organizations under the supervision of faculty. Prerequisite: junior or senior standing and consent of program director.

ENVR SCI 398-1,2 Environmental Research Seminar Independent research directed by environmental sciences faculty. Research design and scientific communication. Prerequisite: senior standing and major in environmental sciences.

ETHICS AND CIVIC LIFE

www.bradypprogram.northwestern.edu

The interdisciplinary Brady Program in Ethics and Civic Life provides students with the opportunity to examine and practice the ethics of citizenship and leadership. The three-year program includes academic, international, and service components. Brady Scholars are selected in spring of the freshman year.

As sophomores, Brady Scholars enroll each quarter in a seminar that addresses how to be a good individual, how to be a good friend and neighbor, and how to make their cities, the nation, and the planet better places in which to live. Each group of Brady Scholars selects one community problem for further study.

In the junior year Brady Scholars participate in a study abroad program and, in addition to their regular course work, learn how the foreign country addresses the problem selected by their group.

Moral philosophy, global citizenship, and service learning are integrated for seniors in the Brady Program when

their 16-student class works collectively to provide concrete solutions to a social problem in Evanston, drawing on their three years of rigorous research and academic study of the problem. Seniors receive 1 unit of academic credit.

Courses

Specific topics in these sophomore-year seminars will vary as different professors participate.

PHIL 273-1 The Good One

PHIL 273-2 The Good Neighbor

PHIL 273-3 The Good Place

EVOLUTIONARY PROCESSES

See Biological Sciences.

FRENCH AND ITALIAN

www.frenchanditalian.northwestern.edu

Studies in French and Italian provide unique insights into the language, thought, and character of cultures different from our own. Such knowledge builds an awareness of our own society's diversity and the ways it resembles and differs from others. As the merging of domestic and international events increasingly affects the material and intellectual life of every individual, the ability to communicate with other peoples assumes vital importance. Whether a student is planning a career in teaching, government, science, the professions, or business, the study of a foreign language, literature, and culture is a valuable component of any university education.

Programs in the department are varied. Language courses, from the elementary through the graduate levels, develop communication skills that allow students to function at ease with foreign texts or in a foreign environment. Courses in literature and civilization not only broaden and deepen insights into the thought and writing of another culture but also train students to think independently, to organize and analyze materials thoughtfully, and to discuss ideas effectively.

The department offers a minor in French, a major in French studies, MA and PhD programs in French, and a minor and a major in Italian. These may be supplemented by study abroad, which allows students to increase their knowledge of a foreign language and society while continuing university work abroad in a variety of fields. It is not necessary to be a major to participate in these programs. An excellent library, modern audiovisual resources, and a distinguished faculty further strengthen studies in French and Italian.

French

Major in French

Major requirements (15 units)

- At least 10 courses must be at the 300 level.
 - All majors must take 2 courses from the 310, 312, 314, 316 sequence (at least 1 pre-1800).
 - At least 1 additional 300-level course must be on literature and culture before 1800.

- o All majors must take 396 and 397 during their senior year.
- At most 5 courses may be at the 200 level (202, 203, either 210 or 211, and 2 or fewer from 271, 272, 273); courses lower than 202 do not count toward the major.
- At most 2 courses may be French department courses taught in English.
- Students returning from a study abroad program in France or any other francophone country may receive up to 7 credits (depending on program length) if the content of the courses taken abroad relates in a substantive way to some aspect of French or francophone culture. All returning majors must take 396 and 397.

Minor in French

The goal of the minor in French is to give students a solid grounding and good fluency in the French language and to provide a basic familiarity with important aspects of French culture and society. Together these accomplishments will enable students to pursue their interests in French and in countries where French is used.

The minor is designed for students who have a strong interest in French but cannot fulfill the requirements of the French major, either because their knowledge of French was nonexistent or elementary when they came to Northwestern, or because they are engaged in another major with requirements that preclude pursuing a second major.

Students choosing to minor in French are assumed to have completed 201 or the equivalent.

Minor requirements (9 units)

- Up to 5 200-level courses chosen from 202, 203, either 210 or 211, and no more than 2 from 271, 272, 273
- At least 4 300-level courses
 - o 2 language courses chosen from 301, 302, 303, 305, 309, 391
 - o 2 other courses in literature or civilization
 - 1 may be a French department course taught in English.
 - 309 may be counted as a civilization course.
- Students returning from a study abroad program must enroll in at least 1 300-level course in the department other than 301, 302, and 303.

Four-Year BA/MA

The department offers a four-year BA/MA program in French for outstanding undergraduate majors. Interested students should see Accelerated Master's Programs on page 39 and consult with the department chair.

Honors in French

Students who have a grade point average of 3.4 or higher in the major and are interested in writing an honors thesis should declare their intention of doing honors work no later than the spring quarter of their junior year. They

should also consult with the director of undergraduate studies. The honors project is produced through 1 or 2 quarters of 399. It may build on previous work done in a 300-level course. These courses will count toward the 15 required credits for the major. See Honors in the Major on page 38.

The Teaching of French

Weinberg College students pursuing a major in French who also wish to be certified for secondary teaching must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Introductory and Intermediate Language Courses

FRENCH 111-1,2,3 Elementary French Conversation, grammar, reading, and writing for beginners. Four class meetings a week.

FRENCH 115-1,2 Intensive Elementary French For students with some previous experience in French. Review and development of skills in speaking, understanding, reading, and writing as preparation for work at the second-year level. Four class meetings a week. Prerequisite: department placement.

FRENCH 121-1,2,3 Intermediate French Grammar review, conversation, reading, and writing. Four class meetings a week. Prerequisite: 111 or 115.

FRENCH 125-1,2,3 Intensive Intermediate French French language and culture: conversation, composition, reading of cultural and literary texts, and grammar review. Three class meetings a week. Prerequisite: 115 or placement.

FRENCH 198-0 Independent Study Credit possible for 1 quarter only. Approval of department required.

FRENCH 199-SA-1,2 Language and Culture Grammar, conversation, reading, writing, and culture study. Restricted to students in Northwestern's Paris programs. Students completing this course must take a placement exam before continuing French at Northwestern. Prerequisites: none.

FRENCH 201-0 Introduction to French Studies Development of fluency, accuracy, and creativity in speaking, comprehension, reading, and writing French; introduction to social, cultural, and literary topics. Prerequisite: 121-3, 125-3, or department placement.

FRENCH 202-0 Writing Workshop Practical study of French grammar and structure; students develop and improve writing skills through practice in preparing short compositions. Prerequisite: 201, AP score of 4, or consent of department.

FRENCH 203-0 Oral Workshop Practical course to increase listening comprehension, build vocabulary and idiom use, and enhance communication skills. Prerequisite: 201, AP score of 4, or consent of department.

FRENCH 299-SA-1,2 Language and Culture Study of French language and culture in Paris. Restricted to students in

Northwestern's Paris programs. Students completing this course must take a placement exam before continuing French at Northwestern. Prerequisite: Weinberg College French language proficiency.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

Introductory Literature and Culture Courses

FRENCH 210-0 Reading Literatures in French Study of texts illustrating various genres from the Middle Ages to the present such as poetry, drama, fairy tale, novel, and autobiography. Prerequisite: 203, AP score of 5 in language, or consent of instructor.

FRENCH 211-0 Reading Cultures in French Introduction to French and/or francophone cultures through study and analysis of major themes, issues, and debates. Prerequisite: 203, AP score of 5 in language, or consent of instructor.

FRENCH 271-0 Introducing the Novel Fundamental concepts and significant achievements of the novel in French. Prerequisite: 210 or 211, AP score of 5 in literature, or consent of instructor. Credit not allowed for both 271 and 278.

FRENCH 272-0 Introducing Theater Basic concepts and representative works of French and/or francophone theater. Principles of tragedy and comedy; contemporary developments. Prerequisite: 210 or 211, AP score of 5 in literature, or consent of instructor. Credit not allowed for both 279 and 272.

FRENCH 273-0 Introducing Poetry in French Reading lyric poetry written in French from the 16th century to the present, focusing primarily on the history of major poetic movements. Credit not allowed for both 273 and 276. Prerequisites: 210 or 211, AP score of 5 in literature, or consent of instructor.

Courses with Reading and Discussion in English

No prerequisite in French; readings, discussions, papers, and examinations in English.

FRENCH 276-0 Poetry in Translation Introduction to French poetry of different periods and genres. Focus is on major themes and trends in French literary history, but students also learn about French versification and poetic forms. Credit not allowed for both 273 and 276.

FRENCH 277-0 Literature of Existentialism Existentialism in its literary, philosophical, and cultural manifestations.

FRENCH 278-0 The Novel in Translation Introduces students to the French novel through analysis of texts from different periods or subgenres. Content varies. Credit not allowed for both 271 and 278.

FRENCH 279-0 Theater in Translation Representative French plays from the 17th through the 20th centuries; basic concepts of genre; social and historical context. Credit not allowed for both 279 and 272.

FRENCH 372-0 Medieval Movies Films representing medieval and Renaissance culture; films that a medieval viewer would have understood.

FRENCH 374-0 Proust Introduces the works of Marcel Proust, a central figure of European literature and thought.

FRENCH 375-0 French Film Topics in French cinema: for example, French classical cinema, the New Wave, post-colonial French film, the cinema of Marguerite Duras.

FRENCH 376-0 Gender and Sexuality Major trends and perspectives in gender studies such as first- and second-wave feminisms, lesbian writers, AIDS literature, queer theory, gender and orientalism, cross-cultural feminism.

FRENCH 378-0 Contemporary Theory Introduction to some major trends in contemporary French theory and the way they have influenced literary studies in the United States.

Courses with Prerequisites in French

FRENCH 301-0 Advanced Grammar Review and study of French grammar. Functional implementation of rules through oral and written exercises. Prerequisite: 202 or consent of instructor.

FRENCH 302-0 Advanced Composition Development of written expression organized according to language functions (describing, summarizing, hypothesizing, persuading, etc.) and communicative needs (e.g., social and business correspondence). Prerequisite: 301 or consent of instructor.

FRENCH 303-0 Advanced Conversation Oral practice based on short readings, visual media, and spontaneous scenarios. Prerequisite: 301 or consent of instructor.

FRENCH 305-0 French Phonetics Study of syllabic division, intonation, rhythm, accent, linking, vowels, consonants. Practical exercises to improve pronunciation. Prerequisite: 302 or consent of instructor.

FRENCH 309-0 French in Commerce and Industry Introduction to fundamentals of the French business world in historic, economic, social, and political contexts. Acquisition of language skills for communication in commerce and business. Prerequisite: 302 or consent of instructor.

FRENCH 310-0 The Middle Ages and Renaissance Study of literary texts of the French Middle Ages and Renaissance with emphasis on their historical and literary-historical contexts. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 312-0 Classicism and Enlightenment Study of literary texts from Classicism to Enlightenment and the Revolutionary period with emphasis on their philosophical, literary, and cultural contexts. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 314-0 The Age of Revolutions and Colonialism Study of literary texts from the period between the French Revolution and World War I with emphasis on their historical and literary-historical contexts. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 316-0 The Contemporary French-Speaking World Study of literary texts from the 20th and 21st centuries with emphasis on their philosophical, literary, and cultural

contexts. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 320-0 Medieval French Song Songs of the troubadours, songs of courtly love, social and political songs, women's songs. Study of musical setting and performance. No musical training required. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 322-0 Medieval French Narratives Major narrative works of the French Middle Ages in historical context. Content varies; may include epics such as the *Song of Roland*, romances such as Chrétien de Troyes's *Perceval*, and narratives of childhood. Texts read in modern French versions. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 335-0 17th-Century Literature Topics and issues related to the literature and culture of 17th-century France. Content varies; topics covered previously include theater and its social and political contexts, the rise of rational thought, and the development of fiction and poetry. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 340-0 Sexual Politics and the Ancien Régime Literary, intellectual, and political role of women in view of the debates generated by the issues of women's power in the public sphere before and during the French Revolution. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 342-0 France in the Age of Scandals Examination of political, financial, and religious scandals that racked 18th-century France. Analysis of writings, especially novels, that both denounced and celebrated scandal. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 344-0 Rousseau and the French Revolution Analysis of Rousseau's political thought and major literary works and their impact on Revolutionary ideology and culture. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 346-0 The Enlightenment and the World Authors such as Rousseau, Diderot, Montesquieu, Graffigny, and Moreau de Saint-Méry in relation to Enlightenment debates about religion, political authority, human nature, colonialism, gender, and slavery. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 350-0 The Novel in French Content varies; may include the novel of the ancien régime, the psychological novel, and the Bildungsroman in France. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 355-0 The Invention of Modernity Study of the origins of modernity in the 19th century, addressing such issues as the rise of mass culture, urbanization, and the beginnings of consumer society. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 360-0 From Modernism to Postmodernism: Experiments in Narrative Form Crises and reinventions of French prose from the modernist moment of the early 20th century to the ambiguities of "engaged" literature of the 1930s to postmodernism. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 362-0 African Literatures and Cultures Major issues, trends, and authors from francophone Africa. Content varies; may include Shahrazade, narratives of gender relations, law and literature, violence, and writing. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 364-0 Caribbean Literatures and Cultures Major issues, trends, and authors from the francophone Caribbean and its diasporas. Content varies; may include creolization in Caribbean women writers; slavery, history, and memory; Caribbean identities. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 365-0 The Maghreb and the Middle East Major issues in the literatures and cultures of North Africa and the Middle East. Content varies. May include exile in writing; politics of language and translation. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 366-0 France and East Asia Interdisciplinary approaches to the history of French–East Asian relations, including French representations of East Asia. May include translation, japonisme, cinema, literary and philosophical avant-gardes, and culture and globalization. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 380-0 Political and Social Thought in France Major political and social trends in France from the ancien régime to the 20th century. Content varies. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 382-0 Literature and Exoticism Various modalities of the rhetoric of exoticism, including orientalism, throughout the history of French literature and in popular culture. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 384-0 Women Writing in French Analysis of texts by women authors with regard to their respective social, cultural, political, and historical contexts. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 386-0 Gender and Writing Issues of gender and sexuality in the production of literary and other creative texts in various historical periods. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 390-0 Topics in Culture Topics, issues, and questions in French and francophone culture. Content varies; may include French and francophone cinema, the intellectual in France. May be repeated for credit with different topic. Prerequisite: 271, 272, or 273 or consent of instructor.

FRENCH 391-0 Theory and Practice of Translation Intensive course integrating previously acquired skills through the comparative study and translation of English and French. Prerequisite: 301, 302, study abroad, or consent of instructor.

FRENCH 396-0 Contemporary Thought in the French-Speaking World An examination of different perspectives and paradigms for understanding literature and culture. Prerequisite: senior status or consent of undergraduate adviser.

FRENCH 397-0 Studies in Literature and Culture In-depth research and analysis of a problem or topic concerning cultural representation. Prerequisite: senior status or consent of undergraduate adviser.

FRENCH 399-0 Independent Study Independent reading and research. Topics arranged through consultation with an instructor and approval of the department.

Italian

Major in Italian Literature and Culture

Major requirements (14 units)

- At least 10 courses offered by the Italian department
 - At most 6 courses taught in English
 - At most 3 200-level courses taught in Italian
- At most 4 courses dealing with Italian culture offered by other departments, including 1 or more courses on theory and methodology; subject to approval of the director of undergraduate studies.
- At least 8 300-level courses
- 100-level courses do not count toward the major.
- Students studying abroad may substitute for department courses 4 courses whose content relates in a substantive way to some aspect of Italian culture; 4 additional courses taken abroad dealing with Italian culture may be credited as courses offered by other departments. Returning students must take 2 300-level courses in Italian in their senior year.

Minor in Italian

Minor requirements (7 units)

- At most 3 courses taught in English
- At most 2 200-level courses taught in Italian
- At least 4 300-level courses.
- Students returning from study abroad must take at least 1 300-level course in Italian in their senior year.

Honors in Italian

Students who have a grade point average of 3.4 or higher in the major and are interested in writing an honors thesis should declare their intention no later than spring quarter of their junior year and consult the director of undergraduate studies. The honors project is produced during 1 or 2 quarters of 399. It may build on previous work completed in a 300-level course or, with consent of the instructor, in a graduate seminar. These courses will count toward the 14 credits required for the major. See Honors in the Major on page 38.

Courses Taught in Italian

Prerequisites for all 300-level courses taught in Italian: 2 200-level courses in Italian or consent of instructor.

ITALIAN 101-1,2,3 Elementary Italian Emphasis on oral communication supported by grammar, composition, reading. Four class meetings a week. Prerequisite: none.

ITALIAN 102-1,2,3 Intermediate Italian Grammar review, conversation, composition, and readings in modern prose and drama. Four class meetings a week. Prerequisite: 101-3 or equivalent.

ITALIAN 103-1 Italian for Musicians Italian language course for musicians, focusing on developing comprehension and pronunciation skills for operatic performance. Analysis of libretti and scores of Italian operas. Prerequisite: 101-2 or equivalent.

ITALIAN 133-1,2,3/134-1,2,3 Intensive Italian Intensive double course covers two years of Italian language, the equivalent of 101 and 102, in a single academic year. Students enroll concurrently in 133 and 134 and receive 2 credits per quarter. Four two-hour class meetings per week. Prerequisite: none.

ITALIAN 201-0 Italian through Media Issues from Italian media; frequent oral and written reports: for instance, America in Italian media, advertising, immigration, youth culture. Students produce a newspaper or newscast at the end of the quarter. Prerequisite: 102-3 or 133-3/134-3 or equivalent.

ITALIAN 202-0 Italian through Performance Students develop and perform original material on video or live. Content may derive from television, theater, opera, and commedia dell'arte. Prerequisite: 102-3 or 133-3/134-3 or equivalent.

ITALIAN 203-0 Creative Writing in Italian A course meant to improve written Italian through exercises and experiments in a variety of genres and styles. Prerequisite: 102-3 or 133-3/134-3 or equivalent.

ITALIAN 204-0 Introducing Italian Literature An introduction to the history, genres, and themes of Italian literature. Course content may vary, focusing on reading, comprehension, and interpretive skills. Prerequisites: 102-3 or equivalent proficiency.

ITALIAN 205-0 Reading Italian Cities An approach to Italian culture and civilization through an exploration of representative Italian cities. Prerequisite: 102-3 or 133-3/134-3 or equivalent proficiency.

ITALIAN 206-0 Business Italian Introduction to the business and economic environment in Italy. Study of business practice and development of linguistic skills necessary for professional communication.

ITALIAN 207-0 Conversation in Italian Introduction to Italian culture. Emphasizes group activities and focuses on listening comprehension and speaking skills. Prerequisite: 102-3 or 133-3/134-3 or equivalent proficiency.

ITALIAN 304-0 Modern Italian Cultural Studies Culture of Italy from World War II to the present. Novels, films, popular culture.

ITALIAN 306-0 Borders and Margins Italian literary practice in contact with groups that Italy has defined as other — either beyond or within its geographical boundaries.

ITALIAN 347-0 Visual and Literary Culture in Italy Interdisciplinary course on Italian culture from the Middle Ages to the present. Each week pairs an artist with an author — for instance, Giotto/Dante, Michelangelo/Vittoria Colonna, Caravaggio/Galilei, De Chirico/Pirandello, Germi/Flaiano.

ITALIAN 348-0 The Italian Novella Exploration of Italian culture through the form of the novella from the Middle Ages to the present. Each week is devoted to a groundbreaking author, such as Boccaccio, Sacchetti, Basile, Pirandello, Flaiano, and Calvino.

ITALIAN 349-0 Topics in Italian Culture and Literature

Advanced exploration of special topics in Italian studies.

ITALIAN 399-0 Independent Study Supervised independent reading. Consult the director of undergraduate studies.

Courses with Reading and Discussion in English

No prerequisites in Italian.

ITALIAN 230-0 Italian Theatre and Performance Introduction to drama and performance in Italy.

ITALIAN 250-0 Topics in Italian Culture and Literature

Cross-disciplinary exploration of a defined topic in Italian studies as it interacts with other cultural and literary traditions — for example, aspects of love. May be repeated for credit with change in topic.

ITALIAN 251-0 Introduction to Italian Cinema: Passion and Defiance Introduction to postwar Italian cinema, with an emphasis on textual analysis and film criticism.

ITALIAN 265-0 Body and Soul from Rome to the Renaissance Comprehension of the human body and soul in Italy from Augustan Rome to the Renaissance, as seen in literary and religious authors. Readings include Ovid, St. Paul, Gnostics, St. Francis, “dolce stil novo,” Boccaccio.

ITALIAN 270-0 Michelangelo and the Italian Renaissance

A close examination of Michelangelo's life and work in the broader context of Italian Renaissance culture.

ITALIAN 275-0 Dante's *Divine Comedy* Introduction to the *Divine Comedy*, its artistic and intellectual achievement, and its cultural and historical context.

ITALIAN 277-0 Neorealism and International Film: Framing Reality Exploration of Italian neorealism and its influence on European (especially the French New Wave), New Latin American, West African, and Indian cinema.

ITALIAN 350-0 Advanced Topics in Italian Culture and Literature

Advanced exploration of special topics in Italian studies determined by the research interests of a visiting scholar. May be repeated for credit with change in topic. Prerequisite: consent of instructor.

ITALIAN 351-0 Advanced Italian Cinema: Powers of Form

In-depth exploration of postwar Italian cinema. Focus on specific filmmakers (for instance, Antonioni, Visconti, Pasolini) and/or topics relevant to students within the larger field of cinema and media studies. Prerequisite: 251 or consent of instructor.

ITALIAN 360-0 From the Avant-Garde to the Postmodern

Major authors and movements animating the modern and contemporary literary scene. Content varies — for example, futurism, feminist Italian fiction, intellectuals and politics from D'Annunzio to Pasolini, Calvino, Eco, and the postmodern.

ITALIAN 374-0 Love and Sexuality in the Early Modern Period

Analysis of how love and sexuality work as generalized symbolic media of communication in Italian early modern society and culture. Prerequisite: consent of instructor.

ITALIAN 377-0 Gender and Sexuality in 20th-Century Italian Culture

Interdisciplinary course on gender and visual practices in Italy (photography, film, television, and video). Prerequisite: 251 or consent of instructor.

ITALIAN 378-0 Against Acting: Spectacle and Performance in Italy

Contemporary theatre and performance in Italy from the '70s to the present, with attention to sociopolitical context and trends in European art. Prerequisite: consent of instructor.

GENDER STUDIES

www.genderstudies.northwestern.edu

The Gender Studies Program is a dynamic interdisciplinary program that draws on faculty and courses from more than 20 departments and several schools — including Weinberg College, the School of Communication, the School of Law, the Feinberg School of Medicine, and the Henry and Leigh Bienen School of Music. The program offers an adjunct major and minor for Northwestern undergraduates, as well as a certificate for graduate students. It includes 11 core faculty members with joint appointments as well as affiliated faculty. Gender studies faculty teach courses and pursue research in the history and theory of gender, feminism, women's studies, and sexuality studies, including gay, lesbian, and queer studies.

The many approaches, methods, and topics in gender studies at Northwestern are united in focusing on gender, sex, and sexuality as key but often underexamined categories in history, scholarly study, and daily life. At the same time, they attend to questions of identity and sexual politics in ways that do not take for granted the particular sex/gender categories of the modern Western world.

A full range of courses is offered, from freshman seminars to graduate courses. They provide information and analysis of culture, society, history, and politics, often from a transnational and international perspective. Each year a number of undergraduate majors choose to write honors theses in gender studies.

Adjunct Major in Gender Studies

Adjunct major requirements (11 units)

- 3 core courses selected from 210, 230, 231, 232, 233, 240, 250, and SOCIOL 216
- 8 additional courses
 - 1 theory course, such as 374, 381, 395, or 397
 - 6 other courses, including 4 at the 300 level and no more than 2 cross-listed courses offered by other departments. Examples include
 - AF AM ST 334
 - ANTHRO 354
 - FRENCH 384

- MUSICOL 340 (see the Bienen School of Music chapter of this catalog)
- PERF ST 307 (see the School of Communication chapter of this catalog)
- o A senior thesis (398 and 399) or 1 additional 300-level course. Students who complete a senior thesis may be nominated for departmental honors.
- All adjunct majors require completion of a stand-alone major as well. At most 2 courses may be double-counted toward the gender studies adjunct major and another major.

Minor in Gender Studies

Minor requirements (7 units)

- 2 core courses chosen from 210, 230, 231, 232, 233, 240, 250, and SOCIOL 216
- 5 additional courses chosen in consultation with a program adviser
 - o At least 3 must be at the 300 level.
 - o 3 must be gender studies courses.
 - o The remaining 2 may be gender studies courses or courses from any department cross-listed under gender studies (for sample electives, see the list above under adjunct major).
- At least 5 courses for the minor must not be double-counted toward a major.

Honors in Gender Studies

To be eligible for honors, students must have a grade point average of 3.4 or higher in the major, complete the thesis sequence (398 and 399), and submit a thesis. Those who prepare an outstanding thesis will be recommended to the college for graduation with honors. For more information consult the director of undergraduate studies. See also Honors in the Major on page 38.

Courses

GNDR ST 210-0 Gender, Power, and Culture in America

Relationship of gender to issues of political, economic, and cultural power in personal and public life; intersections of gender, race, class, and sexuality.

GNDR ST 230-0 The Roots of Feminism Introduction to milestone texts in the development of 200 years of British, European, and American feminist thought, with particular attention to emerging arguments and strategies around issues of gender and sexuality.

GNDR ST 231-0 Gender, Sexuality, and Representation

Representations in art and literature within their historical, social, and political contexts. Theories of spectatorship, resistance, and revision.

GNDR ST 232-0 Sexuality and Society Examination of the role of sexuality in the cultural, economic, political, and social organization of the United States. Sex work, sex tourism, sexual migration, LGBT social movements, and moral panics. Taught with SOCIOL 232; students may not earn credit for both courses.

GNDR ST 233-0 Gender, Politics, and Philosophy Role of gender difference in the main political-philosophical traditions: social contract, liberalism, republicanism, socialism-Marxism, critical theory. Classics of feminist and political thought (Wollstonecraft, Mill, Taylor, Engels) and contemporary debates. Taught with PHIL 230; students may not earn credit for both courses.

GNDR ST 240-0 Gender Studies for a Small Planet Transnational and global perspectives on gender and sexuality.

GNDR ST 250-0 Gender Issues in Science and Health Aspects of gender in the cultures of science and medicine.

GNDR ST 321-0 Gender, Sexuality, and History Historical considerations of gender and/or sexuality. Topics may cover different historical time periods. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 324-0 American Gay and Lesbian History Social, cultural, and political history of same-sex desire in the United States, emphasizing the last 150 years. Taught with HIST 324; students may not earn credit for both courses.

GNDR ST 331-0 Sociology of Gender and Sexuality

Gender and issues of social reproduction and social change, with an emphasis on sexuality and reproduction.

GNDR ST 332-0 Gender, Sexuality, and Health Health-related topics concerning gender and/or sexuality. Topics include reproductive health, HIV/AIDS, the women's health movement, environmentalism, and eating disorders. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 341-0 Transnational Perspectives on Gender and Sexuality Studies of gender and sexuality in relation to globalization or non-U.S./non-Western cultures. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 345-0 Gender, Sexuality, and Ideology Studies in ideology, ontology, and ethics concerning gender and sexuality. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 351-0 Gender, Sexuality, and Public Policy Studies of legal systems and public policy. Specific topics may include domestic violence and abortion legislation. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 352-0 Gender, Sexuality, and Political Theory Studies in political theory relating to gender and sexuality. May count toward the major's theory requirement. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 353-0 Gender and Citizenship Examinations of conventional conceptions of political participation and counter-public spheres informed by feminist activism and feminist and gender theory.

GNDR ST 361-0 Gender, Sexuality, and Literature Studies of literary texts in the context of gender theory, feminism, or sexuality studies. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 362-0 Gender, Sexuality, and Drama Studies in gender and/or sexuality in the context of theater and drama in or across historical periods. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 363-0 Postcolonial Studies and Gender and Sexuality

Postcolonial approaches to literature and theory. Topics include orientalism and diaspora theory as they relate to gender and sexuality. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 371-0 Gender, Sexuality, and Popular Culture

Cultural studies perspective on selected topics in popular culture as they relate to gender and/or sexuality. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 372-0 Gender, Sexuality, and Performance Selected topics concerning theories of performance in relation to gender and/or sexuality. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 373-0 Gender, Sexuality, and Film Primary emphasis on representations of gender and sexuality in film and film theory. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 374-0 Gender, Sexuality, and Digital Technologies

Theories concerning gender and sexuality in digital representations, particularly Internet related. Content varies by quarter. Fulfills the major's theory requirement.

GNDR ST 375-0-0 Internship in Gender Studies Field research and practical work experience in activist organizations; biweekly meeting with the instructor and other interns for discussion of internship experiences and common readings. Prerequisite: consent of instructor.

GNDR ST 380-0 Black Feminist Theories Introduction to black feminist studies and its impact in the late 20th century. Fulfills the major's theory requirement.

GNDR ST 381-0 Queer Theory Survey of queer theories and methodologies. Fulfills the major's theory requirement. Content varies by quarter; may be repeated for credit with different topics. Prerequisite: introductory course in gender studies or course in literary theory.

GNDR ST 382-0 Race, Gender, and Sexuality Literature and theory concerned primarily with the intersections of race and/or ethnicity and gender and sexuality. Content varies by quarter; may be repeated for credit with different topics.

GNDR ST 390-0 Topics in Gender Studies Topics vary — for example, masculinity; gender, race, and reproduction; gender, law, and public policy; Asian American women's history; women artists and their publics.

GNDR ST 392-0 Gender, Sexuality, and Autobiography Investigations of women and men as readers and producers of autobiography. Exploration of memory and construction of self in relation to gender, culture, and ethics. Prerequisite: introductory course in gender studies or consent of instructor.

GNDR ST 395-0 Sexuality and Its Discontents Social and historical constructions of sexuality; emergence of lesbianism and homosexuality as categories; issues of sexuality, race, and class; problems of sexual domination and violence. Fulfills the major's theory requirement. Prerequisite: introductory course in gender studies or consent of instructor.

GNDR ST 396-0 Feminist Therapy Theoretical basis for the feminist critique of traditional psychotherapy. Exploration of

problems presented by female clients; gender-related causes and feminist strategies for resolution. Prerequisites: 1 course in gender studies or psychology; junior/senior standing.

GNDR ST 397-0 Gender Theory Survey of gender and feminist theory. Content may vary by quarter. Fulfills the major's theory requirement.

GNDR ST 398-0 Senior Research Seminar Students work with an adviser and begin research on a senior thesis project, meeting on a reduced schedule over two quarters. Prerequisite: consent of instructor.

GNDR ST 399-0 Independent Study Individual tutorials or research projects. Prerequisite: consent of instructor.

GEOGRAPHY

www.geography.northwestern.edu

The Program in Geography offers three types of courses to students who seek a knowledge of the physical earth and its various modes of human occupancy. Introductory courses develop global perspectives on environments that are relevant to many social and physical science fields. Courses in regional geography present a unique way of understanding how nature and culture have interacted over time to give character to specific places or regions. Advanced courses focus on the concepts and techniques of professional geography, especially on the construction of maps and on the uses of maps in solving geographical problems.

Programs of study may lead to an adjunct major or a minor in geography. In addition to the following requirements, students majoring in geography also must complete a major in a related social or natural science field.

Adjunct Major in Geography**Program courses (6 units)**

- 211 or 235; 240; 341
- 3 additional geography courses, including 1 unit of research (399)
- All adjunct majors require completion of a stand-alone major also. Students majoring in geography also must complete a major in a related social or natural science field. Program courses for the geography adjunct major may not be double-counted toward other majors.

Related courses (units depend on mathematics sequence taken)

- ECON 201, 202
- MATH 220, 224 (or equivalent)
- STAT 210 (or equivalent)

Minor in Geography

The minor in geography supplements the academic programs of students who major in related social and natural sciences by training them in the theory and method of geographical analysis.

Prerequisites

- MATH 220, 224 (or equivalent)
- STAT 210 (or equivalent)

Minor requirements (6 units)

- 211 or 235, 240, 341
- 3 additional courses approved by the geography program adviser

Honors in Geography

Superior students may qualify for program honors by obtaining sufficiently high grades, enrolling in 399 for two successive quarters, and completing a research project deemed worthy of honors. Students meeting these criteria are recommended to the college for graduation with honors. See also Honors in the Major on page 38.

Introductory Courses

GEOG 211-0 World Biogeography Geography of the world's major ecosystems based on the global climate model.

Physical processes of soil formation and vegetation development in various ecosystems. Human impacts on natural systems resulting from past and present land-use practices.

GEOG 235-0 Atmosphere and Climate Nature and composition of the atmosphere, principles of atmospheric motion, global circulation model, cyclonic storms; climates and climatic change.

GEOG 240-0 Economic Geography Population, natural resources, land use, commodity production, and trade, with an emphasis on the world scale. Industrial location theory and global economic structures.

Regional Geography Courses**GEOG 312-0 Geography of Chicago and Its Region**

Chicago as an example and model of city form. Physical environments of the Chicago region and their influence on settlement. Evolution of the geography of Chicago and its suburbs from the 19th century to the present, with an emphasis on recent trends. Prerequisite: junior standing.

GEOG 313-0 North America Detailed study of the regional geography of the United States and Canada. The regional distribution of landform types. Patterns of culture, history, and economic development that underlie the distribution of distinctive lifeways in the two countries.

Advanced Courses

GEOG 328-0 The Human Use of the Earth Geography of the earth's natural environments as modified by human agency. Natural versus anthropogenic environmental change. Processes of habitat alteration in hunter-gatherer societies. Impacts of modern agriculture and forestry.

GEOG 341-0 Principles of Cartography Design, construction, and use of thematic maps for effective presentation of spatial data. Typography and symbolization. Coordinate systems and map projections. Prerequisites: MATH 220 and 224.

GEOG 343-0 Geographic Information Systems Methods and techniques of digital cartography; encoding and analysis of spatial information; applications to archaeology, environmental sciences, and business geographics. Prerequisite: 341.

GEOG 399-0 Independent Study Independent research projects. Open to qualified advanced students with consent of department.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

GERMAN

www.german.northwestern.edu

The Department of German offers a variety of courses in English and German, giving students a choice in satisfying their educational needs and interests. Courses are designed to

- Offer students wishing to acquire basic knowledge of the German language (either to fulfill the college language requirement or as part of the requirements for a German major or minor) an opportunity to use a variety of audio-visual materials and cultural and literary readings to expose them to different styles of written and spoken language and to the culture and people of German-speaking countries.
- Expose German majors and minors to a course of study in language, literature, culture, and history that forms the basis from which they may pursue their interests in specific areas of concentration (the program emphasizes the modern period — 18th century to the present).
- Provide a basis for the understanding of the intellectual and cultural life of Germany for students who are not proficient in German.

Major in German**Major requirements (15 units)**

- 12 core courses
 - 4 language courses
 - 2 200-level courses (1 from 201, 203-1,2; 1 from 205-1,2, 207, 209)
 - 2 300-level courses (from 303, 305, 307)
 - 2 courses in history and culture (from 222, 224, 228, 311, HISTORY 344, 349)
 - 6 courses in literature and culture
 - 3 200-level courses (from 211, 221-1,2,3, 223, 225, or 245)
 - 3 300-level courses (from 321-1,2,3, 323, 325, 327, 329, 331, 333, 335, 337, 345, 348, or 398)
- 3 concentration courses, chosen from one of these:
 - *Business studies*: 209, 309-1,2
 - *Critical thought*: 3 courses at the 300 level: 322, PHIL 310 or 314, and an undergraduate seminar (398 or 399) or graduate seminar in German or comparative literature
 - *German-Jewish studies*: 234-1,2 and 1 course at the 300 level (from HISTORY 344, 349, RELIGION 230, 331, 333, 334, or 339)
 - *History and culture*: 1 course at the 200 level and 2 courses at the 300 level or 3 courses at the 300 level (chosen from 222, 224, 228, HISTORY 344 or 349)

- *Literature and culture:*
 - 1 200-level course (from 221-1,2,3, 223, 225, 245, 226, 232, 236, 238, 240, or 246)
 - 2 300-level courses (from 321-1,2,3, 323, 322, 324, 325, 326, 327, 328 329, 331, 333, 335, 337, 345, 348, or 398)
- Courses listed as prerequisites for an advanced course may not be taken for credit after the advanced course has been completed.
- Majors returning from a study abroad program must enroll in at least 1 300-level course in the department.

Minors in German

The Department of German offers two minors, one in German and one in business German. Each minor consists of 9 courses. The minor in German is designed to give students solid language proficiency and significant knowledge of German culture. The minor in business German is designed to prepare students for careers in government service or international business or for graduate study in international economics, management, trade, or law.

Minor requirements: German (9 units)

- 4 language courses
 - 2 200-level courses at the 200 level
 - 1 from 201, 203-1,2
 - 1 from 205-1,2, 207, 209
 - 2 300-level courses (from 303, 305, 307)
- 1 course in history and culture at the 200 or 300 level (222, HISTORY 344 or 349)
- 4 courses in literature and culture
 - 2 200-level courses (from 211, 221-1,2,3, 223, 225, or 245)
 - 2 300-level courses (from 321-1,2,3, 323, 325, 327, 329, 331, 333, 335, 337, 345, or 398)
- Courses listed as prerequisites for an advanced course may not be taken for credit after the advanced course is completed.
- Minors returning from a study abroad program must enroll in at least 1 300-level course in the department.

Minor requirements: business German (9 units)

- 4 language courses
 - 2 200-level courses
 - 1 from 201, 203-1,2
 - 1 from 205-1,2, 207, 209
 - 2 300-level courses (from 303, 305, 307)
- 3 courses in business German: 209, 309-1,2
- 1 course in history and culture at the 200 or 300 level (222 or HISTORY 344 or 349)
- 1 200-level course in literature and and culture (211, 221-1,2,3, 223, 225, or 245)
- Courses listed as prerequisites for an advanced course may not be taken for credit after the advanced course is completed.

- Minors returning from a study abroad program must enroll in at least 1 300-level course in the department.

Business German Examinations

Students completing a major with a concentration in business studies or a minor in business German may take one or both of the internationally recognized business German examinations offered through Northwestern. Business German credentials are important in today's job market for two reasons: German is a leading language in the European market, and German corporations have more than 2,500 subsidiaries and affiliates in the United States that employ nearly 600,000 Americans.

Students successfully completing 1 quarter of 209 may take the Zertifikat Deutsch für den Beruf, an examination developed jointly by the Goethe-Institut and the Deutscher Volkshochschulverband. Students successfully completing German 309-1 and 309-2 may take the Prüfung Wirtschaftsdeutsch International, an examination developed by the Goethe-Institut, the Association of German Chambers of Industry and Commerce, and the Carl Duisberg Centers.

For additional information on these examinations, see the German department web site at www.german.northwestern.edu.

Honors in German

Superior students majoring in German may qualify for departmental honors by completing 2 quarters of 398 or 399; 2 quarters of 400-level courses; or 1 quarter of 398 or 399 and 1 quarter of a 400-level course. In addition, they must present a research paper at the end of their second quarter of honors study. Interested students should consult with the department's director of undergraduate studies. See also the German department web site and Honors in the Major on page 38.

The Teaching of German

Weinberg College students pursuing a major in German who also wish to be certified for secondary teaching must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Study Abroad

The Department of German works carefully with individual students to integrate a period of study in Germany, Austria, or Switzerland into their overall academic plans. By interacting with native German speakers and travelers, students typically return with a much firmer grasp of both written and spoken German as well as a more balanced international perspective. Students who have special interests

and needs are welcome to investigate other programs and discuss them with the departmental study abroad adviser.

Courses Taught in German

GERMAN 101-1,2,3 Beginning German This sequence emphasizing the four modalities — speaking, listening comprehension, reading, and writing — offers students a systematic introduction to German language and culture. No prerequisite in German.

GERMAN 102-1,2,3 Intermediate German This sequence offers students a systematic review of German language and culture. The class fosters learning in the four modalities: speaking, listening comprehension, reading, and writing. Prerequisite: 101-3 or equivalent.

GERMAN 115-0 Intensive Beginning German through Musical Journeys in Vienna Interdisciplinary course offering musically interested students the opportunity to acquire German language skills through an immersion in the musical and cultural history of Vienna.

GERMAN 201-0 Focus Reading: Perspectives on German Life and Culture — The Voice of the Outsider This course is for students who would like to explore German texts in more depth. Examines contemporary German culture. Prerequisite: 102-2. Does not count for the language requirement.

GERMAN 203-1 Focus Speaking: Current German-American Images Practical training in listening comprehension and speaking. Focuses on descriptions and comparisons. Prerequisite: 102-2. Does not count for the language requirement.

GERMAN 203-2 Focus Speaking: Documenting Past, Present, and Future Practical training in listening comprehension and speaking. Focuses on retelling past events and on present and future events. Prerequisite: 102-2. Does not count for the language requirement.

GERMAN 205-1 Focus Writing: Berlin — Faces of the Metropolis This course furthers written proficiency in German through analysis and production of portraits, descriptions of places, narratives, and newspaper reports. Prerequisite: 102-3.

GERMAN 205-2 Focus Writing: Identities in Flux; German, European, and Transatlantic Perspectives This course furthers written proficiency in German through work with reviews of films and cultural events, reports, argumentative essays, advertisements, and interpretations of literary works. Prerequisite: 102-3.

GERMAN 207-0 Current Events in German Media Exploration of current events in a variety of German media (newspapers, TV, Internet, etc.). Topics include politics, music, film, sports, and literature. Prerequisite: 102-3.

GERMAN 209-0 German in the Business World German language study oriented toward business-related communication situations such as social interactions with customers, business travel, and basic business letters. Prepares students for the Zertifikat Deutsch für den Beruf exam. Prerequisite: 1 200-level course in German.

GERMAN 211-0 German Culture through Film Introduction to 20th-century German cinema. Discussion of German

identity, culture, history, and politics. Course emphasizes cultural knowledge and German language skills. Prerequisite: 1 200-level course in German.

GERMAN 221-1 Introduction to Literature, 1800–1900

Introduces students to representative texts and writers of 19th-century German literature and familiarizes them with literary analysis and genres. Prerequisite: 1 200-level course in German.

GERMAN 221-2 Introduction to Literature, 1900–45

Introduces students to representative German texts and German writers of the first half of the 20th century, when the First World War, the Weimar Republic, and the Third Reich marked the demise of the German Empire. Prerequisite: 1 200-level course in German.

GERMAN 221-3 Introduction to Literature, 1945–Today

Introduces students to representative short stories by major German-speaking authors writing since 1945. The stories selected represent a dynamic period in German literature and highlight important social, political, and intellectual issues. Prerequisite: 102-3.

GERMAN 223-0 Contemporary Austrian Literature Overview and introduction to contemporary Austria — the land, its people, and cultural institutions — through newer writers such as Hackl, Handke, Haslinger, Helfer, Jelinek, Nöstlinger, Reichart, Schlag, and Turrini. Prerequisite: 1 200-level course in German.

GERMAN 225-0 Contemporary Swiss Literature Overview and introduction to Switzerland — the land, its people, and cultural institutions — through various Swiss authors such as Frisch, Dürrenmatt, Muschg, Hohler, Lötscher, and Bichsel. Prerequisite: 1 200-level course in German.

GERMAN 245-0 Special Topics in German Literature and Culture Studies of a major author, a prominent theme in German literature or culture, a movement, or a genre. May be repeated for credit with different topic. Prerequisite: 1 200-level course in German.

GERMAN 303-0 Speaking as Discovery: Exploring Standpoints, Developing Arguments, Expressing Points of View

A course to improve German listening comprehension and speaking skills to the advanced level. Uses current cultural texts, films, and television broadcasts. Prerequisite: high-intermediate skills in listening, reading, and speaking German.

GERMAN 305-0 Writing as Discovery: Communicating Correctly, Clearly, and Persuasively

Practice of advanced and sophisticated structures of written German through a series of linguistic exercises, including a biographical piece of writing. Prerequisite: high-intermediate skills in listening, reading, and speaking German.

GERMAN 307-0 Current Events and Issues in German-

Language Media Current political, socioeconomic, and cultural events in Germany and Europe. Topics from German-language media, including newspapers, magazines, Internet sources, and news broadcasts. Discussion of journalistic differences among media sources. Prerequisite:

high-intermediate skills in listening, reading, writing, and speaking.

GERMAN 309-1 Advanced Business German: Understanding the German Economy Students acquire a solid understanding of Germany's economy, its current problems, German business practices, and differences from the U.S. system. Begins preparation for the internationally recognized exam Prüfung Wirtschaftsdeutsch International. Prerequisite: high-intermediate skills in reading, writing, and speaking.

GERMAN 309-2 Advanced Business German: German for Marketing and Management Students gain skills to function in a multitude of German business contexts, such as management and marketing. They also increase their cross-cultural knowledge and intercultural competency. Course prepares students for the internationally recognized exam Prüfung Wirtschaftsdeutsch International. Prerequisite: high-intermediate skills in reading, writing, and speaking.

GERMAN 321-1 Reason, Revolution, and Despair: Lessing to Büchner Discussion of key texts in German intellectual history from the Enlightenment to the prerevolutionary period in the 1830s. Prerequisite: high-intermediate skills in speaking and advanced skills in reading and writing.

GERMAN 321-2 Myth and Disenchantment: Nietzsche to Brecht Discussion of key texts to acquaint students with the literature and thought, events and ideologies that helped shape German cultural, political, and social life during a period that saw the rise and final collapse of the imperial tradition, a short-lived experiment with democracy (the Weimar Republic, 1918–33), and the rise of the Nazi state. Prerequisite: high-intermediate skills in speaking and advanced skills in reading and writing.

GERMAN 321-3 Recoveries and Transitions: Böll to the Present Examination of the relationship of literature and film to the sociopolitical sphere since 1945. Prerequisite: high-intermediate skills in speaking and advanced skills in reading and writing.

GERMAN 323-0 Rhyme and Reason: German Poetry since 1700 Introduction to German poetry from the early 18th century to the present. Concentrates on the main formal categories of poetry (meter, rhyme, verse, and poetic genres) as well as the main topics and themes of German poetry. Prerequisite: high-intermediate skills in speaking and advanced skills in reading and writing.

GERMAN 325-0 The Greeks in German Culture Analysis of the extraordinary importance of ancient Greek art and philosophy to German culture from 1750 to the present. Prerequisite: high-intermediate skills in speaking and advanced skills in reading and writing.

GERMAN 327-0 Expressionism: Modernity, Madness, Eros, and Revolution Focuses on German Expressionism in its most extreme literary and artistic reactions to the impact of modernity, war, and revolution and on the individual and collective experience in Berlin from 1910 to 1920. Prerequisite: high-intermediate skills in speaking and advanced skills in reading and writing.

GERMAN 329-0 Brecht: Theater, Film, and Media in the 1920s Introduction to Bertolt Brecht's theater in the 1920s and early 1930s during the Weimar Republic. Historical critical review of the still-evolving media of film and radio. Prerequisite: high-intermediate skills in speaking and advanced skills in reading and writing.

GERMAN 331-0 Memory and Representation in Postwar Literature Examination of the role of German literature and art in the creation of historical consciousness in the postwar period. Prerequisite: high-intermediate skills in speaking and advanced skills in reading and writing.

GERMAN 333-0 Postwar to Post-Wall GDR Literature Study of the literature and culture of the German Democratic Republic within social, political, and historical contexts. Prerequisite: high-intermediate skills in speaking and advanced skills in reading and writing.

GERMAN 335-0 Minority Voices in Germany Study of minority literatures in Germany (including Turkish, Italian, Afro German, and Jewish) within social, political, and historical contexts. Prerequisite: high-intermediate skills in speaking and advanced skills in reading and writing.

GERMAN 337-0 Science and Culture in Germany, 1780–1880 Exploration of key texts popularizing major scientific innovations — such as rational mechanics, analytical chemistry, thermodynamics, and evolutionary biology — in their cultural context. Prerequisite: high-intermediate skills in speaking and advanced skills in reading and writing.

GERMAN 345-0 Topics in German Literature and Culture In-depth study of topics in German literature and/or pivotal periods in German culture. May be repeated for credit with different topics. Prerequisite: advanced skills in speaking, reading, and writing.

GERMAN 398-0 Undergraduate Seminar (1–3 units) Advanced work through supervised reading, research, and discussion. Prerequisite: advanced skills in speaking, reading, and writing.

GERMAN 399-0 Independent Study Open to outstanding German majors with senior standing. Prerequisite: advanced skills in speaking, reading, and writing.

Yiddish Courses

GERMAN 111-1,2,3 Beginning Yiddish The beginning Yiddish sequence offers students a systematic introduction to Yiddish language and culture emphasizing the four modalities: speaking, listening comprehension, reading, and writing. No prerequisite in Yiddish.

GERMAN 112-1,2,3 Intermediate Yiddish Continuation of the introductory 111 sequence emphasizing all four language modalities. Prerequisite: German 111-3 or equivalent.

GERMAN 197-0 Focus Reading: Perspectives in Yiddish Life and Culture This course is for students in beginning Yiddish who would like to explore Yiddish texts in addition to taking a language course. Provides an overview of Jewish life in Eastern Europe. Prerequisite: 111-3. Does not count for the language requirement.

GERMAN 330-0 Introduction to Yiddish Literature and Culture See next section.

Courses with Reading and Discussion in English

No prerequisites in German.

GERMAN 222-0 German History 1789–1989 Survey of German political, economic, social, intellectual, and diplomatic history from the consolidation of the nation in the aftermath of the French Revolution to reunification at the end of the Cold War.

GERMAN 224-0 Contemporary Germany The German political, social, and cultural scene after 1945. May be repeated for credit with different readings.

GERMAN 226-0 New Voices in German Literature An introduction to contemporary German literature in English translation. Topics may vary and may include the contemporary historical novel, short story, novel, or memoir.

GERMAN 228-0 The German Film In-depth study of German films and cultural background. Topics may vary — for example, the pioneer film or “new” German cinema. May be repeated for credit with different topic.

GERMAN 232-0 The Theme of Faust through the Ages Faust theme in literature and music through shifting intellectual and social climates from the 16th century to the present.

GERMAN 234-1 Jews and Germans: An Intercultural History I Exploration of Jewish encounters with German culture. German Jewry from the 18th century to the end of the 19th century, when Jews were granted legal standing as German citizens.

GERMAN 234-2 Jews and Germans: An Intercultural History II Jewish culture–German culture exploration. German-speaking Jewry from the late 19th century to 1935.

GERMAN 236-0 Kafka and Nietzsche Exploration of two key figures in German modernity. Analysis of the relation between philosophy and literature; inquiry into the idea of the “ascetic ideal.”

GERMAN 238-0 Turn-of-the-Century Vienna: In Search of New Values Literature and thought of fin de siècle Vienna and their impact on modern consciousness. Fiction, poetry, essays, and plays by Freud, Schnitzler, Wittgenstein, Hofmannsthal, Musil, Karl Kraus, and Schoenberg.

GERMAN 240-0 Berlin: Weimar Culture Literature, philosophy, fine arts, and architecture of the Weimar Republic as expressions of its intellectual debates and social upheavals. Remarque, Piscator, Mann, Spengler, the Bauhaus.

GERMAN 246-0 Special Topics in German Literature and Culture Topics vary — for example, the fairy tale, Germanic mythology. May be repeated for credit with different topic.

GERMAN 322-0 German Contributions to World Literature Topics vary — for example, Rilke’s poetry; Nietzsche’s influence on literature; Thomas Mann; Hesse, the German novel, and the mystic tradition; German intellectual history. May be repeated for credit with different topic.

GERMAN 324-0 Modern German Drama From the perspective of the stage as a “moral institution,” plays by authors ranging from Heinrich von Kleist to Peter Weiss.

GERMAN 326-0 German Cultural Studies Exploration of key concepts, major figures, and cultural and literary themes in German studies and interdisciplinary fields such as music, art, political science, media studies, and popular culture.

GERMAN 328-0 German Cultural Criticism from Kant to Kluge Exploration of major texts in German cultural criticism from the late 18th to early 21st century, including philosophical, philological, scientific, and essayistic texts.

GERMAN 330-0 Introduction to Yiddish Literature and Culture Traces the history of Yiddish literature and culture from the 17th century to the late 20th century, focusing on three Yiddish “classic” writers: S. Y. Abramovish (*Mendele the Bookseller*), Y. L. Peretz, and Sholem Aleichem. The course provides insight into Jewish life in Eastern Europe.

GERMAN 334-0 Writers and their Critics Study of the texts of leading writers in German through a discussion of the criticism these texts have evoked. Emphasis on 20th- and 21st-century criticism.

GERMAN 346-0 Topics in German Literature and Culture In-depth study of topics in German literature and/or pivotal periods in German culture. May be repeated for credit with different topics.

GERMAN 348-0 Stylistics: Workshop in Literary Translation Exploration of stylistic issues in the German-to-English translation of literary works in a variety of genres. Different approaches to style and to literary texts examined through analysis of register, metaphor, repetition, iconicity, and ambiguity.

GLOBAL HEALTH STUDIES

www.wcas.northwestern.edu/globalhealth

Global health problems are of concern to policy makers, public health professionals, and those who work for international agencies. Solving these problems requires not only financial resources but, more important, a deep understanding of the interaction of domestic and global forces and the cultural and political realities that affect the design and implementation of solutions in specific settings. The interdisciplinary Global Health Studies Program is designed to provide skills for dealing with complex international health issues. Students learn about domestic and international approaches to international crisis management as well as about perspectives on specific health issues within the diverse U.S. population.

Minor in Global Health Studies

The minor in global health studies is designed for students from a variety of backgrounds, including those interested in medicine and the health sciences. It combines course work and international experiences, drawing on many different disciplines.

Elective courses may be drawn from anthropology, biological sciences, economics, history, international studies, political science, sociology, and social policy. Requirements may also be met by taking eligible courses in Northwestern's study abroad programs in public health. A complete list of eligible courses is available from program advisers and the program web site at www.wcas.northwestern.edu/globalhealth.

Minor requirements (7 units)

- 301
- 2 core courses chosen from 302, 303, 304, 390
- 4 approved elective courses
- Global health studies minors must gain substantial public health experience abroad in one of Northwestern's public health programs in China, France, Mexico, Uganda, or South Africa or in another supervised international health experience preapproved by the program director.

Courses

GBL HLTH 260-0 Plagues and Peoples: The Anthropology of Global Health Introduction to global health theory and method, policy, governance, practice, and research. Medical anthropology case studies of infectious disease (malaria, HIV/AIDS, ebola), structural inequities (poverty, gender-based violence), and health systems (Cuba). Taught with ANTHRO 260; students may not earn credit for both courses.

GBL HLTH 301-0 Introduction to International Public Health Social, economic, and cultural influences on variation in human health and well-being in populations worldwide; the continuum between health and sickness and the related impact of distal, chronic, and acute forces; heightened awareness of the need for ethical oversight of research in desperately poor settings.

GBL HLTH 302-0 Global Bioethics Ethical challenges to the safety, freedom, and dignity of human and animal life resulting from advances in biotechnologies and health research on a global scale. Readings drawn from various disciplines (philosophy, anthropology, public health, medicine), perspectives (feminist, religious, secular, applied, pluralist, universalist, cultural relativist), and regions (Europe, United States, sub-Saharan Africa, Japan, Middle East).

GBL HLTH 303-0 Gender and Global Health: Beyond Reproduction How cultural constructions of gender, sex, and sexuality shape a woman's risk and experience of breast cancer, mental illness, intimate partner violence, substance abuse, HIV/AIDS, and other diseases as well as access to health resources. Discussion of special health issues in the lesbian and disabled communities in the United States.

GBL HLTH 304-0 International Perspectives on Violence Violence and the creation of public health and legal problems in the domestic and international arenas; origins of different forms of violence in the U.S. and abroad, their scope, and

possible legal and public health interventions. Topics include gun violence, child abuse, domestic violence, sex trafficking, and the interaction between mental health and violence.

GBL HLTH 310-1,2 Supervised Global Health Research

Minors are encouraged to do supervised public health research on campus. Supervised research does not fulfill elective or core course requirements, however.

GBL HLTH 311-SA Health Care Systems in Europe and the United States

Provides students with an understanding of the various ways in which health care systems are organized in European countries, the problems they face, and the reforms implemented or proposed at the national and EU levels. Restricted to students in Northwestern's Paris program.

GBL HLTH 312-SA Public Health in Europe: Issues and Policies Examines issues and debates on health policy in France and the EU, including primary health issues, health insurance, health inequalities, HIV/AIDS, SARS, elderly care, and genetically modified organisms. Lectures are supplemented by visits to relevant sites. Restricted to students in Northwestern's Paris program.

GBL HLTH 313-SA International Organizations and Health:

A Research Seminar Students design team research projects, learn about research methodology, discuss their research progress, and present findings. Restricted to students in Northwestern's Paris program.

GBL HLTH 314-SA Health and Community Development in

South Africa Health-related issues confronting South Africa, their social and economic impact, efforts to address them. Apartheid and posttransition policies. Demographics, prevention, and treatment of both infectious and chronic noncommunicable diseases. Restricted to students in Northwestern's South Africa program.

GBL HLTH 390-0 Special Topics in Global Health Advanced work in areas of developing interest and special significance. Can be repeated for credit with a different topic. Recent course titles have included Managing Global Health Challenges, Disability and Global Health, and International Perspectives on Mental Health.

GREEK

See Classics.

HEBREW

See African and Asian Languages.

HINDI

See African and Asian Languages.

HISTORY

www.history.northwestern.edu

The Department of History is a place where students can study virtually any region of the world, during almost any historical era, from a wide variety of perspectives. The faculty includes nationally distinguished scholars in United States, European, Latin American, African, and Asian history.

Faculty resources enable the department to offer major fields of study in the history of the Americas, English/European history, African/Middle Eastern history, and Asian/Middle Eastern history. The department is particularly strong in social, cultural, and intellectual history.

Most history courses are open to any undergraduate. Few have specific prerequisites, although freshmen are generally advised to try 100- and 200-level courses before attempting 300-level courses. History majors have priority in registering for classes, but the majority of students enrolled in most history courses are majoring in other departments and schools. The history faculty welcomes this diversity of students.

Since all courses listed below cannot be given in any one year and the quarters in which they are offered are subject to change, see the online quarterly class schedule from the Office of the Registrar for actual offerings.

Major in History

The purpose of the major is to help students understand themselves as products and makers of history by introducing them to historical patterns and problems in a variety of areas and periods as well as to different historical materials and techniques of analysis. It encourages students to learn analytical techniques and to search deeply in at least one concentration. Achievement of these goals depends heavily on effective use of faculty advice, and each student should see his or her adviser as soon as one is assigned. Thereafter, each student should confer with the adviser at least once each quarter to ensure smooth progress through the program of study.

Students majoring in history select one of four concentrations:

- History of the Americas
- English/European history
- African/Middle East history
- Asian/Middle East history

Students may arrange to emphasize certain special fields within the context of one of these four areas.

The program for majors consists of 11 graded courses in history and 5 graded courses in related subjects, none of which may be substituted by advanced placement credits. These courses, chosen by the student in consultation with the adviser, are distributed as follows.

Department courses (11 units)

- 2 undergraduate seminars
 - 395 (should be taken in the junior or senior year and need not be within the student's concentration)
 - 1 chosen from 101, 102, 103, 392, 394
- 9 additional 200- or 300-level courses
- 5 courses must be in one of the four areas of concentration listed above.
- 4 courses must be outside the area of concentration and distributed to provide both geographical and chronological variety.

- At least 2 of the 11 courses must be in fields other than modern European or U.S. history (e.g., courses in European history before 1800 or in African, Asian, Middle Eastern, or Latin American history in any period).

Related courses (5 units)

- At least 2 must be at the 300 level.
- The other 3 may be 200- or 300-level courses.
- Courses must be chosen from at least two programs or departments in the social sciences and humanities.
- Courses should bear some coherent relationship to the student's major program.
- Students are encouraged to discuss their related courses with their advisers.

Minor in History

The minor in history encourages students majoring in other fields to study history and to organize their historical studies in a coherent way. The structure of the minor requires students to gain both depth and breadth in history. Students must select a concentration, which enables them to acquire significant knowledge of one area of the world, and take courses outside the concentration, which encourages an understanding of diverse cultural contexts.

Minor requirements (7 units)

- At least 3 must be at the 300 level.
- 4 must be in one of the following areas of concentration, and at least 2 of these must be at the 300 level:
 - Europe, including Britain
 - United States
 - Latin America
 - Asia
 - Middle East
 - Africa
- 3 must be outside the area of concentration.

Honors in History

Majors with outstanding overall and departmental records may apply for the history honors program. A departmental and overall grade point average of at least 3.5 is required. Interested juniors may attend informational sessions during the winter and must submit a thesis proposal and a letter of recommendation from a Northwestern history professor by an early spring deadline. Those chosen enroll as seniors in a three-quarter honors seminar (398-1,2,3) and submit a completed thesis in May. Interested students should consult with the director of undergraduate studies. See also Honors in the Major on page 38.

The Teaching of History

Weinberg College students pursuing a major in history who also wish to be certified for secondary teaching must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this

catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Introductory Colloquia

The following 3 courses are colloquia, each limited to 15 undergraduates, which introduce students to modes of historical analysis through the study of various topics in history. Specific subjects will be listed in the Class Schedule. Open to freshmen only.

HISTORY 101-6 Freshman Seminar: European History

HISTORY 102-6 Freshman Seminar: American History

HISTORY 103-6 Freshman Seminar: Non-Western History

Introductory Lecture Courses

HISTORY 200-0 New Introductory Courses in History

Introductory lecture courses on topics not covered in regular offerings. Content varies. May be repeated for credit with different topic.

HISTORY 300-0 New Lectures in History Lecture courses on special topics not covered in regular offerings. Content varies. May be repeated for credit with different topic.

African History Courses

HISTORY 255-1,2,3 Background to African Civilization and Culture Historical approach to society, economy, polity,

and culture in Africa. **1.** Agricultural origins to the 17th century. **2.** 16th through 19th centuries. **3.** 1875 to 1994.

HISTORY 356-1,2 History of South Africa 1. From the African iron age to the establishment of the multinational gold mining industry, emphasizing the rise of African states and the contest for land with white settlers.

2. Emphasis on the 20th century, the rise of African nationalism, and the clash with the apartheid state.

HISTORY 357-0 East Africa Selected topics in East African history.

HISTORY 358-1,2 West Africa Selected topics in West African history: economy, society, and government.

Asian History Courses

HISTORY 281-0 Chinese Civilization Chinese history to the 16th century, emphasizing cultural and intellectual history.

HISTORY 284-1,2 Japanese History 1. Ancient and medieval Japan (200–1600), from the first evidence of civilization on the archipelago through the Warring States Period.

2. Social, cultural, and political developments in the Tokugawa Period (1600–1868).

HISTORY 381-1,2 History of Modern China 1. Late Imperial China, 1600–1911. **2.** 20th-century China, 1911–present.

HISTORY 382-0 The Modern Japanese City Social and cultural history of urban Japan.

HISTORY 384-1,2 History of Modern Japan 1. Japan: the modern state, 1860–1943. **2.** War and postwar Japan, 1943–present.

HISTORY 385-1,2 History of Modern India 1. The early modern period, ca. 1500–1800: The Mughal Empire; the early phase of European trade and conquest in the subcontinent. **2.** ca. 1750–present: The age of British colonial dominance; the politics of nation building and anticolonial resistance; independence, partition, and the postcolonial predicament.

England and the British Isles History Courses

HISTORY 260-1,2 British History, 1066 to the Present

1. The British Isles from the Norman Conquest to the Glorious Revolution. **2.** Britain from the Glorious Revolution to the 21st century.

HISTORY 362-1,2,3 Modern British History 1. Social, political, and institutional history, 1688–1815. **2.** The age of industrialization and liberalism, 1780–1900. **3.** The welfare state, democracy, and total war, 1900–present.

HISTORY 363-0 Modern Ireland in Historical Perspective

History of Ireland from the Celts to the “troubles” in Northern Ireland; emphasis on 19th and 20th centuries.

HISTORY 364-1,2 Social and Intellectual History of Modern Britain 1. Rise and fall of Victorian culture, 1780–1900.

2. Main themes in 20th-century society and thought, 1900–present.

European History Courses

HISTORY 201-1,2 European Civilization 1. Culture and structure of preindustrial society, high medieval through mid-18th century. **2.** Impact of industrial and political change and development of modern society to the present.

HISTORY 202-0 The Culture and History of Eastern Europe

Taking a cultural approach, this course introduces students to the rich historical background of Eastern Europe from the Roman days until the end of the Communist era.

HISTORY 203-1,2 Jewish History 1. 1492–1789: Mercantile era involving economic and cultural reshaping of Jewish community; legalized readmission of Jews to European cities; emancipation process bolstering Jewish integration into European society. **2.** 1789–1948: Plurality of models of Jewish integration, acculturation, and assimilation; formation of multiple identities; split of the traditional community; emerging patterns of sociocultural behavior; spread of political movements.

HISTORY 330-0 Medieval Sexuality Fluidity of sex and gender roles in an age before “sexual orientation”; impact of and resistance to Christian theology’s negative assessment of sexuality; the cult of chastity.

HISTORY 331-0 Women in Medieval Society Examination of medieval women’s lives in both secular and religious spheres through the different ideologies (religious, philosophical, scientific) that shaped them.

HISTORY 332-1,2,3 The Development of Medieval Europe

1. Early Middle Ages, 300–1000. **2.** High Middle Ages, 1000–1300. **3.** Late Middle Ages, 1300–1500.

HISTORY 333-0 The Age of the Renaissance Decline and revival of European civilization, 1350–1530. Cultural, political, economic, and social developments.

HISTORY 334-0 The Age of the Reformation Europe in the 16th century, especially origins, evolution, and effects of changes in religion.

HISTORY 336-0 Spain 1500–1700: Rise and Fall of a European Empire Social, political, and economic history of the largest early-modern European empire, its multicultural genesis, rise to domination in Europe and the Americas, and struggle to integrate internally.

HISTORY 337-0 History of Modern Europe Survey of the political and social history of Europe between 1815 and 1945, with emphasis on the political integration and disintegration of the Continent and the causes and effects of social and economic change.

HISTORY 338-1,2 Europe in the 20th Century Growth of mass politics, fascism, the home fronts, rise of the welfare state, loss of empire, economic resurgence and integration. 1. 1900–45. 2. 1945–present.

HISTORY 342-1,2,3 History of Modern France 1. The ancien régime and the French revolution, 1715–99. 2. 19th-century France. 3. 20th-century France.

HISTORY 343-0 Modern Italy Italy from the Enlightenment to the present, concentrating on the *Risorgimento*, the world wars, Mussolini and fascism, the postwar economic miracle, and terrorism.

HISTORY 344-0 Weimar and Nazi Germany German social, economic, political, and cultural developments between 1918 and 1945.

HISTORY 345-1,2,3 History of Russia 1. Emergence of the Kievan and Muscovite states, 800–1700. 2. Russia from Peter to the Revolution, 1700–1917. 3. The Soviet Union and its successor states, 1917–present.

HISTORY 346-0 East Central Europe under Communist Rule and Beyond, 1945 to the Present The history of East-Central Europe from the World War II to the collapse of Soviet rule and beyond.

HISTORY 348-1,2 Jews in East Europe, 1250–1991 1. 1250–1917: East European Jews from the earliest medieval settlement through modernized communities; interaction with Slavic cultures and societies in the Polish-Lithuanian Commonwealth and the Russian Empire. 2. 1917–91: Political, social, religious, cultural, literary, and artistic aspects of the Jewish encounter with communism; integration of Soviet Jews into the transformation of the Soviet empire.

HISTORY 349-0 History of the Holocaust Origins and development of the massacre of European Jewry during World War II.

Latin American History Courses

HISTORY 365-0 The Formation of Latin American Society Development of Latin American socioeconomic structures, political institutions, and cultural tendencies from the

pre-Columbian and Iberian backgrounds through the colonial period.

HISTORY 366-0 Latin America in the Independence Era The 18th-century background to Latin American independence and its 19th-century aftermath. The process of achieving independence, changing social structures and economic patterns, and the problem of forming new nations.

HISTORY 367-0 The History of Modern Brazil Historical roots of modern Brazilian society: its rush toward economic modernization; radical social and economic inequalities; racially and culturally hybrid national identities; quest for effective democracy and universal citizenship.

HISTORY 368-1,2 Revolution in 20th-Century Latin America 1. Mexico and its revolutions. Mexican history, from the modernizing regime of Díaz, through the revolutionary upheaval and the consolidation of a new regime, to contemporary problems. 2. Comparative study of the origins and aftermaths of major Marxist revolutions in Cuba and South and Central America.

HISTORY 369-0 Development and Inequality in Modern Latin America Examination of various models of economic development that have been implemented in 20th-century Latin America, exploring the cultural, social, political, and economic roots of such policies and their impact on the region's poorest and most marginalized populations.

Middle East History Courses

HISTORY 270-0 Middle Eastern/Islamic Civilization Influence of Islam on the components of Middle Eastern societies (nomads, agrarian and urban populations) from the inception of the faith (7th century B.C.E.) to the modern period.

HISTORY 370-1,2,3 History of the Islamic Middle East 1. 600–1200: the classical Islamic community; medieval Islamic civilization. 2. 1200–1789: the great empires — Mamluks, Ottomans, and Safavids; cultural and economic decline. 3. 1789–present: Jewish and Arab nationalism, oil diplomacy, Islam in the modern context.

HISTORY 372-0 The History of Ancient Egypt (3100–c. 1000 B.C.E.) The Old Kingdom: centralized government, divine kingship. The Middle Kingdom: new monarchic principles in the aftermath of social disorder. The New Kingdom: imperialism in response to foreign aggression; religious revolution of Akhenaton.

United States History Courses

HISTORY 210-1,2 History of the United States Interpretative survey from the 17th century to the present. 1. Precolonial to the Civil War. 2. Reconstruction to the present. Lectures, discussion sections.

HISTORY 212-1,2 Introduction to African American History 1. Key concepts from 1700 to 1861, including African origins, the Atlantic slave trade, origins of slaving and racism in the United States, life under slavery in the North and the South, religion, family, culture, and resistance. 2. Key concepts from emancipation to the civil rights era. Focus on

construction of class, gender, and community; the rise of Jim Crow; strategies of protest; and migration and urbanization. Taught with AF AM ST 212-1,2; students may not earn credit for both courses.

HISTORY 214-0 Asian American History Introduction to the history of Asians in the United States, with a focus on their impact on American society as well as their experiences within the United States. Taught with ASIAN AM ST 214; students may not earn credit for both courses.

HISTORY 215-0 Western Hemisphere Environments from 1492 to the Present Environmental change in the history of North and South America. Conquest, exploitation, and restoration of common resources. Human activity in the shaping of Western Hemisphere environments. Emergence of environmental movements. Emphasis on hemispheric aspects of environmental change.

HISTORY 303-1,2 American Women's History Women and gender in American life, with attention to differences among women based on class, race, and ethnicity. 1. To 1865. 2. Since 1865.

HISTORY 304-0 Asian American Women's History Exploration of race, gender, and the contours of U.S. history from the perspective of Asian American women's experiences. Considers migration, exclusion, labor, marriage, family, sexuality, and cross-racial alliances.

HISTORY 305-0 American Immigration Origins, social characteristics, cultural values, and assimilation of immigrants in the 19th and 20th centuries. Consequences of immigration in comparative and historical perspective.

HISTORY 306-1,2 History of the American South From colonial settlement in the 17th century to the civil rights movements of the 1950s and 1960s. 1. The rise of slavery and the plantation system, formation of slave family and culture, sectional conflict, the Civil War, and emancipation. 2. Reconstruction, segregation, and civil rights movements. **HISTORY 310-1,2 Early American History** 1. Conquest and colonization: to 1688. 2. The age of the American Revolution: 1688–1789.

HISTORY 314-0 The Civil War and Reconstruction “Middle period” of American history, emphasizing origins of the Civil War, its revolutionary nature, and its immediate and long-term consequences for the South and the nation.

HISTORY 315-1,2,3 The United States since 1900 America's domestic history and role in world affairs since 1900. 1. Early 20th century. 2. Mid-20th century. 3. Late 20th century to the present.

HISTORY 316-0 The Sixties Examination of one of the most tumultuous eras in U.S. history, its roots in the reshaping of American society after World War II, and its legacies for the present. Emphasis on social movements of the period, particularly the civil rights movement, and political and cultural change.

HISTORY 317-1,2,3 American Cultural History Changing values of the American people, how they have been transmitted, and how they have shaped American society,

politics, and the economy. 1. Early America. 2. 19th century. 3. 20th century to the present.

HISTORY 318-1,2 Legal and Constitutional History of the United States 1. Development of legal institutions, constitutionalism, law and social change, law and economic development, colonial period–1857. 2. Law in industrial society: administration, race relations, corporations, environmental protection, civil liberties, 1857–present.

HISTORY 319-1,2,3 History of American Foreign Relations Evolution of American foreign policy, emphasizing domestic and international background and constitutional and military problems involved in planning policy. 1. 1763–1900. 2. 1900–45. 3. 1945–present.

HISTORY 320-0 History of Social Movements in the U.S. From the abolition movement of the early 19th century to the New Right of the present. Samples radical, reform, and reactionary movements, with their development, organization, and effect on American politics and culture.

HISTORY 321-0 The Vietnam Wars Analysis of Vietnam's wars for national independence, with emphasis on U.S. involvement. Topics include international context, political rationales, military engagements, popular attitudes, cultural exchange, and lasting legacies.

HISTORY 322-1,2 Development of the Modern American City Characteristics of urban society in America from the period of settlement to the present. 1. To 1870. 2. 1870–present.

HISTORY 324-0 American Lesbian and Gay History Gender, sexuality, and the rise of modern lesbian and gay identities. Lecture and discussion. Taught with GNDR ST 324; students may not earn credit for both courses.

HISTORY 326-0 American Intellectual History Central questions in America's intellectual past: inquiries into human nature and the self; 19th-century debates about freedom, race, and slavery; the emergence of pragmatism and the social sciences in the progressive era; and intellectual and scientific debates emerging from and contributing to social and economic practices.

History of Science and Technology Courses

HISTORY 275-1,2 History of Western Science and Medicine

1. Origins of science and medicine in early modern Europe: science, religion, and cosmology; anatomy and sexual difference; the Enlightenment and social science. 2. Modern science and medicine in Europe and America: quantum physics and the A-bomb; Darwinism, genetics, and eugenics; DNA typing and “racial science.”

HISTORY 325-0 History of American Technology American history through its material culture; industrialization and its discontents; consumer culture and household technology; mass communication and democracy; technological utopia and the computer revolution.

HISTORY 377-0 Medicine in American Society Development of medical theories, practices, and institutions in North America, from colonial times to the present, with emphasis on the 19th century.

Courses Primarily for Majors in History

HISTORY 392-0 Topics in History Advanced work through reading, research, and discussion in an area of special significance. Graduate students permitted in some courses with consent of instructor.

HISTORY 395-0 Research Seminar Students research and complete a term paper on a topic of choice. Required of majors.

HISTORY 398-1,2,3 Thesis Seminar Advanced work through supervised reading, research, and discussion. Admission by written application, to be reviewed by department. Grade of K given in 398-1 and 398-2.

HISTORY 399-0 Independent Study Reading and conferences on special subjects for advanced undergraduates. Open only with consent of director of undergraduate studies and instructor.

History Courses in Other Departments

A history major may take no more than 2 courses listed below to satisfy the 11-course history requirement.

CLASSICS 211, 212, 321-1,2,3

ECON 315, 318, 321, 323-1,2, 324

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

HUMANITIES

www.humanities.northwestern.edu

The humanities are those branches of knowledge that are concerned with human thought and culture, including the traditional liberal arts such as philosophy, literature, and art. They may also include fields of study that are classified as social sciences, in particular history and art history, as well as some aspects of anthropology, sociology, and psychology.

Kaplan Institute for the Humanities

The Alice Kaplan Institute for the Humanities fosters interdisciplinary conversation among humanists working with different materials and texts. Each year the institute organizes several major public lectures on topics of wide-ranging importance in the humanities. The institute offers a number of interdisciplinary courses taught by its former faculty fellows, Northwestern faculty, and Jean Gimbel Lane Humanities Professors. The institute includes the Kaplan Humanities Scholars Program and also administers an internship program that places undergraduates in Chicago humanities and arts institutions.

For more information visit the institute web site at www.humanities.northwestern.edu, call 847-491-7946, or e-mail hum@northwestern.edu.

Kaplan Humanities Scholars Program

Open to interested freshmen from the natural and social sciences as well as the humanities, the Kaplan Humanities

Scholars Program is a rigorous and innovative program of study in the humanities with the theme of “the good society.” Students take 2 specially designed lecture courses and 2 seminars in their yearlong investigation of the long-standing debate about “the good society.” They read works of enduring value, conduct site visits, and pursue research projects.

Minor in Humanities

The minor in the humanities exposes undergraduate students from a wide range of backgrounds to diverse examples of human thought and culture that make up the ever-changing array of topics and objects studied in the various humanities disciplines. Humanities courses also present the different interdisciplinary methods and theories used in humanities scholarship. The minor is rooted in the idea that the opportunity to study an assortment of humanities topics from a wide range of perspectives provides an excellent complement to the more closely focused course work undertaken in any major, whether inside or outside the humanities.

Minor requirements (7 units)

- Up to 3 courses at the 200-level, drawn from 201, 210, 211, and 260; each may be repeated for credit with a change in topic.
- Remaining courses are drawn from 301, 302, and 395; each may be repeated for credit with a change in topic.
- 390 and/or 399 may be counted toward the minor with consent of the minor adviser.

Courses in the Humanities Scholars Program

Specific topics in these courses will vary as different professors participate.

HUM 101-6 Freshman Humanities Seminar

HUM 102-6 Freshman Humanities Seminar

HUM 210-0 The Good Society 1

HUM 211-0 The Good Society 2

Other Humanities Courses

HUM 201-0 Thinking Through and Across Traditions

What is a cultural tradition, and what part may it play in engendering identification and community as well as violence and war? How is a tradition created, passed down, transmitted across cultures, and transformed in the process? What aspects of a tradition do writers single out for adaptation to specific social and political struggles? How do different cultural traditions respond differently to similar themes and story lines? Course content varies; it may concentrate on works that come from a particular cultural tradition (e.g., Western European, Japanese, Russian, African American) or cut across cultural boundaries.

HUM 220-0 Health, Biomedicine, Culture, and Society

Provides a broad introduction to controversies surrounding health and biomedicine by analyzing culture, politics, values, and social institutions. Taught with SOCIOL 220; students may not earn credit for both courses.

HUM 260-0 Humanities Explorations A multifaceted exploration of significant topics of wide humanistic interest, such as the nature of the self, encounters with the transcendent, and the nature of the good society, from different points of view and a variety of sources and methodologies — e.g., aspects of love, the feminine divine in cross-cultural perspective, imagining democracy, and the city as metaphor. May be repeated for credit with change in topic.

HUM 301-0 Topics in the Humanities Interdisciplinary issues and current research in the humanities — e.g., biology, citizens, and communities in the 19th and 20th centuries; the Andes imagined — culture, conflict and modernity in the 20th century; narration, exile, and survival; India in the Victorian imagination. May be repeated for credit with change in topic.

HUM 302-0 New Perspectives in the Humanities New issues in the humanities and current innovative research — e.g., poetry and diaspora; race, gender, and the politics of beauty; role and place of negritude in contemporary African thought. May be repeated for credit with change in topic.

HUM 390-0 Humanities Internship Placement at a Chicago cultural institution or theater, such as the Chicago Humanities Festival, Art Institute, Lyric Opera, or Newberry Library, for approximately 10 hours per week; entails a research project supervised by a Northwestern faculty mentor. Prerequisites: grade point average of 3.0 or higher and consent of institute.

HUM 395-0 Humanities Seminar Interdisciplinary course offered by the current Jean Gimbel Lane Humanities Professor, an eminent scholar invited to address important issues in the humanities — e.g., cities as modern utopia/dystopia in Europe, Asia, and America; the afterlife of Marxism; the politics of reputation; being animal, being human. Prerequisite: consent of institute.

HUM 399-0 Independent Study Individual projects with faculty guidance. Open to junior and senior minors. Prerequisite: consent of instructor.

INTEGRATED SCIENCE

www.isp.northwestern.edu

The Integrated Science Program (ISP) is a highly selective curriculum of natural sciences and mathematics presented predominantly in small classes at an accelerated pace. Courses emphasize the common base and relationships between the traditional sciences, including the importance of mathematics and the development of first principles, leading to interdisciplinary topics at the forefront of science today. The goal is to provide students who are interested in careers in science and mathematics with a broad quantitative background that will give them superior preparation for further work in graduate or professional schools or permanent employment. The curriculum is composed of 23 courses, up to 3 of which may be independent research, as well as a regular seminar series. Most students take advantage of the opportunity to pursue research

in a world-class laboratory at Northwestern and are able to publish peer-reviewed papers in professional journals. ISP may lead to a three-year bachelor of arts degree if, by the end of the third year, the student has completed 36 or more courses and satisfied all other college requirements.

Students must be accepted to Northwestern to be eligible for admission to ISP, which requires a separate application to the program director. For more information on admission procedures, see Special Admission Programs on page 11. Also see the ISP web site for the achievement tests required.

The curriculum consists of specially designed courses taught by faculty members of science and mathematics departments. Course descriptions are found in the appropriate departments in this catalog. Though listed in a three-year format, the program is often spread over four years, particularly if a student wishes to combine an ISP major with a second major in a traditional department such as biological sciences, chemistry, computer science, environmental sciences, earth and planetary sciences, materials science, mathematics, physics, psychology, or an engineering field. Specific second-major requirements for ISP students can be found under individual departments in this catalog.

Major in Integrated Science

Major requirements (23 units)

- First year
 - 101-1,2,3
 - CHEM 171, 172
 - MATH 281-1,2,3
 - PHYSICS 125-1,2,3
- Second year
 - BIOL SCI 212-1,2
 - CHEM 212-1, 348
 - EARTH 350
 - MATH 381, 382
 - PHYSICS 339-1,2
- Third year
 - ASTRON 331
 - BIOL SCI 310, 311
 - MATH 383
 - PHYSICS 339-3
- INTG SCI 398 may be substituted for up to 3 of the following courses: ASTRON 331; BIOL SCI 310 or 311; MATH 382 or 383; PHYSICS 339-3.

Honors in Integrated Science

To be eligible for honors, students must have a grade point average of at least 3.2 in ISP courses. Those eligible to pursue honors will be so informed no later than the fall quarter of senior year. Enrollment is required in at least 2 quarters of 398 or 399, either in ISP or an ISP-affiliated department, with a faculty research adviser. At the beginning of May eligible students submit both a senior thesis describing research activities and supporting faculty letters. The ISP honors committee recommends students for

honors to the college. For more information consult the program director. See also Honors in the Major on page 38.

Courses

INTG SCI 101-1,2,3 Computing Applications (1/3 unit each quarter) Introduction to the formulation and solution of scientific problems using advanced computational programming methods.

INTG SCI 398-0 Undergraduate Research Advanced independent study and research for superior students. Consent of ISP director required.

INTERNATIONAL STUDIES

www.intstudy.northwestern.edu

International studies is an undergraduate adjunct major, complementing and taken in conjunction with a disciplinary major. It is open to students in all schools.

The adjunct major provides students with an interdisciplinary understanding of the international system as it has developed and as it affects contemporary politics and society. Students are required to take a core set of courses in history, political science, sociopolitical development, and economics that are designed to introduce key elements and concepts related to the historical development of the global political and economic system. They then choose thematic and regional areas of focus, taking courses from a variety of disciplines such as history, political science, economics, anthropology, literature, art, linguistics, global health, music, and religion. Students complete the major with either an integrating project seminar related to the thematic focus or an honors thesis that includes a 3-quarter honors seminar.

Each student majoring in international studies has a different combination of courses. Because international studies majors must show a minimum of 8 courses not double-counted in any other major(s), students should see an international studies adviser when designing their programs.

Adjunct Major in International Studies

Adjunct major requirements (12 units)

- 5 core courses
 - 201-1,2
 - HISTORY 319-3 or POLI SCI 344
 - ECON 201
 - POLI SCI 240
- 3 courses in a thematic cluster
 - The courses are chosen from one of these themes:
 - Issues in international security
 - Global commons
 - Culture and society
 - International political economy and development
 - Thematic clusters must be completed with courses from at least two different disciplines.

- Students with coherent interdisciplinary programs of study that do not fit into one of these four themes may petition to create a self-designed thematic cluster.
- Lists of eligible courses may be found each quarter at the program office and on the web site.
- 3 courses in a regional (area studies) cluster
 - 1 course must be historical.
 - 1 course must be in literature or the arts.
 - 1 course must be in belief and social systems.
 - The program web site and advisers have lists of appropriate courses, and advisers will discuss substitutions if courses are not available for a particular region.
 - An exception to the three-content-area requirement is made for students who choose to use study abroad to fulfill the regional cluster. These students may either count 3 courses taken abroad for the regional cluster or ask for a regional cluster exception and take 3 additional international studies–related courses at Northwestern. Study abroad does not lessen the 12-course total requirement, however.
 - Language instruction does not count toward the regional cluster.
- Integrating project seminar or thesis seminar
 - Most international studies majors in their junior or senior year take an integrating seminar linked to their thematic cluster. The seminar provides a format to complete a research project that integrates a variety of disciplines to address an issue in international culture, society, economics, or politics.
 - Instead of an integrating seminar, students admitted to the international studies honors program participate in the 3-quarter thesis seminar and write an integrated honors thesis.
- Students must demonstrate proficiency in a language other than English at a level equivalent to two full years of instruction.
- All adjunct majors require completion of a stand-alone major as well. At most 4 courses may be double-counted toward both the international studies adjunct major and another major.

Minor in International Studies

Minor requirements (8 units)

- 5 core courses, as defined for the major
- 3 additional courses in either a regional or a thematic cluster

Honors in International Studies

The honors program is for outstanding and engaged majors who wish to take on the challenge of actively researching and writing about an international topic. Participants are required to have enough comprehension of a foreign language to draw on its research resources. Students accepted into the honors program enroll in a 3-quarter-long seminar (spring junior year and fall and winter senior

year) during which they plan, research, and write their theses. Juniors studying abroad may be exempted from the spring-quarter honors seminar, though they must demonstrate progress in formulating a research project during that time.

Acceptance into the honors program is competitive. Students apply in January of their junior year or, if they plan on spending junior year abroad, in their sophomore year. Applicants propose a thesis topic, including a research question, describe their preparation for this research, and are interviewed about their language competence. For more information and application guidance, consult the director of international studies. See also Honors in the Major on page 38.

Courses

INTL ST 201-1,2 Global History Introduction to political and social forms organizing human societies over the centuries.

1. How to analyze variations in geopolitics, demographic cycles, long-distance commerce, and world imperial religions over time. 2. Examination of how Western expansion through colonization gradually brought all societies into the orbit of a single world economy. The processes of global integration, disintegration, and present-day globalization.

INTL ST 390-0 Special Topics in International Studies

Additional courses focus on international topics to augment offerings of departments. Different topics in different quarters, as announced.

INTL ST 395-0 Integrating Project Seminar Small research seminars allow international studies majors to conduct research in their chosen themes.

INTL ST 398-1,2,3 Thesis Seminar Students on campus must enroll in 398-1 in the spring quarter of their junior year; juniors studying abroad apply to the honors program in January of their sophomore year. 398-2,3 are required for completion of the honors program.

INTL ST 399-0 Independent Research Advanced research is carried out under the supervision of a Northwestern professor. Independent study may be counted toward completion of either a regional or a thematic cluster. Consent of the director of the undergraduate's major is required following submission of a written proposal.

ITALIAN

See French and Italian.

JAPANESE

See African and Asian Languages.

JEWISH STUDIES

www.wcas.northwestern.edu/jewish-studies

The Jewish Studies Program focuses on Judaism, not only in its narrow sense as a religious phenomenon but also in its broader sense as a phenomenon of culture and

civilization. A good case can be made that the roots of Western culture lie in two places: Athens and Jerusalem. The traditional education of the humanist scholar recognized this by requiring not only the mastery of Greek and Latin but also of Hebrew. Thus, the study of Judaism in this program considers the many and varied dimensions of the phenomenon of Jewish civilization. A typical program of study includes, in addition to the religious dimension, the historical, sociological, linguistic, philosophic, and artistic dimensions. The Jewish Studies Program offers a major and two minors: Jewish studies and Hebrew studies.

Major in Jewish Studies

Major requirements (12 units)

- 2 courses chosen from third-year Hebrew (any quarter of AAL 203), courses in the Department of Religious Studies on classical Jewish texts in Hebrew, or courses in Hebrew literature read in Hebrew. Students who complete two years of Yiddish language are exempt from this requirement and need only 10 courses for the major.
- RELIGION 230
- 1 course covering the biblical period
- 1 course covering the rabbinic period
- 2 courses covering the postrabbinic periods (post-800 C.E.), such as HISTORY 348-1,2, 349, 203-1,2
- 5 additional courses counting for major or minor credit in Jewish studies; may include third-year courses in Hebrew and Yiddish
- At least 6 courses must be at the 300 level.
- At least 1 must be from the history department.
- At least 1 must be in literature.
- Majors must complete or place out of second-year Hebrew (AAL 102-1,2,3).

Minor in Jewish Studies

Minor requirements (7 units)

- 3 courses in Jewish history that provide a basis for advanced work
 - 1 course on ancient or biblical Judaism (such courses include RELIGION 220 or any course on the history of ancient Israel)
 - 1 approved course on the history or culture of the Jewish people in the Middle Ages
 - 1 approved course on some aspect of modern Jewish history, such as HISTORY 203-2, 348-2
- 2 courses on Jewish religion offered in the Department of Religious Studies or approved by the director of undergraduate studies; eligible courses include RELIGION 230, 320, 332, 333, and 339
- 2 additional approved courses chosen from the fields of Jewish literature and Jewish philosophy — e.g., courses covering thinkers such as Maimonides, Rosenzweig, and Levinas — or the sociology/anthropology of Jewish communities

- At least 5 courses must not be double-counted toward a major.
- Students who also satisfactorily complete two years of language study in Hebrew complete the minor requirements with 5 courses:
 - 3 in Jewish history
 - 1 in religion
 - 1 in Jewish literature and philosophy

Minor in Hebrew Studies

Before declaring the Hebrew studies minor, a student must complete or place out of the second year of Hebrew (AAL 102-1,2,3).

Minor requirements (6 units)

- 2 courses conducted in Hebrew — for example, third-year Hebrew (AAL 203-1,2,3)
- 1 course on a classical (premodern) Hebrew text read in Hebrew (eligible courses are typically on biblical, rabbinic, or mystical texts — for example, RELIGION 329 or 339)
- 1 course on modern Hebrew literature, using Hebrew literary texts from the Haskalah through the contemporary periods, either in the original language or in English
- 1 course on modern Israel, exclusive of Israeli literature, typically in history, political science, sociology, or anthropology; must be approved by the director of undergraduate studies
- 1 elective chosen from Hebrew literature or Jewish literature, in translation or in the original; Israel studies; courses in the Department of Linguistics relevant to Semitic languages; courses covering classical Hebrew texts in translation or in the original; or courses conducted in Hebrew (e.g., AAL 203-1,2,3, 355-1,2,3)
- At least 2 of the 6 courses must be at the 300 level.

Honors in Jewish Studies

Majors with outstanding records in Jewish studies become eligible for recommendation for honors by writing an acceptable senior thesis supervised by a program faculty member. An independent study based on original primary sources, the thesis should explore a subject in one of the subfields of Jewish studies (literature, philosophy, sociology, history, religion). Senior honors candidates may write the thesis outside the established framework by enrolling in a three-quarter-long seminar in a relevant department. Those interested in this option should consult with the relevant department, the anticipated thesis adviser, and the director of undergraduate studies. Due in May, the thesis is evaluated by the thesis adviser and two other Jewish studies faculty members. For more information contact the director of undergraduate studies and see Honors in the Major on page 38.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

Courses

JWSH ST 278-1,2 Modern Hebrew Literature in Translation History of Hebrew literature. 1. The European period. 2. The Israeli period. Taught with COMP LIT 278; students may not earn credit for both courses.

JWSH ST 279-0 Modern Jewish Literature Modern European, American, and Israeli Jewish literature in historical context. Taught with COMP LIT 279; students may not earn credit for both courses.

JWSH ST 350-0 Representing the Holocaust in Literature and Film Analysis of artistic, ethical, and historical questions about representing the Holocaust in different genres.

JWSH ST 379-0 Storytelling in Modern Jewish Literature Modern Jewish writers from diverse national and linguistic backgrounds who have reshaped the oral tradition in Judaism to their individual talents.

Relevant Courses in Other Departments

Additional Jewish studies courses are offered by many departments and programs. The following is a sampling; a complete list is available on the department web site.

- AAL 101-1,2,3, 102-1,2,3, 203-1,2,3
- COMP LIT 278, 279
- ENGLISH 205, 368 (relevant sections of each)
- GNDR ST 390 (relevant sections)
- GERMAN 111-1,2,3, 197, 234, 330
- HISTORY 203, 348, 349, 391 (relevant sections), 392 (relevant sections)
- PHIL 311 (relevant sections)
- POLI SCI 390 (relevant sections)
- RELIGION 220, 230, 329 (relevant sections), 339, 351
- SOCIOLOG 376 (relevant sections)
- SPANISH 397 (relevant sections)

KOREAN

See African and Asian Languages.

LATIN

See Classics.

LATINA AND LATINO STUDIES

www.latinostudies.northwestern.edu

Latina and Latino studies focuses on the experiences of U.S. Latinas and Latinos and encompasses a wide diversity of communities, cultures, and backgrounds as well as relationships to diasporic homelands.

Explicitly concerned with exposing inequality and injustice, the field examines the relationships among social structure, cultural production, and power. It produces scholarship that challenges normative analyses of the place of Latinas and Latinos in U.S. society. Scholars use inter- and multidisciplinary approaches instead of more conventional paradigms.

Students may expect to investigate the productive tension between U.S. Latinas and Latinos. The curriculum

explores commonalities and differences in social movements, transnationalism, electoral politics, race and comparative processes of racialization, immigration, queer theory, and gender and sexuality.

Majors and minors meet with the program director for advising, including review and approval of course selections and review of progress toward timely completion of the major or minor.

Major in Latina and Latino Studies

The major consists of 16 courses plus a related immersion experience. All must be selected in consultation with the program director.

Program courses (12 units)

- 1 introductory course from 201-1,2,3 (if students take all 3, only 1 will count toward the major)
- 1 senior-year seminar: 395 (399 and an approved senior thesis may be substituted)
- 6 core courses
 - At least 1 from each of the three broad disciplinary categories (social sciences, history, and humanities)
 - At least 4 at the 300 level
- 4 comparative courses in U.S. race and ethnicity
 - Courses are chosen from African American studies, Asian American studies, or other courses with substantial content about other U.S.-based ethnic or racial groups.
 - At least 2 courses must be at the 300 level.

Related courses (4 units)

- At least 2 must be at the 300 level.
- 1 must have a focus on analyzing gender or sexuality.
- Courses are typically drawn from Latin American and Caribbean studies, English, anthropology, history, sociology, economics, gender studies, performance studies, theater, and American studies.

Immersion experience

- All majors must have an immersion experience with Latina/o communities in the United States or a transnational counterpart.
- Examples of immersion experiences include
 - Study abroad in Mexico or Latin America
 - Chicago Field Studies
 - Senior thesis in Latina and Latino studies
 - Independently proposed research or internship
 - SESP 299-1,2 Civic Engagement Capstone Research Project if it relates to Latina/o communities
 - 2 performance-based courses in theater, dance, communication, sound design, or performance with a U.S. Latina/o focus; examples are THEATRE 349-3 and DANCE 335 (if relevant topics)
- Courses for the immersion experience may double-count toward elective and required courses for the major with permission of the program director.

Minor in Latina and Latino Studies

Minor requirements (6 units)

- 1 introductory course from 201-1,2,3 (if students take all 3, only 1 will count toward the minor)
- 3 core courses at the 300 level, 1 from each of the three broad disciplinary categories (social sciences, history, and humanities)
- 2 comparative courses in U.S. race and ethnicity from African American studies, Asian American studies, or other courses with substantial content about other U.S.-based ethnic or racial groups
- Courses must be selected in consultation with the program director from an approved list.

Honors in Latina and Latino Studies

Eligibility for honors in Latina and Latino studies requires a GPA of 3.3 or higher in the major courses; completion of a senior thesis or project of outstanding quality; and 2 quarters of independent study (399) for researching and writing the thesis. Taken in fall and spring of senior year, both quarters of 399 may count toward the major requirements. The deadline for the completed project is typically in early May.

Students interested in completing an honors project should apply by the end of their junior year. The application includes a project proposal and approval of a faculty thesis adviser, who may be in another department.

The program director consults with the thesis adviser and the program honors committee about recommending the student to the college for graduation with honors.

See Honors in the Major on page 38 and the program web site for more information.

Courses

LATINO 201-1 Introduction to Latina and Latino History

Introduction to past experiences shaping U.S. Latina/o communities and to material and epistemologies for interpreting them; focus on parallels of colonization, assimilation, cultural resistance, and cultural innovation. Uses history as its primary, although not exclusive, disciplinary approach. Formerly taught as LACS 251.

LATINO 201-2 Introduction to Latina and Latino Social and Cultural Analysis

Survey course examining political and social conditions of U.S. Latinas/os. Uses qualitative and quantitative social science methodologies to consider parallels and distinctions among a heterogeneous population identified in the U.S. as “Latino.” Formerly taught as LACS 251.

LATINO 201-3 Introduction to Latina and Latino Cultural Studies

Uses literary theories and cultural studies approaches in the study of U.S. Latinas/os. Draws on text and other forms of representation to examine parallels and divergent social and cultural experiences. Formerly taught as LACS 251.

LATINO 222-0 Latino Youth in U.S. Cities Cultural, social, and political contexts that shape the lives of Latino/a

youth in U.S. cities, as well as Latino/a youths' ideas of self-identity and civic engagement.

LATINO 342-0 Latino Social Movements Histories and ideologies of various U.S. Latino social movements.

Draws upon historical, ethnographic, autobiographical, and documentary accounts.

LATINO 353-0 Latino Cultures and Subjectivities The contradictions of egalitarian ideology and socioeconomic disparities as seen through the lens of U.S. Latino cultural production.

LATINO 391-0 Topics in Latina and Latino History Content varies; may be repeated for credit with different topic.

Recent topics include history of Latinas/os in Chicago; origins and histories of U.S. Latinos. Formerly taught as LACS 351.

LATINO 392-0 Topics in Latina/o Social and Political Issues

Content varies; may be repeated for credit with different topic. Recent topics include el barrio; history of Latino/a activism. Formerly taught as LACS 351.

LATINO 393-0 Topics in Latina and Latino Text and

Representation Content varies; may be repeated for credit with different topic. Recent topics include Latinos in Hollywood; Latino representation in the media. Formerly taught as LACS 351.

LATINO 395-0 Capstone Seminar in Latina and Latino

Studies Advanced course synthesizing the state of current research. Questions the boundaries of Latina/o studies. Contextualizes research and topics in relation to other ethnic studies, gender/queer studies, and diaspora studies. Primarily for majors and graduate students. Prerequisite: consent of the program director.

LATINO 399-0 Independent Study in Latina and Latino

Studies Reading, research, and/or tutorials for students pursuing projects outside the context of regularly offered courses. Prerequisite: consent of instructor.

LATIN AMERICAN AND CARIBBEAN STUDIES

www.wcas.northwestern.edu/lacs

The Program in Latin American and Caribbean Studies allows students to pursue a coherent interdisciplinary course of study on this region of the world, including courses offering a variety of perspectives: social, historical, linguistic, political, and cultural. The program requires a set of core courses and also offers a series of elective courses in several different departments. Students also are encouraged to study in a Latin American or Caribbean country through the programs offered by the Study Abroad Office.

Minor in Latin American and Caribbean Studies

All students in the program are expected to have an effective reading knowledge of Spanish, Portuguese, or another language spoken in the region. Students who would like more information about the minor should contact the program director.

Minor requirements (8 units)

- 4 core courses from the following four areas, normally chosen from this list, although substitutions may be approved by the program director:
 - ANTHRO 390 or 490 (when relevant to Latin America, the Caribbean, and/or U.S. Latinos)
 - HISTORY 300 (when relevant to Latin America or the Caribbean), 365, 367, 368, 369, or 392 (when relevant to Latin America or the Caribbean)
 - POLI SCI 353 or 356
 - SPANISH 260, 261, 361, or 390 or 395 (when relevant to Latin America, the Caribbean, and/or U.S. Latinos)
- 4 additional courses on Latin America and the Caribbean
 - Courses must be chosen from the list on the program web site or approved by the program director. Many departments and programs, especially anthropology, history, Latina and Latino studies, political science, and Spanish and Portuguese, regularly offer courses that can count toward this requirement.
 - 1 elective course focusing on Latinos in the United States is strongly recommended.
- At least 5 courses for the minor must not be double-counted toward a major.

Course

LATIN AM 391-0 Topics in Latin American and Caribbean

Studies An interdisciplinary introduction to significant topics in Latin American and Caribbean studies. Content varies from year to year; may be repeated for credit with a different topic.

LEGAL STUDIES

www.legalstudies.northwestern.edu

The Legal Studies Program challenges students to use various academic perspectives and methodologies to study legal issues and to use the conceptual framework of the law to illuminate empirical and theoretical concerns in the social sciences and humanities. It is not a "prelaw" program. This program conceives of law broadly to include the study of legal institutions, legal actors, and legal processes. The law has become an important institution in American society and throughout the world; as such, it warrants study in its own right and provides an excellent lens through which students may learn about and critically examine a variety of themes central to other academic disciplines.

Adjunct Major in Legal Studies

Students are required to have completed or be in the process of completing at least 2 legal studies electives before admission to the program. These 2 courses will later count toward the adjunct major. Students apply for the adjunct major and admission to the Advanced Research Seminar (398-1,2) in the spring of their sophomore year.

Adjunct major requirements (11 units)

- 2 core courses: 398-1,2, typically taken during the junior year
- 9 approved electives taught in legal studies or drawn from other departments, including 1 course from each of the following five categories:
 - *Theory and philosophy*
 - *Global and comparative studies*
 - *Institutions, organizations, economics*
 - *Law and inequality*
 - *Argument and communication*
- A list of approved courses is available on the program web site.
- SOCIOL 206 and POLI SCI 230 are strongly recommended.
- At most 2 Chicago Field Studies credits may be counted.
- All adjunct majors require completion of a stand-alone major as well. At most 2 of the 9 electives may be double-counted toward another major.

Minor in Legal Studies**Minor requirements (8 units)**

- The courses must be from legal studies or approved courses from other departments.
- At least 1 course must be chosen from each of the five categories listed for the major.
- At least 4 must be at the 300 level.
- At most 2 Chicago Field Studies credits may be counted.

Honors in Legal Studies

Students who achieve a grade point average of 3.5 or higher in courses completed for the adjunct major and who write a research seminar thesis deemed to be of distinction will be nominated for honors. For more information about honors, consult the program director. See also Honors in the Major on page 38.

Courses

LEGAL ST 376-0 Topics in Legal Studies Topics such as culture wars and the Constitution, wrongful convictions, law and social movements, and trial advocacy. May be repeated for credit with consent of instructor or program director.

LEGAL ST 398-1,2 Advanced Research Seminar Exposure to theoretical and empirical approaches to the study of law and legal institutions and their relationship to society; emphasis on analytic skills and interdisciplinary research experience. Readings in legal studies; preparation and presentation of research projects and papers. Varying class format incorporating meetings, group exercises, and small tutorials led by faculty-supervised graduate teaching fellows. Consecutive enrollment required in both courses in the sequence. Pre-requisite: Acceptance to program as adjunct major.

LEGAL ST 399-0 Independent Study Readings and conferences on special subjects for students pursuing a specific area of interest in legal studies.

LINGUISTICS

www.linguistics.northwestern.edu

Linguistics is the scientific study of language, its structure and function as a means of communication, its acquisition, and the mental and physiological processes involved in its use. Knowledge of the structure, origins, and functions of language can provide deep insight into human nature and behavior. The major in linguistics prepares students for professional studies in law, medicine, technology, education, and business, as well as for graduate work in linguistics, cognitive science, and related disciplines.

Three introductory courses examining the sound structure of human language, the structure of words and sentences, and the structure of linguistic meaning make up the core of the major and provide the foundation for more advanced work. More specialized courses in linguistics introduce students to the activities of working researchers in various subfields.

Linguistics majors are encouraged to participate in faculty research and to develop independent research. Students often enhance their linguistics major through interdisciplinary studies in cognitive science, communication sciences and disorders, psychology, philosophy, international studies, mathematics, or computer science. Students with a strong record in their major courses and an interest in pursuing linguistics at the graduate level are encouraged to enroll in 400-level courses.

Major in Linguistics**Department courses (12 units)**

- 3 introductory courses: 250, 260, 270
- 9 courses beyond the 200 level
 - Should include 350, 360, and 370. A methods course such as 330, 331, 332, 333, or 334 may be substituted for 1 of these courses.
 - Only 1 of the 9 may be 398 or 399.
 - Certain exceptions or substitutions, such as COG SCI 210, may be granted with the consent of the director of undergraduate studies.

Related courses (4 units)

- Selected in consultation with the linguistics director of undergraduate studies.

Minor in Linguistics

The minor in linguistics broadens the academic background of students majoring in related fields such as cognitive science, communication sciences and disorders, psychology, philosophy, foreign languages, mathematics, and computer science by offering training in the theory and methods of linguistic analysis.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

Minor requirements (8 units)

- 250, 260, 270
- 5 courses beyond the 200 level, including 2 chosen from 350, 360, or 370 (a methods course such as 330, 331, 332, 333, or 334 may be substituted for 1 of these courses)

Four-Year BA/MA Program

Students with a strong record in their major courses and an interest in graduate study are eligible to apply for the four-year BA/MA program in linguistics. Applications should be made no later than spring quarter of the junior year. To be considered for this program, students must demonstrate that they will be able to complete by the end of their senior year all Weinberg College requirements for the BA degree plus the department's requirements for the MA degree. see Accelerated Master's Programs on page 39.

Honors in Linguistics

At the invitation of the department, an outstanding senior majoring in linguistics may be eligible for departmental honors by successfully completing a self-designed, faculty-supervised research project on a topic of his or her choice. The research project culminates in a senior thesis that, in conjunction with the student's record in linguistics and related courses, forms the basis for the awarding of honors. For more information about guidelines and requirements for earning honors, consult the director of undergraduate studies.

Courses

All 200-level linguistics courses have an experimental requirement. Students may fulfill this requirement by participating in any combination of two one-hour experiments or video showings. The experiments will be part of ongoing departmental research and illustrate features of language structure and use relevant to topics covered in the core linguistics curriculum. Similarly, the videos will be on topics covered in the core curriculum.

COG SCI 210-0 Language and the Brain See Cognitive Science.

LING 220-0 Language and Society Introduction to the study of language in its social context. Language variation by gender, race/ethnicity, social class, and region. Language norms and attitudes. Multilingualism and public policy.

LING 221-0 Language and Prejudice Linguistic manifestations of prejudice from various sources: region, gender, race, ethnicity, social class, sexual orientation, and country of origin. Speech codes, the balance between rules of civility and freedom of speech, "politically correct" language, the language policies of schools and governments, and the imposition of language standards.

LING 222-0 Language, Politics, and Identity The role of language in constructing, preserving, and manipulating political and national identities. Topics include linguistic nationalism, language laws, rights of minority languages, language discrimination, language and religion, alphabet issues, language and dialect as ethnic identity, standard

language, and others. Regional content varies depending on interests and expertise of instructor.

LING 243-0 Language Evolution Introduction to linguistics from an evolutionary perspective. The biological basis of communicative systems; the evolution of the human language capacity; sounds, syntactic structures, and meanings in the world's languages.

LING 250-0 Sound Patterns in Human Language Introduction to the formal and instrumental analysis of the sound structure of language. The description of speech sounds in terms of articulation in the human vocal tract, physical acoustic output, and human perception. Cross-linguistic similarities and differences. The patterning of speech sounds to convey meaning. Introduction to contemporary speech technology.

LING 260-0 Formal Analysis of Words and Sentences Formal structure of words (morphology) and sentences (syntax) in natural language. Biological basis of human language.

LING 270-0 Meaning How information is encoded in words and sentences and how speakers and listeners use language to communicate.

LING 300-0 Topics in Linguistics Topics in linguistic theory. Content varies. May be repeated for credit with different topic.

ENGLISH 302-0 History of the English Language

See English.

LING 310-0 Psycholinguistics Introduction to experimental and developmental psycholinguistics. Mental processes underlying the comprehension, production, and acquisition of language. Structure of the human lexicon and parser.

LING 311-0 Child Language Introduction to first language acquisition. How infants and children learn the grammar (structure of sounds, words, and sentences) of their native language. Innate and environmental factors in linguistic development. Emphasis on experimental and corpus-based methods of inquiry.

LING 312-0 Second Language Acquisition Major theories of second language acquisition and current issues in the field. Cognitive, linguistic, and sociocultural variables affecting second language learning.

LING 320-0 Sociolinguistics Linguistic diversity in multi-dialectal and multilingual societies. Correlations between linguistic variables and social categories. Language planning and policy; diglossia.

LING 321-0 Bilingualism Cognitive and linguistic aspects of the acquisition, representation, and processing of two or more languages in an individual's mind/brain. The biological basis of bilingualism and how brain damage (e.g., aphasia) affects the language function in a bilingual person. The challenge of translation from one language to another for humans and computers.

LING 322-0 Language Variation Differences in language that correlate with historical periods, geographic regions, and societal groupings (e.g., age, race, ethnicity, gender, social class).

LING 323-0 Language and Gender Differences in the language used by and about men and women. Cross-cultural gender differences in language and language attitudes.

LING 324-0 Linguistics and English Composition Recent trends in the study of the uses and forms of writing and the processes of written composition. The learning and teaching of written language.

LING 327-0 Language and Sexuality The use of language to construct, negotiate, and conceal sexual identity, focusing on the language of and about gay men and lesbians. Topics include heteronormativity, identity labels, gender versus sexuality, and cross-cultural sexual diversity. Prerequisite: a course in linguistics or consent of instructor.

LING 330-0 Research Methods in Linguistics Methods of linguistic data collection, management, and analysis with an emphasis on the use of computational, experimental, and statistical methods.

LING 331-0 Formal Foundations of Linguistic Theory

Topics include set theory, trees and lattices, feature structures and unification, formal languages, complexity, and probabilistic grammars. Prerequisite: 250, 260, or 270.

LING 332-0 Linguistic Field Methods Collection of primary linguistic data from an unfamiliar language. Lexicon and grammar development focusing on phonology, morphology, and syntax. Prerequisite: 250, 260, or 270.

LING 334-0 Introduction to Computational Linguistics

Hands-on introduction to computational methods in empirical linguistic analysis and natural language processing. Topics include the use of text corpora and other sources of linguistic data; morphological analysis, parsing, and language modeling; and applications in areas such as information retrieval and machine translation.

LING 340-0 Historical Linguistics Introduction to the study of how and why language changes. Topics include the comparative method, the regularity of sound change, syntactic change, distant genetic relationships, and language evolution.

LING 341-0 Language Typology A comparison of varying and universal features of the world's languages. Prerequisite: 250, 260, or 270.

LING 342-0 Structure of Various Languages Phonological, morphological, or syntactic structure of a particular language. May be repeated for credit with change in language.

LING 350-0 Fundamentals of Laboratory Phonology

Articulatory and acoustic phonetics. Syllable structure, phonotactics, prosody, and intonation. Fundamentals of experimental design and data analysis. Prerequisite: 250 or consent of instructor.

LING 360-0 Fundamentals of Syntax Fundamental principles of theoretical syntax. Phrase structure, argument structure, movement operations. Emphasis on argumentation, hypothesis formation and testing, and analytic methods. Prerequisite: 260 or consent of instructor.

LING 361-0 Morphology Issues in theoretical morphology. The internal structure of words. Linguistic and

psycholinguistic findings about the representation and processing of word structures. Prerequisite: 250, 260, or 270.

LING 370-0 Fundamentals of Meaning Theoretical approaches to the study of linguistic meaning. Topics include word meaning, argument and event structure, sentence meaning, truth conditions, and inference types (e.g., entailment, implicature, presupposition). Prerequisite: 270 or consent of instructor.

LING 371-0 Reference Linguistic and philosophical approaches to the study of reference, focusing on the role of context in utterance production and interpretation. Topics include definiteness, genericity, deixis, and anaphora. Prerequisite: a course in linguistics or consent of instructor.

LING 372-0 Pragmatics Introduction to extrasemantic meaning, focusing on the role of context in utterance production and interpretation. Topics include the semantics-pragmatics boundary, implicature, presupposition, reference, information structure, and speech acts. Prerequisite: 250, 260, or 270.

LING 380-0 Spoken English for Nonnative Speakers

Conversational English addressing all oral language skills; primarily for international graduate students who are non-native speakers of English. Content varies.

LING 381-0 Written English for Nonnative Speakers Written argumentation skills and all aspects of academic writing; primarily for international graduate students who are non-native speakers of English.

LING 398-0 Undergraduate Seminar in Linguistics By invitation of the department. For students of superior ability, with choice of topic left to the group.

LING 399-0 Independent Study

MATERIALS SCIENCE

www.matsci.northwestern.edu/wcas-matsci.html

Materials science is the study of processing-structure-property relationships in materials of importance to society, such as metals, ceramics, polymers, semiconductors, and their combinations (composites). Materials scientists pay special attention to “microstructure” — i.e., how materials are constructed on the microscopic, submicroscopic, and even the nanometer levels, and how this affects their properties. Given the wide range of uses for materials, their properties of interest are similarly broad, from mechanical (e.g., strength) to electrical (e.g., semiconduction) to biological (e.g., biocompatibility).

By offering the opportunity to study materials science within the context of the liberal arts and sciences, the Material Science Program in Weinberg College is distinct from the program in the Department of Materials Science and Engineering in the Robert R. McCormick School of Engineering and Applied Science. The Weinberg program has strong connections with Weinberg's physical and biological sciences departments in addition to its links with McCormick's various engineering disciplines. Students in other majors are strongly encouraged to pursue a dual major or a minor in materials science.

Major in Materials Science

Students majoring in materials science in Weinberg College choose from two tracks: general materials or soft materials. (Students interested in solid-state materials should see the materials physics concentration in the Department of Physics and Astronomy; they may double-major in materials science.)

Requirements include foundation courses in mathematics and science and advanced electives. Course descriptions for materials science courses are listed in the McCormick School chapter of this catalog.

Program courses (13 units)

- 5 core courses: MAT SCI 201 or 301, 315, 316-1,2, 351-1
- 5 courses in the chosen track
 - *General materials track*
 - CHEM 210-1 or 212-1
 - CHEM 342-1 or MAT SCI 314
 - MAT SCI 331; 2 courses chosen from 332, 351-2, 361
 - *Soft materials track*
 - CHEM 210-1,2 or 212-1,2
 - CHEM 342-1 or MAT SCI 314
 - MAT SCI 331; 370 or equivalent
- 3 advanced electives, 1 in materials science and at least 1 in another department, chosen from the following:
- 332, 333, 336, 337, 340, 341, 351-2, 355, 360, 361, 370, 371, 376, 380, 381, 390, 391, 395, 398
- CHEM 210-3 or 212-3, 333, 342-2, 342-3
- EARTH 300
- MATH 250; 351 or 381
- PHYSICS 332, 333-1, 333-2, 337, 339-3, 357, 358, 359-3

Foundations in mathematics and science (*units depend on chemistry and mathematics sequences taken*)

- MATH 220 and 224 or 212, 213, and 214; 230, 234, and 240 or 281-1,2,3 or 285-1,2,3 or 290-1,2,3 or 291-1,2,3
- CHEM 101; 102; 103 or 171; 172
- PHYSICS 135-1,2,3 or 125-1,2,3
- Students in the soft materials track who are interested in biomaterials and/or medicine are encouraged to take additional courses in biology; BIOL SCI 210-2 is highly recommended.

Minor in Materials Science

Program courses (6 units)

- 201 or 301; 315; 316-1,2
- 2 other 300-level materials science courses (excluding 394, 396-1,2, 399)

Foundations in mathematics and science (*units depend on chemistry and mathematics sequences taken*)

- MATH 220 and 224 or MATH 212, 213, and 214; MATH 230 and 234 or equivalent (e.g., 290-2,3 or 291-2,3)
- CHEM 101; 102; 103 or 171; 172

- PHYSICS 135-1,2,3 (or 125-1,2,3)
- 1 course in thermodynamics: MAT SCI 314 or CHEM 342-1 or PHYSICS 331

Materials Science Double Major for Physics and Astronomy Students

Students in physics and astronomy completing the materials physics concentration and wishing to double-major in materials science are required to take an additional advanced studies course for each course duplicated between the two programs (e.g., MAT SCI 316-1,2, 332, 355, 360, 361, 380). The replacement courses should be in disciplines other than physics.

Materials Science Second Major for ISP Students

The Integrated Science Program (ISP) is a highly selective BA program within Weinberg College. Students majoring in ISP who wish to complete a second major in materials science must take

- MAT SCI 201 or 301
- 315
- 316-1,2
- 2 300-level MAT SCI electives

Honors in Materials Science

Seniors who have done outstanding work in the classroom and research laboratory may be eligible for graduation with honors in materials science. To be recommended for honors, students must maintain a grade point average of 3.3 or higher in all math and science courses. They must also complete 2 units of research (from CHEM 398, 399, MAT SCI 396-1,2, 394, 399, PHYSICS 398, or 399) and a written research report. A strong recommendation from the research adviser is also necessary. See Honors in the Major on page 38.

MATHEMATICAL METHODS IN THE SOCIAL SCIENCES

www.mmss.northwestern.edu

A central feature of modern social, behavioral, managerial, and policy sciences is the use of mathematics, statistics, and computers, both as languages and as methods of abstraction and analysis. Most undergraduate programs in the social sciences do not incorporate mathematical approaches in an organized and consistent manner, however. The Mathematical Methods in the Social Sciences Program (MMSS) was created to give undergraduate students an opportunity to combine the study of social sciences with training in formal analytical methods.

MMSS students pursue a double course of study: a common mathematics/quantitative methods sequence and the social science major of their choice. (In some cases, students have chosen their joint major from outside the social sciences.) The program is for students with high mathematical aptitude and strong interest in social

problems and issues, including policy and research implications. It provides excellent preparation for graduate study in social or managerial sciences as well as for careers requiring quantitative skills and a solid background in the social sciences.

In the first two years of the program, students enroll in a coordinated sequence of 12 1-quarter courses (2 courses per quarter) covering mathematical methods and their applications in the social sciences. These courses are open only to MMSS students and are taught at an appropriately advanced level. In their senior year, all MMSS students participate in a senior seminar in which they write a thesis. There are no other required MMSS courses, but students must fulfill the requirements of their joint major.

Admission to the MMSS program is very selective and is limited to entering freshmen and to Northwestern sophomores with superior academic records and a demonstrated strong aptitude in mathematics.

A full-year course in calculus is a prerequisite for admission. High school students fulfilling this prerequisite are encouraged to enter the program as freshmen, applying to both Northwestern and the program.

To be considered for admission as sophomores, students lacking calculus should complete at least 2 quarters of calculus (MATH 220 and 224) in their freshman year. Those with sufficient background in calculus are advised to register for a 200-level calculus/linear algebra sequence such as MATH 230, 234, 240, 290-1,2,3, 291-1,2,3, or ES APPM 252-1,2 in their freshman year. Students with less mathematics preparation who are admitted to the program after their freshman year may be required to take all or part of the first-year MMSS math sequence.

Northwestern applicants interested in the program should see Special Admission Programs on page 11. Current students who wish to be considered for the program may request an application from the MMSS office, Kresge Hall, room 1-340, or download an application at www.mmss.northwestern.edu.

Adjunct Major in MMSS

Adjunct major requirements (14 units)

- 6 first-year courses: 211-1,2,3; MATH 285-1,2,3
- 6 second-year courses: 311-1,2; MATH 300, 385, 386-1,2
- 2 senior-year courses: 398-1 and 398-2 or 398-3
- All adjunct majors require completion of a stand-alone major as well. MMSS students must complete a major in a social science or other approved area. See the program website for information on adjustments to requirements in other majors for students in MMSS.

Major in Mathematics for MMSS Students

MMSS students seeking a sophisticated understanding of mathematics and formal analysis of models are encouraged

to pursue a major or minor in mathematics as well as their joint major in MMSS and another social science. To receive a mathematics major, MMSS students must complete

- The required MMSS courses (which include MATH 285-1,2,3, 300, 385, and 386-1,2). Students who receive permission to skip 300 must substitute another 300-level mathematics course.
- MATH 320-1,2,3 or 321-1,2,3
- 3 courses chosen from MATH 310-2,3, 330-1,2,3, 331-1,2,3, 334, 344, 360, 366-1, or 368; students may not count corresponding quarters of both 330 and 331 toward this requirement

Minor in Mathematics for MMSS Students

To receive a minor in mathematics, MMSS students must successfully complete MATH 320-1,2,3 or 321-1,2,3, as well as the other required MMSS courses (including MATH 285-1,2,3, 300, 385, and 386-1,2). MMSS students who receive permission to skip MATH 300 must substitute another 300-level mathematics course.

Honors in Mathematical Methods in the Social Sciences

MMSS students who write an outstanding senior thesis may be nominated by the faculty to graduate with program honors. A Weinberg College committee awards honors after reviewing recommendations. Typically, more than half of all MMSS students graduate with program honors. See also Honors in the Major on page 38.

Courses

MMSS 211-1,2,3 Quantitative Social Science for MMSS:

First Year 1. Intermediate microeconomics. **2.** Game theory. **3.** Formal models in political science.

MATH 285-1,2,3 Accelerated Mathematics for MMSS:

First Year See Mathematics.

MATH 300-0 Foundations of Higher Mathematics

See Mathematics.

MMSS 311-1,2 Quantitative Social Science for MMSS:

Second Year 1. Advanced microeconomic theory.

2. Advanced formal models in political science.

MATH 385-0 Probability Theory for MMSS See Mathematics.

MATH 386-1,2 Econometrics for MMSS See Mathematics.

MMSS 398-1,2,3 Senior Thesis Seminar

MATHEMATICS

www.math.northwestern.edu

Mathematics, often celebrated as the “Queen of the Sciences,” has long been an indispensable tool in the physical sciences, engineering, and commerce. Today it is also used in sophisticated ways in the social sciences and humanities. Students majoring in mathematics have the opportunity to learn about its diverse applications, as well as to acquire an understanding of both the foundations and the frontiers of the discipline.

The department offers a major and a minor in mathematics. The mathematics major is flexible, accommodating students interested in the foundations of the modern mathematical sciences; those primarily interested in the application of mathematics to the biological, social, and behavioral sciences; and those interested in management or engineering.

Students with sufficiently strong preparation who are interested in a more rigorous approach to the subject are encouraged to enter the Mathematical Experience for Northwestern Undergraduates Program (MENU). The department also encourages appropriately prepared students to enroll in its graduate courses.

A course in computer science is often a valuable adjunct to a mathematics major. Students interested in probability and statistics or in becoming actuaries should take 310-1,2,3 and 1 or more courses in statistics (e.g., STAT 350, 351, 352, 355). They should try to include some courses from real analysis (320 or 321), computer science, and areas where probability and statistics are used.

Those interested in economics should take 320-1,2,3 or 321-1,2,3, and 310-1,2,3 and as well as ECON 380-1,2 and/or 381-1,2. Double majors in mathematics and economics should consult the director of undergraduate studies in economics about possible adjustments to their economics requirements.

All majors are encouraged to discuss their programs of study with the director of undergraduate studies as well as their classroom professors.

Major in Mathematics

Major requirements (*units depend on basic courses taken*)

- Basic courses: 220, 224 (or 212, 213, 214), 230, 234, 240 (or 281-1,2,3 or 285-1,2,3 or 290-1,2,3 or 291-1,2,3), or equivalent
- 9 additional courses offered by the department at the 300 level or above
 - Must include at least 1 of the complete sequences 310-1,2,3, 320-1,2,3, 321-1,2,3, 330-1,2,3, or 331-1,2,3.
 - 334 is required of all majors who do not take at least 1 quarter of 320, 321, 330, or 331.
 - With the prior approval of the director of undergraduate studies, as many as 3 of these 9 courses may be at the 300 level or above in other departments that focus on serious applications of mathematics or have substantial mathematical content. This option is especially recommended to those interested in the applications of mathematics to other areas of study. No such course, however, may be simultaneously counted toward the requirements of another major, minor, or school.

Minor in Mathematics

Minor requirements (*units depend on basic courses taken*)

- Basic courses: 220, 224 (or 212, 213, 214), 230, 234, 240 (or 281-1,2,3 or 285-1,2,3 or 290-1,2,3 or 291-1,2,3), or equivalent

- 6 additional courses offered by the department at the 300 level or above
 - Must include at least 1 2-quarter sequence chosen from 310-1,2, 320-1,2, 321-1,2, 330-1,2, or 331-1,2. Students may ask the director of undergraduate studies for permission to substitute where appropriate 310-2,3, 320-2,3, 321-2,3, 330-2,3, or 331-2,3 or other regularly offered 2-quarter mathematics sequences that provide a focused, in-depth introduction to a subfield of mathematics.
 - With the prior approval of the director of undergraduate studies, as many as 2 of these 6 courses may be at the 300 level or above in other departments that focus on serious applications of mathematics or have substantial mathematical content. This option is especially recommended to those interested in the applications of mathematics to other areas of study. No such course, however, may be simultaneously counted toward the requirements of another major, minor, or school.

MENU Program

Mathematical Experience for Northwestern Undergraduates (MENU) is a flexible program of courses designed to provide qualified undergraduates with a thorough foundation in mathematics suitable for advanced study in mathematics and its applications across a wide range of disciplines.

MENU offers students an opportunity to expand their mathematical knowledge while retaining flexibility about their majors. The program is especially suited for students considering a major in mathematics, the natural sciences, or economics, although MENU attracts participants with a variety of interests and majors. The program director is available to advise all MENU students regardless of major.

During the first year MENU participants typically enroll in one of two yearlong sequences: MATH 290-1,2,3 or 291-1,2,3. Each provides a strong background in linear algebra and multivariable calculus. In contrast to standard mathematics courses, MATH 290 and 291 develop linear algebra before multivariable calculus and use linear algebra as an important tool in the study of multivariable calculus. MATH 291 emphasizes theory and proofs and is appropriate for students who are particularly skilled in and passionate about mathematics. Students may transfer between 290 and 291 with permission from the MENU director.

After the first year MENU participants may choose among three upper-level MENU sequences: MATH 321-1,2,3, 331-1,2,3, or 360-1,2; or they may enroll in other advanced courses in the mathematics department.

Admission to MENU is by invitation. Students who earn an Advanced Placement score of at least 4 on the Calculus BC examination or at least 5 on the Calculus AB examination should automatically receive an invitation to participate. Others who satisfy any of the following criteria qualify for MENU (although they do not receive an

automatic invitation) and may obtain permission to enroll from the director:

- International students who have completed single-variable calculus
- Students who have completed a college-level sequence in single-variable calculus with high grades
- Students earning a score of 7 on the International Baccalaureate Higher-Level Mathematics Examination (although they do not receive an automatic invitation)

Students who excelled in 220 and 224 may consult the MENU director about continuing their study of mathematics in MENU. Further information about MENU is available at www.math.northwestern.edu/undergraduate/menu.

Mathematics Second Major for ISP Students

The Integrated Science Program (ISP) is a highly selective BA program in Weinberg College (see Integrated Science Program). Students majoring in ISP may complete a second major in mathematics by fulfilling the following requirements:

- They may not substitute ISP 398 for any mathematics course in the ISP curriculum.
- They must also complete 1 of the full-year sequences 320-1,2,3, 321-1,2,3, 330-1,2,3 or 331-1,2,3 in lieu of all major requirements listed above.
- It is recommended but not required that ISP students planning graduate work in mathematics take both a real analysis (320/321) and an algebra (330/331) sequence.

Mathematics Second Major or Minor for MMSS Students

Students who have completed all the requirements for the MMSS major may complete an additional major or a minor in mathematics. Please see Mathematical Methods in the Social Sciences for information.

Honors in Mathematics

Majors with outstanding records may be nominated for graduation with departmental honors. They must have completed both 320-1,2,3 (or 321-1,2,3) and 330-1,2,3 (or 331-1,2,3). In exceptional cases, students who have not completed these courses may be considered for honors.

To be nominated for departmental honors, a student must also complete with distinction 2 quarters of independent study or 2 quarters of a graduate course, as well as an acceptable project that culminates in an honors thesis. Finally, the student must have a grade point average of 3.5 or above in courses used to satisfy major requirements. (Basic courses are not used in this computation.)

For more information on honors, consult the director of undergraduate studies and the department web site. See also Honors in the Major on page 38.

The Teaching of Mathematics

Weinberg students majoring in mathematics who wish to be certified for secondary teaching must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete the relevant requirements outlined in the SESP chapter of this catalog. They should contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Course Recommendations for Entering Students

Students enrolled in the McCormick School, ISP, or MMSS should consult their programs to determine the appropriate beginning mathematics course.

Students who have not taken any calculus normally enroll in 220. Those with particularly weak mathematics backgrounds should consult the director of calculus about the possibility of starting in 212. Students intending to major in a behavioral science other than economics and those from Medill may take 202 and 211 rather than 220/224/230, especially if they are concerned about their math skills. Those who wish only to fulfill the Area II distribution requirement and plan no further study of mathematics may also take 104, 110, or 111.

Students who have taken calculus in secondary school should determine their beginning math course as follows:

- Those who have studied linear algebra or multivariable calculus should consult the director of undergraduate studies.
- Those invited to MENU should take 290 or 291; they may consult the MENU director about which is appropriate.
- Those who have taken a year of calculus with grades of A- or better should consult the MENU director about admission to MENU.
- Those who have taken a year of calculus with grades of B or B+ should enroll in 230.
- Those who have taken a semester of calculus with grades of B or better should enroll in 224.
- Those whose calculus grades were below B should consult the director of calculus.

Substantial portions of the material from 230, 234, 240, 250 are also covered in the sequences 281-1,2,3, 285-1,2,3, 290-1,2,3, 291-1,2,3, and ESAM 252-1,2,3. Those uncertain about the exact equivalencies should consult with the director of undergraduate studies. Students should not attempt to mix and match courses on their own, since they will not be allowed credit for programs that result in excessive duplication of subject matter.

Courses

Prerequisites for mathematics courses may be waived by the director of undergraduate studies but may not be taken for credit after completion of courses for which they were prerequisites. No 100-level course may be taken for credit

after a 200- or higher-level course has been completed. See the course descriptions for other restrictions.

MATH 104-0 Introduction to Game Theory Introduction to the mathematical theory of strategic competition; optimal strategies and equilibria; the Prisoner's Dilemma; bargaining and negotiation; strategic voting; applications to economics and political science. For nonscience students seeking a gentle introduction to the subject without the technical details or prerequisites of a more advanced course. Familiarity with high-school mathematics is assumed.

MATH 110-0 Introduction to Mathematics I This course explores the beauty and mystery of mathematics through a study of the patterns and properties of the natural numbers 1, 2, 3, Topics include counting, probability, prime numbers, Euclidean algorithm, and unique factorization. Recommended for students with little mathematical background.

MATH 111-0 Introduction to Mathematics II Similar in spirit to 110, with topics chosen from number theory, topology, probability, geometry, cryptology, and algebra. Recommended for students with little mathematical background. 110 is not a prerequisite.

MATH 202-0 Finite Mathematics Primarily for the behavioral sciences. Topics chosen from elementary linear algebra and its applications, finite probability, and elementary statistics.

MATH 211-0 Short Course in Calculus Elements of differential and integral calculus. Examples drawn from the behavioral and social sciences. Students may not receive credit for both 211 and 220. Not suitable for those planning to major in mathematics, the natural sciences, or economics. Does not prepare for 230. 202 is not a prerequisite.

MATH 212-0 Single-Variable Calculus I Review of trigonometric, exponential, logarithmic, and inverse functions and transformation of graphs. Limits, continuity, derivative of a function, product, quotient and chain rule, mean value theorems, Newton's method, linear approximation and differentials, optimization problems. Students may not receive credit for both 212 and 211 or 220. For students with little or no previous exposure to calculus. Prerequisite: consent of department.

MATH 213-0: Single-Variable Calculus II Logarithmic differentiation, implicit differentiation, inverse trigonometric functions, related rates. L'Hôpital's Rule, curve sketching. Fundamental theorem of calculus. Techniques of integration, including integration by substitution and by parts, partial fractions, trigonometric substitutions, numerical integration, areas, and volumes. Students may not receive credit for both 213 and 211 or 224. Prerequisite: 212 or consent of department.

MATH 214-0: Single-Variable Calculus III Review of trigonometric substitutions and partial fractions. Improper integrals. Applications of integration: computation of arc length and surface area, work, and probability. Sequences and series: the integral and comparison tests, alternating

series, power series, ratio test. Taylor's formula and Taylor series. Series solutions of differential equations. Students may not receive credit for both 214 and 224. Prerequisite: 213 or consent of department.

MATH 220-0 Differential Calculus of One-Variable Functions Limits, differentiation, linear approximation, optimization, curve sketching, related rates, Newton's method, anti-derivatives. Students may not receive credit for both 220 and 211 or 212.

MATH 224-0 Integral Calculus of One-Variable Functions Integrals, techniques of integration, volumes, arc length, work, differential equations, sequences and series, Taylor polynomials. Prerequisite: 220. Students may not receive credit for both 224 and 213 or 214.

MATH 230-0 Differential Calculus of Multivariable Functions Vector algebra, vector functions, partial derivatives, optimization, Lagrange multipliers. Prerequisite: 214 or 224. Students may not receive credit for both 230 and 281-1, 285-2, 290-2, or 291-2.

MATH 234-0 Multiple Integration and Vector Calculus Cylindrical and spherical coordinates, double and triple integrals, line and surface integrals. Change of variables in multiple integrals; gradient, divergence, and curl. Theorems of Green, Gauss, and Stokes. Prerequisite: 230. Students may not receive credit for both 234 and 281-1, 285-3, 290-3, or 291-3.

MATH 240-0 Linear Algebra Basic concepts of linear algebra. Solutions of systems of linear equations; vectors and matrices; subspaces, linear independence, and bases; determinants; eigenvalues and eigenvectors; other topics and applications as time permits. Prerequisite: 230. Students may not receive credit for both 240 and 281-3, 285-1, 290-1, or 291-1.

MATH 250-0 Elementary Differential Equations Applications of calculus and linear algebra to the solution of ordinary differential equations. Prerequisites: 230; 240 or concurrent registration in 240; or equivalent. Students may not receive credit for both 250 and 281-2.

MATH 281-1,2,3 Accelerated Mathematics for ISP: First Year 1. Multivariable differential calculus, multiple integration and vector calculus. 2. Vector integral calculus, differential equations, infinite series. 3. Linear algebra, differential equations. Open only to students in ISP.

MATH 285-1,2,3 Accelerated Mathematics for MMSS: First Year 1. Linear algebra. 2. Continuation of linear algebra; multidimensional calculus. 3. Multivariable calculus. Prerequisite: first-year standing in MMSS.

MATH 290-1,2,3 MENU: Linear Algebra and Multivariable Calculus 1. Linear algebra in Euclidean space. 2. Continuation of linear algebra. Multivariable differential calculus. 3. Multivariable integral calculus. Vector analysis. Students may not receive credit for both 240 and 290-1; 230 and 290-2; or 234 and 290-3. Prerequisites: one year of calculus (usually in high school) and consent of the department.

MATH 291-1,2,3 MENU: Intensive Linear Algebra and Multivariable Calculus 1. Foundations. Linear algebra in

vector spaces. **2.** Continuation of linear algebra. Multivariable differential calculus. **3.** Multivariable integral calculus. Vector analysis. Emphasis on theory and proof. Prepares students for 300-level mathematics courses such as 321 and 331 as sophomores. Students may not receive credit for both 240 and 291-1; 230 and 291-2; or 234 and 291-3. Prerequisites: one year of calculus (usually in high school) and consent of the department.

MATH 300-0 Foundations of Higher Mathematics Introduction to fundamental mathematical ideas — such as sets, functions, equivalence relations, and cardinal numbers — and basic techniques of writing proofs. Prerequisite: 240. May not be taken for credit after 320-1, 321-1, 330-1, or 331-1 without prior departmental consent.

MATH 306-0 Combinatorics and Discrete Mathematics Discrete mathematics, inductive reasoning, counting problems, binomial coefficients and Pascal's triangle, Fibonacci numbers, combinatorial probability, divisibility and primes, partitions, and generating functions. Prerequisite: 240 or instructor's consent.

MATH 308-0 Graph Theory Introduction to graph theory: graphs, trees, matchings, planar graphs, colorings. Additional topics as time permits. Prerequisites: 291-1, 300, 306, or equivalent.

MATH 310-1,2,3 Probability and Stochastic Processes **1.** Discrete probability spaces, random variables, expected value, combinatorial problems. Special distributions, independence, and conditional probability. Weak law and central limit theorem. **2.** Convolution, central limit theorem, Markov processes in discrete time, recurrence, and transience. **3.** Markov processes in continuous time, stationary process, second-order process, stochastic differential equations. Students may not receive credit for both 310-1 and any of 383, 385, EECS 302, or STAT 320-1. Prerequisites: 234, 240.

MATH 320-1,2,3 Real Analysis Rigorous analysis in Euclidean space, beginning with one and proceeding to several variables. Properties of the real numbers, limits and continuity, differentiation and integration, sequences and series, the inverse and implicit function theorems. Applications to Fourier series. Primarily for undergraduates; open to graduate students only with departmental consent. Students may not receive credit for both 320-1 and 321-1 or both 320-2 and 321-2. Prerequisite: 234, 240, 300; or 291-1,2,3; or instructor's consent.

MATH 321-1,2,3 MENU: Real Analysis 1,2. Rigorous analysis on Euclidean and metric spaces. Real number system; metric space topology; sequences, series; continuity; differentiation; integration; sequences and series of functions; inverse and implicit function theorems. **3.** Lebesgue measure and integration. Sequence covers more topics, more abstractly, at a faster pace, and in greater depth than 320-1,2 and emphasizes analyzing and creating proofs. Students may not receive credit for both 320-1 and 321-1 or both 320-2 and 321-2. Prerequisite: average grade of A- or above in

291, A- or above in 334, A in 300, B or above in 331, or consent of the department.

MATH 325-0 Complex Analysis Complex numbers, analytic functions, contour integrals, Cauchy's theorem, Laurent series, residue theorem, conformal mapping, analytic continuation. Students may not receive credit for both 325 and 360-3 or ESAM 311-3. Prerequisites: 234 and 240 or equivalent.

MATH 330-1,2,3 Abstract Algebra 1. Groups and their structure; elementary ring theory; polynomial rings. **2.** Continuation of ring theory. **3.** Field theory and Galois theory. Prerequisite: 291-1,2,3, 300, or consent of instructor. Students may not receive credit for corresponding quarters of both 330 and 331.

MATH 331-1,2,3 MENU: Abstract Algebra 1. Groups and their structure, including the Sylow theorems. **2.** Ring theory; polynomial rings. Module theory, including applications to canonical form theorems of linear algebra. **3.** Field theory; Galois theory. 331 differs from 330 in that it covers more topics in more depth and aims at intensive development of students' ability to analyze and create mathematical proofs. Prerequisite: consent of department. Students may not receive credit for corresponding quarters of both 330 and 331.

MATH 334-0 Linear Algebra: Second Course Abstract theory of vector spaces and linear transformations. Complex vector spaces, unitary and Hermitian matrices. Jordan canonical form. Selected applications as time permits. Students who took 330-1 (formerly 337-1) prior to 2004-05 may not also take 334 for credit toward the major without departmental consent. Prerequisite: 240 or equivalent.

MATH 336-1,2 Introduction to the Theory of Numbers

1. Divisibility and primes, congruences, quadratic reciprocity, Diophantine problems. **2.** Additional topics in analytic and algebraic number theory. Prerequisite: 230.

MATH 340-0 Geometry Axiomatics for Euclidean geometry. Non-Euclidean geometry. Projective geometry. Introduction of coordinate system from the axioms. Quadrics. Erlangen program. Introduction to plane algebraic curves. Prerequisite: 230 and 300 or equivalent.

MATH 342-0 Introduction to Differential Geometry Curves and surfaces in three-dimensional space. Prerequisites: 234 and 240 or equivalent.

MATH 344-1,2 Introduction to Topology 1. Basic concepts: topologies, connectedness, compactness, separation axioms. Geometric concepts, including simplicial complexes and manifolds. **2.** Fundamental groups. Language of categories. Covering spaces. Prerequisite for 344-1: 320-1 or equivalent; for 344-2: 344-1 and 330-1 or equivalent.

MATH 351-0 Fourier Analysis and Boundary Value Problems Expansion in orthogonal functions with emphasis on Fourier series. Applications to solution of partial differential equations arising in physics and engineering. Students may not receive credit for both 351 and 381 or both 351 and ESAM 311-2. Prerequisite: 250.

MATH 353-0 Qualitative Differential Equations Qualitative theory of ordinary differential equations. Linear systems, phase portraits, periodic solutions, stability theory, Lyapunov functions, chaotic differential equations. Prerequisites: 240 and 250 or equivalent.

MATH 354-1,2 Chaotic Dynamical Systems 1. Chaotic phenomena in deterministic discrete dynamical systems, primarily through iteration of functions of one variable. 2. Iteration of functions of two and more variables, including the study of the horseshoe map, attractors, and the Henon map. Complex analytic dynamics, including the study of the Julia set and Mandelbrot set. Prerequisite: 240.

MATH 360-1,2 MENU: Applied Analysis 1. Linear ordinary differential equations and their applications. 2. Systems of linear ordinary differential equations, qualitative analysis of ordinary differential equations, linear partial differential equations, Laplace transform, Fourier series, orthogonal functions, and applications. Prerequisite: 290-1,2,3 or 291-1,2,3.

MATH 364-0 Game Theory Selected topics in game theory: noncooperative games, matrix games, optimal strategies, cooperative games. Students may not receive credit for both 364 and ECON 380-1. Prerequisite: 240.

MATH 366-1 Mathematical Models in Finance Cash flow computations. Basic financial concepts (stocks, bonds, options, arbitrage, hedging) and put-call parity. Binomial tree models. Risk-neutral valuation. Random walk and Brownian motion as a tool of modeling fluctuations. Options pricing. Application of the central limit theorem. The Black-Scholes formula and partial differential equation. Numerical approximations. Prerequisites: 240 plus any 1 of 310-1, 383, 385, IEMS 202, or ECON 381-1. Some acquaintance with basic differential equations is desirable but not required.

MATH 368-0 Introduction to Optimization Methods and concepts of linear and nonlinear optimization theory, going beyond the treatment of optimization in calculus. Topics not usually covered in real analysis, including Kuhn-Tucker Theory, convexity conditions, and linear programming. Fulfills a prerequisite for the Kellogg managerial analytics certificate. Prerequisites: 285-3, 290-3, or 291-3; or both 240 and 300.

MATH 370-0 Mathematical Logic Mathematical formulation and rigorous discussion of logical systems, particularly the propositional calculus and the functional calculi of first and second order. Well-formed formulae, formal languages, proofs, tautologies, effective procedures, deduction theorems, axiom schemata. Prerequisite: consent of instructor.

MATH 374-0 Theory of Computability and Turing Machines Algorithms, computability, decidability, enumerability; formal replacements and Church's thesis. Turing machines, primitive recursive functions, mu-recursive functions, recursive functions. Undecidability predicates; the undecidability and incompleteness of arithmetics. Prerequisite: consent of instructor.

MATH 381-0 Fourier Analysis and Boundary Value Problems for ISP Fourier analysis and boundary value problems. Students may not receive credit for both 351 and 381. Ordinarily taken only by students in ISP; permission required otherwise. Prerequisites: 281-1,2,3; PHYSICS 125-1,2,3.

MATH 382-0 Complex Analysis and Group Theory for ISP Complex analysis, elements of group theory. Students may not receive credit for both 325 and 382. Ordinarily taken only by students in ISP; permission required otherwise. Prerequisites: 281-1,2,3; PHYSICS 125-1,2,3.

MATH 383-0 Probability and Statistics for ISP Probability and statistics. Ordinarily taken only by students in ISP; permission required otherwise. Students may not receive credit for both 310-1 and 383. Prerequisites: 281-1,2,3; PHYSICS 125-1,2,3.

MATH 385-0 Probability and Statistics for MMSS Probability theory and its social science applications. Students may not receive credit for both 310-1 and 385. Prerequisite: second-year standing in MMSS.

MATH 386-1,2 Econometrics for MMSS Econometric methods. Prerequisite: second-year standing in MMSS.

MATH 395-0 Undergraduate Seminar (1 unit) Topics of modern mathematics and relationships among different branches of mathematics. Open only to superior students by consent of department. May be repeated for credit with change of topic.

MATH 399-0 Independent Study Open on approval of department to undergraduates who are qualified to do independent work under the direction of a faculty adviser. Students must file a plan of study with the department before enrollment in 399.

MIDDLE EAST STUDIES

See Asian and Middle East Studies.

MOLECULAR BIOSCIENCES

The Department of Molecular Biosciences does not offer an undergraduate degree. See Biological Sciences for a description of that major.

NEUROBIOLOGY AND PHYSIOLOGY

The Department of Neurobiology and Physiology does not offer an undergraduate degree. See Biological Sciences for a description of that major.

PERSIAN

See African and Asian Languages.

PHILOSOPHY

www.philosophy.northwestern.edu

The Department of Philosophy is committed to exposing students to a broad range of philosophical traditions and issues. With strengths in Anglo-American and continental philosophy, the department provides courses in all systematic areas of philosophy as well as a strong array of courses in ancient, medieval, and modern philosophy. The

research interests of members of the department show a similar breadth. This pluralism enables students to see philosophy's application to all areas of life and to appreciate the diversity of approaches possible in philosophy.

Major in Philosophy

Because the study of philosophy involves the critical discussion of the most fundamental questions asked by human beings, it helps develop breadth of understanding and clarity of thought. This character of philosophical inquiry makes a double major attractive to many students. Moreover, with appropriate supporting courses, a philosophy major can be a sound preparation for many careers, whether or not they involve further study.

The core of the program is a firm grounding in the history of philosophy. Against this background, students may tailor a program that meets their particular interests.

Major requirements (12 units)

- 3 history of philosophy courses
 - 210-1,3 (should be completed as early as possible, since the material is a prerequisite to more advanced work)
 - 1 chosen from 210-2, 310, 311, 312, 313-1,2, 362, 363
- 1 logic course: 150 or 250 (should be completed as early as possible, since the material is a prerequisite to more advanced work)
- 1 course in moral or political philosophy: 260 or 261
- 7 additional courses
 - At least 4 must be at the 300 level (not including 398).
 - None may be 398, and none except 110 may be at the 100 level.
- 1 of the 12 courses may be offered outside the department if it has substantial philosophical content. Course approval must be obtained from the director of undergraduate studies by submitting a petition that includes the course syllabus.

Minor in Philosophy

The minor in philosophy requires students to be well-grounded in the history of philosophy, especially ancient and early modern, covering the major texts of ethical and political theory as well as the major texts of epistemology and metaphysics. The emphasis on argument and logical structure in philosophy requires familiarity with contemporary logic, at least up to the level of the first-order predicate calculus. Beyond this foundational requirement, students take 4 courses tailored to their individual interests and, typically, to complement work being done in their major. To provide the greatest latitude for this, only 3 of the 4 remaining courses need be at the 300 level.

Minor requirements (8 units)

- 4 core courses: 150 or 250, 210-1, 210-3, and 260 or 261
- 4 additional courses
 - At least 3 must be at the 300 level.

- None may be 398, and none except 110 may be at the 100 level.

Honors in Philosophy

To receive honors, a student must have a grade point average of 3.5 or above in the philosophy major and declare candidacy before the spring quarter of the junior year. Declaration of candidacy involves approval of an honors project by a faculty adviser and by the director of undergraduate studies or the honors convenor in the philosophy department. The candidate then takes 398 in the spring quarter of junior year and in the fall quarter of senior year submits a paper demonstrating an appropriate level of research and reflection. It is also possible to ask the department's permission to begin the senior thesis sequence in fall quarter of senior year or, in very exceptional circumstances, undertake honors in nonconsecutive quarters. See Honors and Awards in the undergraduate section of the department web site about these options.

The honors paper is read by the adviser and another faculty member. Their comments are submitted to the Committee on Undergraduate Studies, which recommends approved nominations to the college. For more information consult the department web site and see also Honors in the Major on page 38.

Courses Primarily for Freshmen and Sophomores

Students with an informed interest in philosophy, especially those intending to choose philosophy as a major, should begin with 210-1 and 210-3 in their first year.

PHIL 109-0 Introductory Seminar in Philosophy

Introduction to philosophy: special topics or a general survey. Offered in small discussion-oriented classes.

PHIL 110-0 Introduction to Philosophy Fundamental problems and methods of philosophy.

PHIL 150-0 Elementary Logic I Introduction to the formal study of logical implication. Paraphrase of English sentences into logical schemata. Truth-functional logic. Quantifiers, predicates, and relations. Implication and its general properties. Establishing implication. First quarter of 150/250/350 sequence.

PHIL 210-1,2,3 The History of Philosophy 1. Ancient philosophy. 2. Medieval. 3. Early modern.

PHIL 216-0 Introduction to Pragmatism Introduction to classical and contemporary literature in pragmatist philosophy: Peirce, James, Mead, Dewey, and 20th-century neopragmatist authors (Quine, Rorty, Putnam, et al.).

PHIL 219-0 Introduction to Existentialism Principal sources of existential philosophy: Kierkegaard, Jaspers, Marcel, Nietzsche, Sartre, Heidegger, Merleau-Ponty, and others.

PHIL 220-0 Introduction to Critical Theory Crisis, criticism, and critique in philosophical, political, and cultural contexts. Focus on the philosophical aspects of critical theory with reference to social conditions and art, literary, and/or political forms. Taught with COMP LIT 207; students may not earn credit for both courses.

PHIL 230-0 Gender, Politics, and Philosophy Role of gender difference in the main political-philosophical traditions: social contract, liberalism, republicanism, socialism-Marxism, critical theory. The classics of feminist political philosophy (Wollstonecraft, Mill, Taylor, Engels), followed by contemporary debates. Taught with GNDR ST 233; students may not earn credit for both courses.

PHIL 250-0 Elementary Logic II Formal systems of deductive inference and their metalogical properties. Formal semantics. Natural deduction. Completeness and compactness; decidable fragments of first-order logic. Lowenheim-Skolem theorems. Second quarter of 150/250/350 sequence. Prerequisite: 150.

PHIL 254-0 Introduction to Philosophy of the Natural Sciences Philosophical and methodological issues in the natural sciences, such as the discovery and testing of hypotheses, explanation, theory selection, the nature of scientific laws, causality, space and time, determinism. Prerequisite: 1 course in the natural sciences.

PHIL 255-0 Theory of Knowledge Basic philosophical questions about human knowledge, focusing on skepticism and competing theories of knowledge.

PHIL 260-0 Introduction to Moral Philosophy Overview of some of the main ideas and most influential writings of moral philosophy.

PHIL 261-0 Introduction to Political Philosophy Overview of some of the main ideas and most influential writings of political philosophy.

PHIL 262-0 Ethical Problems and Public Issues Analysis of such controversial issues as the death penalty, abortion, euthanasia, sexual morality, economic justice and welfare, pornography and censorship, discrimination and preferential treatment, the environment, and world hunger.

PHIL 266-0 Philosophy of Religion Survey of the central issues in the philosophic analysis of religious experience: the existence of God, creation, miracles, the claims of faith versus the claims of reason, sin, free will, and immortality.

PHIL 267-0 Philosophy, Race, and Racism Introduction to philosophical discussions of race, race identity, and racism. Readings may be drawn from classical as well as contemporary sources.

PHIL 268-0 Ethics and the Environment Topics include our relationship to the environment, the obligation to future generations, pollution and population control, food and energy production and distribution, species diversity, and the preservation of wilderness.

PHIL 269-0 Bioethics Ethical analysis of a variety of issues such as the human genome project, genetic therapy, cloning and stem cell transplantation, human and animal research, reproductive technologies, and the allocation of resources.

Courses Primarily for Juniors and Seniors

PHIL 310-0 Studies in Ancient Philosophy Works of one or more important philosophers or movements before 500 C.E. May be repeated for credit with change of topic.

PHIL 311-0 Studies in Medieval Philosophy Works of one or more important philosophers or philosophical movements between 500 and 1500 C.E. May be repeated for credit with change of topic.

PHIL 312-0 Studies in Modern Philosophy Works of one or more important philosophers or philosophical movements between 1500 and 1800. May be repeated for credit with change of topic.

PHIL 313-1,2 Kant's *Critique of Pure Reason* 1. Detailed analysis of Kant's claims to justify human knowledge in *The Critique of Pure Reason*. 2. Detailed analysis of Kant's criticism of traditional metaphysics.

PHIL 314-0 Studies in German Philosophy Study of one or more key themes, figures, or historical developments in German philosophy from the 18th century to the present. May be repeated for credit with change of topic.

PHIL 315-0 Studies in French Philosophy One or more figures of 20th-century or contemporary French philosophy. May be repeated for credit with change of topic.

PHIL 316-0 Studies in American Philosophy Examination of one or more classical texts or contemporary works in American philosophy. Representative authors are Peirce, James, Dewey, Mead, and Quine. May be repeated for credit with change of topic.

PHIL 317-0 Studies in 19th- and 20th-Century Philosophy Study of one or more key philosophical themes, figures, or developments of the 19th century, 20th century, or both. May be repeated for credit with change of topic.

PHIL 318-0 Studies in Contemporary Philosophy Selected philosophical works of the latter part of the 20th century or the 21st century. May be repeated for credit with change of topic.

PHIL 319-0 Existentialism and Its Sources Intensive study of one or a small number of major contributions to the existentialist tradition.

PHIL 325-0 Philosophy of Mind Selected topics in the philosophy of mind: mind-body problem, problem of other minds, self-knowledge, personal identity, philosophical psychology. May be repeated for credit with change of topic.

PHIL 326-0 Philosophy of Medicine Introduces premed students to ethical problems they are likely to encounter. For example: Is it ever ethical to withhold information from a patient? Should physicians help terminally ill patients commit suicide? Should health care for the elderly be more limited than for children?

PHIL 327-0 Philosophy of Psychology Problems such as the nature of psychological explanation, experimentation and the testing of psychological claims, the standing of psychology as a science, reductionism, the unconscious, and conceptualizing the psyche and its processes.

PHIL 328-0 Classics of Analytic Philosophy Examination of classic texts that shaped the analytic movement of 20th-century Anglo-American philosophy. Readings from Frege, Russell, Wittgenstein, Carnap, Quine, and others.

PHIL 330-0 Practical Reasoning and Choice Explanations for decisions, what it is to decide, possible constraints on

decisions, how and why deliberation occurs, how to understand preference reversals and actions taken against one's better judgment.

PHIL 350-0 Advanced Logic Metalogical limitations of logical theories. Formal arithmetic. Recursive functions. Arithmetization of syntax. Incompleteness and undecidability. Truth-predicates in first- and second-order logic. The provability predicate. Third quarter of 150/250/350 sequence. Prerequisite: 250.

PHIL 351-0 Advanced Topics in Philosophical Logic Methods of modern formal logic applied to traditional philosophical questions, e.g., modal logic, deontic logic, epistemic logic, many-valued logic, tense logic. Prerequisite: 250.

PHIL 352-0 Philosophy of Mathematics Nature of mathematical entities and mathematical truth. Platonism, intuitionism, fictionalism, nominalism, the synthetic a priori, self-referential paradoxes, incompleteness and undecidability, consistency, alternative axiomatizations and uniqueness, the relation between mathematics and logic, and mathematical revolutions.

PHIL 353-0 Philosophy of Language The nature and uses of language as presenting philosophical problems, e.g., theory of reference, the modes of meaning, definition, metaphor, problems of syntax, and semantics. May be repeated for credit with change of topic.

PHIL 355-0 Scientific Method in the Social Sciences Analysis of the philosophical foundations of social inquiry with reference to selected problems, thinkers, and schools, both classical and modern.

PHIL 358-0 Epistemology Central problems in the theory of knowledge, emphasizing contemporary developments. A priori knowledge, perception memory, induction, and theories of meaning and truth.

PHIL 359-0 Studies in Metaphysics The most general features of reality and their relation to thought and language. Topics may include existence, time, identity, properties, truth, causality, and freedom.

PHIL 360-0 Topics in Moral Philosophy Philosophical analysis of recent or contemporary issues, theories, or figures in moral philosophy. May be repeated for credit with change of topic.

PHIL 361-0 Topics in Social and Political Philosophy Philosophical analysis of a recent or contemporary issue, individual philosopher, or school of thought in social and political philosophy. May be repeated for credit with change of topic.

PHIL 362-0 Studies in the History of Ethical and Political Theory Examination of one or more major figures or movements in the history of moral or political philosophy. May be repeated for credit with change of topic.

PHIL 363-0 Kant's Moral Theory Exploration of the moral and ethical thought of Immanuel Kant through careful study of *Groundwork of the Metaphysics of Morals* along with readings from the *Critique of Practical Reason*, *Metaphysics of Morals*, and *Religion within the Bounds of Mere Reason*.

PHIL 367-0 Studies in African American Philosophy Study of the work of one or more important African American philosophers or philosophical movements of the 19th or 20th centuries. May be repeated for credit with change of topic.

PHIL 369-0 Philosophy and Gender Survey of approaches to sex and gender throughout the history of philosophy.

PHIL 370-0 Philosophy and Literature Issues involving the relationship between philosophy and literature.

PHIL 380-0 Topics in the Philosophy of Art Topics to be discussed might include the nature and purpose of art, art and perception, the nature of creativity, and the social responsibility of the artist.

PHIL 390-0 Special Topics in Philosophy May be repeated for credit with change of topic.

PHIL 398-1,2 Senior Tutorial Undergraduate honors thesis. Grade of K given in 398-1. Prerequisite: consent of instructor.

PHIL 399-0 Independent Study Open to properly qualified students with consent of instructor.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

PHYSICS AND ASTRONOMY

www.physics.northwestern.edu

The physics and astronomy major provides an excellent intellectual foundation for nearly any career. The emphasis on quantitative thinking and mathematical analysis that characterizes physics and astronomy can be applied to business and other nonscience areas. While there is no formal major in astronomy, students may select the astronomy concentration within the physics major.

Majors in physics and astronomy usually take PHYSICS 135-1,2,3 in freshman year. Exceptionally qualified students may take PHYSICS 125-1,2,3 with consent of the department. Depending on their high school preparation, majors normally study mathematics in their freshman and sophomore years, starting with MATH 220, 224, and 230 and continuing with 234, 240, 250, and 351. (See the prerequisites for PHYSICS 135-1,2,3; students taking PHYSICS 125-1,2,3 must be enrolled in either MATH 290-1,2,3 or 281-1,2,3.)

Students in Weinberg College may complete their science distribution requirement by taking any of the following courses: PHYSICS 103, 105, 130-1,2, 135-1,2; ASTRON 101, 102, 103, 111, 120, 130. PHYSICS 103, 105, and the 6 astronomy courses allow students who have taken only high school mathematics to explore important ideas in the physical sciences.

Students intending to study physics and/or astronomy in graduate school should consider taking some or all of the following and plan to meet with the director of undergraduate studies before sophomore year ends: 2 or 3 units of PHYSICS 398 or 399 undertaken with the supervision of a faculty member and consisting of a research project in

the student's area of concentration; MATH 325 and 334; selected introductory graduate courses such as PHYSICS 412-1,2,3.

Major in Physics

The physics major is designed to help students acquire a broad and varied background in physics and related fields. The three basic steps toward completing the physics major are fulfilling prerequisites in introductory physics and calculus; taking a core sequence of courses in classical physics, modern physics, and mathematics; and completing a course concentration.

Prerequisites

- MATH 220 and 224 or 212, 213, and 214; plus 230
- PHYSICS 125-1,2,3 or 135-1,2,3

Major requirements

- 9 core courses
 - MATH 234, 240, and 250 *or* 250 and 290-1,2,3 *or* 281-1,2,3; plus 351
 - PHYSICS 330-1, 332, 333-1, 339-1, 359-3
- 6-8 courses in the chosen concentration
 - *Advanced physics (6 units)*
 - PHYSICS 330-2, 333-2, 339-2, 359-1
 - 2 other 300-level physics or astronomy courses other than PHYSICS 335, 398, 399 and ASTRON 398, 399
 - *Astronomy (6 units)*
 - PHYSICS 330-2, 333-2, 339-2
 - ASTRON 220
 - 2 other 300-level astronomy classes other than 398, 399
 - *Biomedical physics (8 units)*
 - BME 301, 302, 305, and 2 courses selected from 323, 327, EECS 360
 - CHEM 101 and 102 or 171 and 172
 - PHYSICS 359-1
 - *Computational physics (7 units)*
 - Prerequisite: knowledge of Fortran, C, or C++
 - ES APPM 311-1 or 346
 - MATH 310-1
 - PHYSICS 252, 359-1
 - 3 electives chosen from the following:
 - 1 300-level physics or astronomy course other than 335, 398, 399
 - ES APPM 311-2,3, 322
 - EECS 310, 336
 - MATH 310-2,3, 354-1,2, 374
 - STAT 330-1,2
 - *Materials physics (8 units)*
 - CHEM 101 and 102 or 171 and 172
 - PHYSICS 337, 339-2
 - MAT SCI 316-1,2 plus 2 courses chosen from 332, 355, 360, 361, 380
 - *Nanoscale physics (6 units)*
 - PHYSICS 333-2, 337, 339-2, 358

- 2 electives chosen from the following
 - PHYSICS 359-1
 - BME 320, 343
 - EECS 389
 - MAT SCI 360, 370, 376
 - MECH ENG 319, 381, 382, 385

Minor in Physics

The minor in physics gives students a basic understanding of the most essential concepts in the field. It carries the same prerequisites as the physics major, a somewhat lighter core, and 2 physics electives.

Prerequisites

- MATH 220 and 224 *or* 212, 213, and 214; plus 230
- PHYSICS 125-1,2,3 or 135-1,2,3

Minor requirements (8 units)

- MATH 234, 240, and 250; *or* 250 and 290-1,2,3; *or* 281-1,2,3
- PHYSICS 330-1; 333-1; 335 *or* 339-1
- 2 other 300-level physics or astronomy courses other than 398 *or* 399

Physics Second Major for ISP Students

The Integrated Science Program (ISP) is a highly selective BA program in Weinberg College that includes PHYSICS 125-1,2,3 and 339-1,2,3 and ASTRON 331 as part of its curriculum. Application to this program is made directly to ISP. It is possible to complete a double major in physics and ISP by completing the following 6 additional upper-level courses:

- PHYSICS 359-1 *or* 359-3
- PHYSICS 330-1,2 *or* PHYSICS 333-1,2 and 3 courses chosen from 300-level physics or astronomy courses other than PHYSICS 335, 398, 399, ASTRON 399, and those required by ISP (PHYSICS 339-1,2,3 and ASTRON 331)
- Students pursuing an ISP/physics double major may not substitute ISP 398 for any physics or math course in the ISP curriculum. They do not have to choose a physics course concentration.

Honors in Physics or Astronomy

The honors program in physics or astronomy provides outstanding physics or astronomy majors with the opportunity to participate in research under the supervision of a faculty adviser selected by the student. The program culminates in a written report that, in conjunction with the student's academic record, forms the basis for faculty decisions on the award of departmental honors. (Note: Students may participate in research without being in the honors program. Students are welcome to initiate research projects by enrolling in 399 at any point in their undergraduate studies.)

The honors program is administered by the department's Undergraduate Curriculum Committee. This committee

consists of the director of undergraduate studies, the assistant chair, and three other faculty members appointed by the chair of the department. The director of undergraduate studies serves as the departmental honors coordinator.

Physics and astronomy majors are eligible to participate in the honors program when they maintain a grade point average of 3.3 or higher overall and in all physics, astronomy, and mathematics courses. These criteria also apply to all classes taken after the student has formally entered the honors program. Students who do not satisfy these requirements at graduation cannot be granted departmental honors.

Students who meet the above criteria and wish to participate in the honors program must notify the director of undergraduate studies. If students have not yet selected an honors research adviser, the director can assist them in finding an appropriate faculty mentor.

Further details on completing the honors program and writing the honors thesis may be obtained from the director of undergraduate studies. See also Honors in the Major on page 38.

Minor in the Study of Evolutionary Processes

The Department of Physics and Astronomy is a contributing department to the interdisciplinary minor in the study of evolutionary processes (MSEP). The minor combines essential components from anthropology, biological sciences, earth and planetary sciences, and physics and astronomy to develop graduates who understand the theoretical and practical aspects of evolution as they apply to modern society, medicine, and technology. More information about the minor can be found on page 61 and at www.wcas.northwestern.edu/evolution.

The Teaching of Physics

Weinberg College students pursuing a major in physics who also wish to be certified for secondary teaching must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Advanced Placement

Freshmen who have taken a calculus-level physics course in high school may waive parts of the introductory physics sequence in the following ways:

- A score of 5 on the College Board Advanced Placement Physics C1 examination (Mechanics) and/or the C2 exam (Electricity and Magnetism) will give the student full credit for 135-1 and/or 135-2, respectively.
- A score of 5 on the College Board Advanced Placement Physics B exam (algebra-based physics) will give the student full credit for 130-1 and 130-2.

- A passing score on the departmental placement examinations, given during New Student Week, will allow a student to place out of any or all parts of the 130-1,2,3 or 135-1,2,3 sequences. (No college credit is given for placing out of the courses.)
- Students who have taken college-level physics on the campus of an accredited college while in high school may apply to have the credit transferred to Northwestern. A transcript from the college is needed. "College-level" classes taken at a high school are not eligible for transfer credit.

Physics Courses

PHYSICS 103-0 Ideas of Physics Topics in modern physics. Content varies — for example, relativity, the physics of music, and the progress of physics through history. Requires only high school mathematics and is designed for nonscience majors.

PHYSICS 105-0 Music, Sound, Timbre Introduction to the interface of art, technology, and science. MIDI; musical analysis and composition; physical acoustics and psychoacoustics; construction and acoustics of instruments; signal generation, recording, and analysis.

PHYSICS 125-1,2,3 General Physics for ISP General physics course relying extensively on calculus. Similar to 135-1,2,3 but more advanced and intended for ISP students. A concurrent advanced calculus course, MATH 281-1,2,3, is offered by the mathematics department. Prerequisite: first-year standing in ISP or consent of the department.

PHYSICS 130-1,2,3 College Physics Algebra-based physics primarily for premedical students who do not need to take calculus-based physics. Topics covered are similar to those of 135-1,2,3. Prerequisites: algebra and trigonometry.

PHYSICS 135-1,2,3 General Physics Classical physics for science and engineering majors and premedical students.
1. Mechanics. Prerequisites: MATH 220, 224; concurrent registration in MATH 230. **2. Electricity and magnetism.** Prerequisite: 135-1. **3. Introduction to modern physics; wave phenomena.** Prerequisite: 135-2.

PHYSICS 252-0 Introduction to Computational Physics Application of computing to physics: Monte Carlo simulation, numerical integration of equations of motion, discrete element methods in electromagnetism. Prerequisite: 135-3.

PHYSICS 330-1,2 Classical Mechanics **1.** Newtonian mechanics, oscillations, the Lagrangian and Hamiltonian formalisms, central-force motion. **2.** Motion in a non-inertial reference frame, kinematics of rigid modes, systems with many degrees of freedom. Prerequisites: 135-1 or equivalent; MATH 234, 240, 250, or equivalent.

PHYSICS 332-0 Statistical Mechanics Ideal gas, Boltzmann distribution, transport phenomena, fluctuation theory, Bose-Einstein and Fermi-Dirac statistics. Prerequisites: 330-1, MATH 234, 240, 250, or equivalent.

PHYSICS 333-1,2 Advanced Electricity and Magnetism

1. Electrostatics and magnetostatics, multipole expansion,

solutions of Laplace's equation, images, analytic functions. **2.** Maxwell's equations, electromagnetic equations, electromagnetic wave propagation and radiation, microwave cavities, diffraction. Prerequisites: 135-1,2,3; MATH 234, 240, 250, or equivalent.

PHYSICS 335-0 Modern Physics for Nonmajors Survey of modern physics for nonmajors with a technical background. Relativity and quantum physics; nuclear, atomic, and molecular structure. Prerequisites: 135-1,2,3 or equivalent. Does not fulfill 300-level requirement for majors.

PHYSICS 337-0 Introduction to Solid-State Physics

Electrons in periodic lattices; phonons; electrical, optical, and magnetic properties of metals and semiconductors; superconductivity. Prerequisites: 339-1,2.

PHYSICS 339-1,2 Quantum Mechanics Introduction to quantum theory. Applications to atomic and molecular systems. The harmonic oscillator, the one-electron atom, the hydrogen molecule, barrier penetration. Prerequisites: second-year standing in ISP or 330-1, 333-1, MATH 351.

PHYSICS 339-3 Particle and Nuclear Physics Nuclei and their constituents; nuclear models; alpha and beta decay; nuclear fission and fusion; the strong, electromagnetic, and weak interactions; and the fundamental particles and particle schemes. Prerequisites: 339-1,2.

PHYSICS 357-0 Photonics Laboratory Optics/laser lab focusing on optical instruments widely used in medical/biological studies, including optical microscopy, fluorescence spectroscopy, tumor detection in optical scattering, and optical fibers in endoscopes. Prerequisite: consent of instructor.

PHYSICS 358-0 Nanolithography Advanced lab involving fabrication of metallic nanometer-scale structures by electron-beam lithography. Characterization of these structures by atomic force microscopy. Prerequisite: 135-1,2,3 or equivalent.

PHYSICS 359-1,3 Physics Laboratory 1. Introduction to modern electronics, construction of elementary analog and digital circuits. **3.** Classic experiments in atomic, nuclear, and solid-state physics using modern electronics and microcomputers. Independent work. Prerequisites: 333-1,2 or consent of instructor; 359-1 is not a prerequisite for 359-3.

PHYSICS 361-0 Classical Optics and Special Relativity

This course covers advanced topics following from electrodynamics, including advanced classical optics, Fraunhofer and Fresnel diffraction, radiation from accelerated charges, wave guides and/or antennae, and special relativity, including dynamics. Prerequisites: 333-1,2.

PHYSICS 371-0 Nonlinear Dynamics and Chaos This course covers advanced topics following from classical mechanics. The focus will be on nonlinear dynamics and chaos theory, though coupled oscillations and continuous systems will also be covered. Prerequisites: 330-1,2.

PHYSICS 398-0 Independent Thesis Research Individual study under the direction of a faculty member. Open only to advanced students pursuing departmental honors.

PHYSICS 399-0 Independent Study Opportunity to study an advanced subject of interest under the individual direction of a faculty member. Open to all advanced students; consent of instructor required.

Astronomy Courses

All 100-level astronomy courses are specifically designed for students without technical backgrounds and require a mathematics background of only high school algebra.

ASTRON 101-0 Modern Cosmology Modern views on the structure of the universe, its past, present, and future. For nonscience majors who seek to follow 120 with a more detailed course.

ASTRON 102-0 Milky Way Galaxy Structure of the galaxy, star formation, interstellar clouds and dust, star clusters, neutron stars and black holes, the galactic center. For nonscience majors who seek to follow 120 with a more detailed course.

ASTRON 103-0 Solar System The planets and their moons, the sun, comets, asteroids. For nonscience majors who seek to follow 120 with a more detailed course.

ASTRON 111-0 Introduction to Astrobiology The modern scientific perspective on the question of life elsewhere in the universe. The prospects for life on Mars. The discovery of extrasolar planets and the search for extrasolar biospheres.

ASTRON 120-0 Highlights of Astronomy Acquaints students with modern ideas about the solar system, stars, galaxies, and the universe. Emphasizes fundamental principles and underlying concepts.

ASTRON 130-0 Imaging in Astronomy Introduction to the wide range of telescopes used to gather astronomical data and the techniques used to reduce the data. Of relevance to any field that uses extensive data or image analysis. 3 lectures, 1 computer lab.

ASTRON 220-0 Introduction to Astrophysics Use of introductory physics (mechanics, electromagnetism, thermodynamics, and modern physics) to cover astrophysical topics starting with the solar system and ending with the large-scale structure of the universe and cosmology. Prerequisites: PHYSICS 135-1,2,3 or equivalent.

ASTRON 321-0 Observational Astrophysics Geometric optics applied to design of optical and X-ray telescopes; diffraction and the Airy disk; radio and optical interferometry and aperture synthesis; adaptive optics; recent developments in detector technology; quantum and thermal noise in astronomy. Independent research projects using the CCD camera and 18-inch refractor in Dearborn Observatory. Offered alternate years. Prerequisite: 220.

ASTRON 325-0 Stellar Astrophysics Physics of stellar interiors, stellar atmospheres, and star formation. Specific topics include simple stellar models, nuclear energy generation, overview of evolutionary phases, white dwarfs, neutron

stars, interstellar gas and dust grains, gravitational collapse. Prerequisite: 220.

ASTRON 329-0 Extragalactic Astrophysics and Cosmology

Big bang cosmology, thermal history of the universe, primordial nucleosynthesis, microwave background, dark matter, large-scale structure, galaxy formation, spiral and elliptical galaxies, groups and clusters of galaxies. Prerequisite: 220.

ASTRON 331-0 Astrophysics Stellar structure and evolution: nucleosynthesis, supernova phenomena, white dwarfs, neutron stars, and black holes. Prerequisite: PHYSICS 339-3. Limited to students enrolled in ISP or with consent of the physics department.

ASTRON 399-0 Independent Study Opportunity to study an advanced subject under the individual direction of a faculty member. Open to all advanced students. Consent of instructor required.

POLITICAL SCIENCE

www.polisci.northwestern.edu

Political science is the study of politics and power from domestic, international, and comparative perspectives. It entails understanding political ideas, ideologies, institutions, policies, processes, and behavior, as well as groups, classes, government, diplomacy, law, strategy, and war. A background in political science is valuable for citizenship and political action, as well as for future careers in government, law, business, media, or public service.

Northwestern's Department of Political Science is nationally and internationally recognized for excellence at both the undergraduate and graduate levels. It is strong in all four subfields of the discipline — American politics, comparative politics, international politics, and political theory. Its faculty is highly regarded for research in historical and contemporary political thought, international law and political economy, sovereignty and strategy, race and politics, public opinion, political psychology, decision making, quantitative and qualitative methods, and the politics of countries in Africa, Europe, Asia, and North and South America.

Political science faculty are closely associated with other departments in Weinberg College, the law school, and the Kellogg School of Management, as well as several interdisciplinary programs, including the Buffett Center for International and Comparative Studies, the Institute for Policy Research, the Program of African Studies, the Gender Studies Program, the Chicago Field Studies Program, the Environmental Policy and Culture Program, and the Center for Civic Engagement.

Major in Political Science

The major in political science provides an opportunity for students to learn about politics in a variety of realms and settings. Students generally begin the major with 200-level courses, which provide a general introduction to subfields

of political science as well as background for 300-level courses. Majors should choose 200-level courses from at least three of the following subfields of political science: American politics, comparative politics, international politics, and political theory.

When students declare a major in political science, they meet with an adviser in the department to discuss their programs of study. Students planning to major in political science are advised to complete the 200-level prerequisites and at least 1 300-level course in political science by the end of their sophomore year. Majors should complete their methodology requirement by the end of their junior year and before taking the 395 research seminar. Students should plan to take 395 during junior year (and those who plan to pursue honors must do so). Those studying abroad in junior year should take 395 as early as possible during senior year. Up to 2 political science courses and 3 related courses taken abroad may be counted toward the major.

Department courses (11 units)

- 3 introductory courses chosen from 201, 220, 221, 230, 240, 250. Since the introductory courses expose students to a variety of subfields, students may take no more than 2 from the American politics courses 220, 221, and 230 to fulfill this requirement.
- 1 methodology course in political science
 - Introductory methods courses include 310, 311, and 315.
 - Students with methods training in other departments may also choose 312 or 316.
- 7 additional 300-level courses in political science, 1 of which must be 395

Related courses (5 units)

- Chosen from African American studies, American studies, anthropology, Asian American studies, economics, environmental policy and culture, gender studies, global health, history, international studies, Latin American and Caribbean studies, legal studies, philosophy, psychology, and sociology.
- At least 3 must be at the 300 level.
- No more than 1 may be at the 100 level.

Minor in Political Science

The minor in political science offers students the opportunity to acquire a foundation in the discipline as well as significant exposure to advanced courses. Students may choose courses that focus on American politics, comparative politics, international politics, law and politics, political theory, or research methodology, or they may take courses across a variety of areas.

Students may want to choose courses that complement and deepen their major area of study. For example, an economics major may want to focus on political economy courses. A history major might study contemporary politics in an area on which he or she is focusing. A philosophy

major may study political theory. Alternatively, students can choose to broaden their knowledge of political science in areas unrelated to their majors. To develop an individual program of study for a minor, students should consult with a member of the departmental undergraduate advising team.

Minor requirements (6 units)

- At least 2 200-level courses chosen from 201, 220, 221, 230, 240, 250
- 4 additional political science courses, including at least 3 at the 300 level

Honors in Political Science

Majors with outstanding overall and departmental records may apply for the political science honors program. Admission is competitive. A departmental and overall grade point average of at least 3.5 is required. Interested students should complete at least 7 of the 11 courses required for the major, including the methodology and research seminar requirements, before senior year. The application includes a thesis proposal and a letter of recommendation from a Northwestern political science faculty member. It is due in early March of junior year, including from students studying abroad.

Accepted students enroll in the 2-quarter Senior Seminar (398) in which they write a senior thesis; 398 does not count toward completion of the major. They must maintain a 3.5 GPA. Students interested in pursuing honors in more than one major are encouraged to pursue interdisciplinary honors.

For more information see the honors program link on the departmental web page and Honors in the Major on page 38.

Certificate of Achievement in a Foreign Language

Mastery of a foreign language has become increasingly important to understanding politics at home and abroad. To encourage students to become proficient in a foreign language, the Department of Political Science offers a certificate of achievement in a foreign language that may be earned either through course work in political science conducted in a foreign language (2 or more courses, usually completed during study abroad) or through the substantial use of foreign language materials in a thesis or other independent study-type (399) work. Faculty advisers can discuss options with students. The certificate must be approved by the director of undergraduate studies.

The Teaching of Political Science

Weinberg College students pursuing a major in political science who also wish to be certified for secondary teaching of political science with history must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are

urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

American Politics Courses

These courses examine the institutions of the U.S. government and their linkages with the public.

POLI SCI 220-0 American Government and Politics The structure and process of American politics from competing perspectives. Analysis of representation, voting, interest groups, parties, leadership, and policy-making institutions. The gateway course for the American politics subfield.

POLI SCI 221-0 Urban Politics Structure of local and regional political power and its relation to the social and economic structure of community.

POLI SCI 320-0 The Presidency Development and operations of the American presidency. Political and constitutional evolution of the office, the modern executive establishment, and the politics of presidential leadership. Prerequisite: 220 or equivalent.

POLI SCI 323-0 Public Opinion and Voting Behavior Who votes and for whom. Social, psychological, economic, and political factors influencing election choices. Sources of opinions. Focus on American presidential elections with some comparative and nonpresidential material. Prerequisite: 220 or equivalent.

POLI SCI 324-0 Political Parties and Elections Role of political parties in a democratic society. Topics include nomination, national conventions, political funding, campaigns, party organization, and national, state, and local parties.

POLI SCI 325-0 Congress and the Legislative Process Organization of legislatures to make public policy; legislative-executive relations; impact of interest groups and other forms of citizen activity on legislative decision making. Emphasis on the U.S. Congress. Prerequisite: 220 or equivalent.

POLI SCI 327-0 African American Politics Survey of black politics in the United States, including antisecessionism struggles, blacks' relations with government, whites, political parties, public policy, and electoral politics.

POLI SCI 328-0 Public Policy The role of government in regulating economic and social behavior; theories of public-policy making; sources and effects of public policy.

POLI SCI 329-0 U.S. Environmental Politics Political problems associated with human impact on natural environment; pollution, natural resources, public lands, land use, energy, and population.

Comparative Politics Courses

This field analyzes political behavior and institutions in foreign countries and areas of the world. Some courses concentrate on understanding the politics of specific national systems, while others focus on certain types of political phenomena and make cross-national comparisons.

POLI SCI 250-0 Introduction to Comparative Politics Emphasis may be on industrialized and/or developing states. Major issues include regime-society relations, political change and conflict, and policy making.

POLI SCI 259-0 Contemporary African Politics A survey of Africa's diverse political systems focusing on the development of democratic political systems since the 1990s. How the rule of law has become the norm in several important countries. Causes of political instability and violence in other countries; African and international responses to these problems.

POLI SCI 352-0 Politics of East Asia Examines East Asia as a site for studying various concepts in comparative politics: war, revolution, imperialism, modernization, dependency, development, authoritarianism, party politics, and democratization.

POLI SCI 353-0 Politics in Latin America Patterns of socioeconomic development and regime forms in Latin America. Interaction of internal and international economic and political structures and processes.

POLI SCI 354-0 Southeast Asian Politics Political economy of selected Southeast Asian countries, 1945 to present. Important themes include colonial influence, oligarchy, democratization, and human rights. Background in comparative politics or political economy is recommended.

POLI SCI 355-0 Chinese Politics The rise of the Communist Party; contemporary issues facing China, including economic reform, financial policies, and political reform.

POLI SCI 356-0 United States and Latin America Interactions between U.S. foreign policy and Latin American politics. The evolving importance of Latin America in U.S. geostrategic objectives since the beginning of the 20th century. How the projection of U.S. power and influence shapes the domestic politics of selected countries.

POLI SCI 357-0 Politics of Postcolonial States European colonialism and its political consequences in Latin America, Asia, and Africa. Colonial legacies on long-run development receive special attention.

POLI SCI 358-0 Nationalism Social, linguistic, religious, and political bases of the rise of modern nationalism in Europe, Asia, and Africa; wars of national liberation in relation to imperialism and colonialism.

POLI SCI 359-0 Politics in Africa Political structures and relation of cultural factors to political stability and change; development of modern political systems.

POLI SCI 361-0 Democratic Transitions Theories of the emergence and breakdown of democracy with a focus on cases from Europe, Latin America, Africa, and Asia.

POLI SCI 362-0 Politics of Western Europe Impact of historical development on contemporary institutions, political and political-economic institutions, interest groups and parties, policy making, and social and economic policy.

POLI SCI 363-SA Political Economy of the European Union The political production, structure, and regulation of economic activity in the EU. Restricted to students in Northwestern's Paris program.

POLI SCI 364-SA France and the European Union Introduction to French politics in the framework of European integration. Covers French efforts to promote integration

and France's role in the international system and adaptation to the EU. Restricted to students in Northwestern's Paris program.

POLI SCI 365-SA Decision Making in the European Union Analysis, by lecture and simulation, of the EU's complicated institutional structure for political decision making. Restricted to students in Northwestern's Paris program.

POLI SCI 366-SA The Dynamics of Law Making in the European Union Examination of the dynamics of law making in the EU and conflict/balance between domestic and regional law. Restricted to students in Northwestern's Paris program.

POLI SCI 367-0 Politics and Nature in a Comparative Perspective The connectedness of people with natural systems. The relationships between processes of urbanization and globalization and struggles over protecting natural systems. Nature and cultural survival. The special role of national parks, biosphere reserves, and other protected areas in struggles over global biodiversity.

POLI SCI 368-0 Political Economy of Less-Developed Countries Major analytical perspectives of modern political economy seen through concrete problems of development and underdevelopment in the least developed countries.

POLI SCI 375-0 Comparative Politics of Business-Government Relations Relations between business and government in a variety of economic, social, and political contexts. Patterns of influence in both business and government. Theories of business influence in politics, such as pluralism, corporatism, collective action, and instrumental and structural Marxism.

International Politics Courses

This field includes the study of major actors and arenas in the world scene, global processes through which cooperation and conflict are managed in the international system, and ways in which change occurs and resources become allocated in the global system.

POLI SCI 240-0 Introduction to International Relations Introduction to the major theories, concepts, and problems of contemporary international relations. Issues in international security, international political economy, and international cooperation.

POLI SCI 340-0 International Relations Theory Conceptual approaches to international relations, including "national interest," sovereignty, international norms and law, and rationality. Prerequisite: 240 or consent of instructor.

POLI SCI 341-0 International Political Economy Introduction to the politics of international economic relations. Roots and evolution of the international political economy. Fundamental controversies about international trade, finance, and development. Prerequisite: 240 or consent of instructor.

POLI SCI 342-0 International Organizations Examines the institutions that arise from and govern the interactions of states, including formal organizations such as the WTO,

the UN, the ICJ, and the ICC, and informal regimes such as international intervention, international criminal law, and sovereignty. Prerequisite: 240 or consent of instructor.

POLI SCI 343-0 International Law Introduction to politics of international law. Influence of politics on formation and interpretation of international law; influence of international law on international politics. Prerequisite: 240 or equivalent.

POLI SCI 344-0 U.S. Foreign Policy How U.S. foreign policy is formulated, executed, legitimated, and contested. Topics include 9/11 and its aftermath, covert action, interventionism, trade, U.S. respect for international norms, and U.S. engagement with the Middle East.

POLI SCI 345-0 National Security Basic issues in national security, focusing primarily on the United States. Topics include the nature of “national interest,” major actors in national security policy making and military strategy, and the influence and role of the defense establishment.

POLI SCI 346-0 Politics of European Unification Development of and prospects for the European Union in geopolitical and historical context.

POLI SCI 347-0 Ethics in International Relations Role of ethical considerations in international relations: where and when ethical questions are raised and by whom; causes and predictability of tensions between the ethics and self-interests of nations and political figures.

POLI SCI 348-0 Globalization Analysis of changes in the world economy and their implications for politics, economics, and society. Politics of multinational production, finance, and trade in the context of governance problems in a globalizing world. Prerequisite: 240 or equivalent.

POLI SCI 349-0 International Environmental Politics International cooperation and conflict resolution of global and transnational environmental problems such as climate change. Role of political, economic, and normative considerations in the formation of politically feasible solutions to international environmental problems.

POLI SCI 370-0 The Fate of the State in a Globalizing World Role states play in world politics and implications for world politics. Origins of the state system and contemporary challenges such as failed states, terrorism, transnational social movements, human rights norms, and humanitarian intervention.

POLI SCI 372-0 The Middle East in International Politics International history and politics of the Arab states, Israel, Iran, and Turkey. Colonialism and nationalism, political Islam and secularism, the Iranian Revolution, the Gulf War of 1991, the U.S.-led occupation of Iraq, relations between Turkey and the European Union. Recommended but not required: 240.

POLI SCI 374-0 The Politics of Religion in International Relations Politics of secularism and religion in global context. History and politics of different forms of secularism, challenges to them, and political consequences for international relations. Recommended but not required: 240.

POLI SCI 376-0 Internal Wars and the State Focus on post-Cold War increase in civil wars, including causes and consequences of internal wars, and theories of conflict. Examines cases of civil wars around the world such as Yugoslavia, Congo, and Iraq.

POLI SCI 377-0 The Politics of International Intervention Analysis of the internal and international politics of humanitarian interventions since the end of the Cold War. Examines evolving norms concerning interventions to protect human rights, including the increasing prevalence of postconflict prosecutions for human rights abuses and crimes of war.

Law and Politics Courses

These courses study the role of the judiciary at the national, local, and emerging levels of government. They also investigate issues in jurisprudence and the administration of justice.

POLI SCI 230-0 Introduction to Law in the Political Arena Roles of law in society and politics. How disputes are resolved, organization of the bar, why people litigate, the consequences of litigation. Compares common law, civil code, and other legal traditions.

POLI SCI 330-0 The Politics of Local Justice Local justice systems, with emphasis on crime and police, trial courts, criminal litigation, sentencing and corrections, and political involvement in these issues.

POLI SCI 331-0 Politics of the Supreme Court Operation of appellate courts, with emphasis on the United States Supreme Court. Decision making by appellate courts and the development of public policy. Prerequisite: 220 or 230.

POLI SCI 332-0 Constitutional Law I Introduction to interpretation of the United States Constitution by the Supreme Court. Judicial review, federalism, separation of powers, economic and religious liberty, and personal privacy. Prerequisite: 220 or 230.

POLI SCI 333-0 Constitutional Law II: Civil and Political Rights Consideration of decisions of the United States Supreme Court dealing with civil and political rights, including equality, freedom of expression, and criminal procedures. Prerequisite: 220 or 230.

POLI SCI 339-0 Special Topics in Law and Politics Specialized courses focused on specific aspects of law in the United States and elsewhere.

Political Theory Courses

These courses examine the ideas that inform the thinking of today's citizens, representatives, and political scientists. They are organized by historical periods and conceptual similarity.

POLI SCI 201-0 Introduction to Political Theory Examination of texts in political theory. Topics vary but often include justice, the Greek polis, the modern state, individualism, representative democracy.

POLI SCI 301-0 Ancient and Medieval Political Thought Political thought of Greece and Rome in historical context and with attention to contemporary theoretical interest.

POL SCI 302-0 Early Modern Political Thought Consideration of major figures and topics from the Renaissance through the 20th century. Topics include the sources of political power (representation, social contract, revolution, state building), its impact (justice, nationalism, equality, conflict, community-individual relations), and mechanisms of accountability (popular protest, law). No prerequisites, but some knowledge of political theory is desirable.

POL SCI 303-0 Modernity and Its Discontents Examination of late 19th- and early 20th-century social and political thought in the works of writers such as Marx, Weber, Mill, Kafka, Darwin, Nietzsche, Freud, and de Beauvoir. No prerequisites, but some knowledge of political theory is desirable.

POL SCI 305-0 Moral Dilemmas and Political Theory Study of moral dilemmas and moral theory from the perspective of political theory. Specific attention to the politics of gender in dilemmas of citizenship, nationality, and abortion in ancient Greek theater, modern philosophy, and contemporary film. No prerequisites, but some knowledge of political theory is desirable.

POL SCI 309-0 Advanced Topics in Political Theory Sustained reflection on one problem (e.g., freedom, republicanism, sexuality) or author (e.g., Plato, Machiavelli, Tocqueville, Arendt). Topics vary. May be repeated for credit with different topics. Prerequisite: 201 or equivalent.

Research Methodology Courses

Courses in this field prepare students to conduct original research on the causes and consequences of political phenomena. The methodological techniques are often transferable to research problems in government and business.

POL SCI 310-0 Methods of Political Inference Methods for inferences based on data in political research. Research design and quantitative and qualitative methods of inference. Focuses on descriptive, statistical, and causal inference and the application of different methods to substantive problems.

POL SCI 311-0 Logics of Political Inquiry Political science as “science.” Identity sources, construction, functions, and validation of social science theory and explanation from varied perspectives.

POL SCI 312-0 Statistical Research Methods Intermediate coverage of statistical methods appropriate for data in political science research, such as multiple regression, logit and probit, estimation and inference with nonindependent or nonidentically distributed sampling, basic time series and panel data methods, and causal inference in statistical models. Prerequisite: 310 or introductory statistics background.

POL SCI 315-0 Introduction to Positive Political Theory Introduction to the rational choice approach to politics focusing on individuals making goal-oriented, purposeful decisions that are aggregated by the institutions through which the individuals interact. Prerequisite: high school algebra.

POL SCI 316-0 Special Topics in Methods In-depth focus on aspects of political methodology not covered in depth in other political science methods courses. A course may focus on applications of statistical modeling in political science, methods of laboratory experimentation, methods of historical research, survey research methods, or critical theory.

Seminars, Independent Study, and Special Opportunities

POL SCI 390-0 Special Topics in Political Science Designed for investigation of topics that are of interest to students and faculty and are not covered by other course offerings. May be repeated for credit with consent of department. No prerequisites.

CFS 393-1,2, CFS 394-1,2, CFS 395-1,2 Chicago Field Studies See Chicago Field Studies on page 67.

POL SCI 395-0 Political Research Seminar Required of all political science majors; is ordinarily taken during junior year or in the fall quarter of senior year. With consent of the department, students may receive full credit for more than 1 395 seminar provided that 399 and 395 courses together do not exceed a total of 4 course credits.

POL SCI 398-1,2 Senior Seminar Two consecutive quarters (fall and winter) during which students work on their senior theses. Prerequisite: 395 and admission to the honors program.

POL SCI 399-0 Independent Study Study and research projects carried out under faculty supervision. A written proposal, signed by the professor with whom the student will study, should be submitted to the director of undergraduate studies. Consent of department required.

PORTUGUESE

See Spanish and Portuguese.

PSYCHOLOGY

www.wcas.northwestern.edu/psych

The study of psychology covers a wide range of topics in the natural and social sciences. It provides students a unique opportunity to increase their understanding of themselves and other people as developing individuals, biological organisms, and participants in society. Because of the strong research orientation of the department, it also provides an understanding of how research is done and an opportunity to participate directly in research.

A major in psychology may lead in various directions after graduation. Graduate study may prepare a student for a career as an academic, clinical, industrial, or other kind of psychologist. With course offerings spanning the areas of cognitive science, psychobiology, psychopathology, and social psychology, psychology is also a useful major for students planning careers in education, medicine, law, or management. Whether or not students continue their education beyond the bachelor's degree, they will find that the psychology major provides knowledge about human

behavior and about methods of research and data analysis that is valuable in business, the helping professions, and other occupations.

At the graduate level, the department recognizes several specialties with programs leading to the PhD. Though opportunities for study and research are available to undergraduates in all of these areas, there is only one undergraduate psychology major. Its requirements are designed to give every student a mastery of the basic methods and a balanced exposure to different aspects of psychology. Beyond that, students are encouraged to follow their interests in regular courses and in independent study. Extensive laboratory facilities and research experiences are available.

Major in Psychology

Department courses (11 units)

- 3 core courses: 110, 201, 205
- 8 additional courses
 - At least 2 must be personality, clinical, and/or social psychology courses chosen from 204, 215, 303, 306, 326, 357, 371, 375, 376, 377, 381, 384, 385, 386.
 - At least 2 must be cognitive psychology and/or neuroscience courses chosen from 212, 228, 312-1, 2, 321, 324, 333, 334, 335, 346, 355, 358, 361, 362, 363, 364, 365, 367, 368; COG SCI 210, 211.
 - At least 1 must be an upper-level research course chosen from 321, 326, 333, 334, 335, 351, 355, 357, 358, 359, 362, 363, 367, 368, 371, 375, 377, 381, 386, 392, 397-2, 398.
 - At least 2 must be at the 200 level; COG SCI 210 and 211 may count toward this requirement.
 - At least 3 must be at the 300 level.
 - A course may count toward more than one of these categories, but the total number of courses must be at least 8.
- Freshman seminars may not count toward the major.
- Only 1 quarter total of 397-1 and 399 may count toward the requirements; a student may not count both courses toward the major.
- Only 1 quarter of 397-2 may count toward the major.
- See page 38 for further restrictions on enrollments in 398 and 399; these also apply to 397.

Related courses (5 units)

- 2 200-level mathematics courses
- 3 additional units of credit chosen from the following:
 - Any 200-level mathematics course
 - COG SCI 207
 - EECS 110, 111, 130
 - Any course outside of psychology and cognitive sciences counting toward the WCAS Area I natural sciences requirement
 - AP credits in biology, chemistry, environmental science, and physics
 - With department consent, PSYCH 351 may also count toward this requirement.

Minor in Psychology

The minor in psychology reflects the view that the undergraduate study of psychology should combine a methodological core with breadth of content. The minor therefore contains the basic course (110), the 2 central methods courses (201 and 205), and at least 1 course from each of the two main content areas defined for the major.

Minor requirements (7 units)

- 3 core courses: 110, 201, and 205
- 4 additional courses
 - At least 1 personality, clinical, and/or social psychology course from 204, 215, 303, 326, 381
 - At least 1 cognitive psychology and/or neuroscience course from 212, 228, 312-1, 324, 346, 361, 362, 365; COG SCI 210, 211
 - At least 1 200-level psychology department course or COG SCI 210 or 211
 - At least 2 300-level psychology department courses; may not count both 399 and 397-1
 - A course may count toward more than one of these categories, but the total number of courses must be at least 4.
- Freshman seminars may not count toward the minor.

Honors in Psychology

Each spring quarter, juniors with outstanding academic records are encouraged to apply for the honors program for the next academic year. Those accepted enroll in 398 in the fall and carry out a yearlong research project. The honors thesis is a report of the findings of this project. Completion of the project and department approval of the final paper typically lead to departmental honors in psychology. For more information consult the department web site and see Honors in the Major on page 38.

Courses

PSYCH 110-0 Introduction to Psychology A survey course reviewing primary psychological research and theories of human behavior. Laboratory experience exposes students to psychology as a research science.

PSYCH 150-0 Advanced Introductory Psychology Principles of scientific psychology, taught at an advanced level. Topics include the biological foundations of psychology, perception, learning, cognition, emotion, social cognition and social influences, and clinical psychology. Prerequisites: For first-year students who have completed a university-level introductory psychology course or have earned a 4 or 5 on the AP Psychology examination.

PSYCH 201-0 Statistical Methods in Psychology Measurement; descriptive statistics; probability and sampling; T-test, ANOVA, correlation, and regression. Prerequisite: 110; some college mathematics recommended.

PSYCH 204-0 Social Psychology Psychological processes underlying social behavior; topics include social cognition,

attraction, aggression, prejudice, and behavior in groups. Prerequisite: 110.

PSYCH 205-0 Research Methods in Psychology Methods of psychological research; experimental design; reliability and validity; review and application of statistics; execution and reporting of psychological research. Prerequisite: 201. **COG SCI 207-0 Introduction to Cognitive Modeling** See Cognitive Science.

COG SCI 210-0 Language and the Brain See Cognitive Science.

COG SCI 211-0 Learning, Representation, and Reasoning See Cognitive Science.

PSYCH 212-0 Introduction to Neuroscience Brain processes related to memory, perception, and motivation. Dissection, histology, and surgery for brain stimulation. A prior course in biology is strongly recommended.

PSYCH 215-0 Psychology of Personality Nature of personality and its development. Modern theoretical interpretations. Biological and social bases of individual differences. Prerequisite: 110.

PSYCH 218-0 Developmental Psychology Development of cognitive, social, and other psychological functions. Prerequisite: 110.

PSYCH 228-0 Cognitive Psychology Introduction to research into mental processes such as memory, reasoning, problem solving, and decision making. Prerequisite: 110.

PSYCH 303-0 Psychopathology Understanding the nature of psychological, emotional, and behavioral disorders. Emphasis on current evidence regarding causes and characteristics of these disorders. Prerequisite: 110.

PSYCH 306-0 Introduction to Clinical Psychology Definition and history of clinical psychology, personality theory in clinical psychology, diagnosis and classification of disorders, assessment, psychotherapy, and ethical issues. Prerequisite: 303.

PSYCH 312-1,2 Physiological Psychology 1. Neurophysiology, neuroanatomy, and electrophysiological substrates of behavior. Prerequisites: 110; 1 biological sciences course. **2.** Neuroanatomical, electrophysiological, and biochemical substrates of psychological processes. Prerequisite: 312-1 or equivalent; 205 recommended.

PSYCH 314-0 Special Topics in Psychology Topic to be announced. Prerequisites vary. May be repeated for credit with different topic.

PSYCH 321-0 Neuroscience and Behavior Laboratory Classical exercises in the physiological psychology laboratory, including brain-wave recording and electrophysiology. Prerequisites: 205, 312-2.

PSYCH 323-0 Deception: Processes and Detection Multiple perspectives on truth and deception. Exposure to clinical and psychophysiological work on lying, malingering, and styles of deceit. Theories and methods in lie detection. Prerequisite: 110.

PSYCH 324-0 Perception Human perception, particularly vision but also hearing, taste, smell, and touch. Biological

foundations, development, and disorders of perception. The senses in everyday life. Prerequisite: 110.

PSYCH 326-0 Social and Personality Development Research methods, theories, and facts relating to the development and modification of attitudes and behavior. Prerequisites: 205; 204, 215, or 218.

PSYCH 332-0 Native Americans and Environmental Decision Making Focus on Native Americans, culture and cultural processes, and environmental decision making. Emphasis on contemporary Native American cultures and relevant research. Prerequisite: 110.

PSYCH 333-0 Psychology of Thinking Research methods and recent experimental findings for types of human thinking. Students conduct original research. Prerequisites: 205, 228.

PSYCH 334-0 Language and Thought Exposure to original research and theoretical perspectives on language and its relation to thought and behavior. Critical analysis of theories and methods. Topics may vary. Prerequisites: 205; 228 or COG SCI 211.

PSYCH 335-0 Decision Making Human decision making from both descriptive and prescriptive perspectives. Theories and models of decision making applied to a variety of contexts. Prerequisites: 205, 228.

PSYCH 337-0 Human Sexuality Sexual development and differentiation, deviations, dysfunctions, and controversies in sexuality. Prerequisite: 110.

PSYCH 339-0 Psychology of Gender Examination of sex differences and similarities. Evaluation of explanations for differences. Review of how gender affects achievement, relationships, and mental health. Prerequisite: 110.

PSYCH 340-0 Psychology and Law Examines the application of psychology to law, including topics such as the insanity defense, criminal profiling, eyewitness testimony, and interrogation. Prerequisite: 110.

PSYCH 344-0 Cultural Psychology Introduction to concepts and empirical methods used to study how culture shapes mind, brain, and behavior over multiple time scales, including over generations and the lifespan and across situational contexts. Prerequisite: 110; at least 1 additional psychology course recommended.

PSYCH 346-0 Psychology of Instructional Design and Technology Introduction to theory and practice in the development of technologies for formal and informal learning. Examines design approaches for developing and implementing effective instructional/training materials for individuals and organizations. Prerequisite: 110; 205 recommended. Taught with LOC 346; students may not earn credit for both courses.

PSYCH 351-0 Advanced Statistics and Experimental Design Advanced topics in research design and analysis of data. Focus on both theory and applications. Prerequisites: 205; 2 200-level mathematics courses.

PSYCH 355-0 Social, Cultural, and Affective Neuroscience Examines use of neuroscience techniques (e.g., neuroimaging) in research on affective and social processes and their interactions with cognitive processes; empirical

findings, foundational topics, and current debates. Prerequisites: 205; one course in cognition and/or neuroscience, e.g., 212, 228, 312-1, 324, 364, 361, BIOL SCI 306, 326, COG SCI 210, CSD 303.

PSYCH 357-0 Advanced Seminar in Personality, Clinical, or Social Psychology Discussion and critical analysis of research methods and findings in an area of personality, clinical, and/or social psychology. Topics vary. May be repeated for credit with different topic. Prerequisite: 205; additional prerequisites may apply.

PSYCH 358-0 Advanced Seminar in Cognition or Neuroscience Discussion and critical analysis of research methods and findings in an area of cognitive psychology and/or neuroscience. Topics vary. May be repeated for credit with different topic. Prerequisite: 205; additional prerequisites may apply.

PSYCH 359-0 Advanced Seminar in Psychology Discussion and critical analysis of research methods and findings in psychology. Interdisciplinary focus, often spanning natural and social science aspects of psychology. Topics vary. May be repeated for credit with different topic. Prerequisite: 205; additional prerequisites may apply.

PSYCH 361-0 Brain Damage and the Mind Survey of human cognition as studied via investigations of brain damage and brain-imaging techniques. Prerequisite: 110, 212, or COG SCI 210.

PSYCH 362-0 Cognitive Development Development of cognition and perception, including development of memory, concepts, language, and expertise. May focus on one or more age groups. Prerequisites: 205; 218 or 228.

PSYCH 363-0 Images of Cognition Study of brain processes underlying cognition. Analysis of brain structure and function. Introduction to imaging techniques including fMRI, PET, and ERP. Prerequisites: 205; a course in cognition and/or neuroscience (e.g., 212, 228, 312-1, 361; COG SCI 210) or consent of instructor.

PSYCH 364-0 Topics in Cognitive Neuroscience Topics spanning cognitive, computational, and systems-level neuroscience and cellular approaches to understanding the human mind/brain. Prerequisite: a course in cognition and/or neuroscience (e.g., 212, 228, 312-1, 361; BIOL SCI 306, 326; COG SCI 210; CSD 303) or consent of instructor.

PSYCH 365-0 Brain and Cognition Investigates the neural bases of human cognition (e.g. perception, spatial, attention, memory, executive function, language and reading) with an emphasis on neuroimaging approaches to examining development and learning. Prior exposure to neuroscience or cognitive science is helpful but not required. Taught with CSD 303; students may not earn credit for both courses.

PSYCH 367-0 Consciousness Examines how psychologists, neuroscientists, computer scientists, and physicists have tackled fundamental questions about consciousness using empirical and theoretical methods. Prerequisites: 205 and a course in cognition and/or neuroscience, or instructor

permission based on a strong background in neurobiology and/or physics.

PSYCH 368-Human Memory Scientific study of human memory, including memory systems of the brain, amnesia, remembering, forgetting, encoding, consolidation, memory suppression, and memory distortion. Emphasizes original research reports in cognitive neuroscience. Prerequisites: 205; 1 or more of the following: 324, 361, 363, 364, 365.

PSYCH 371-0 Personality Research Research in personality, with emphasis on experimental approaches and methods. Basic concepts of test reliability and validity. Students conduct original research. Prerequisites: 205, 215.

PSYCH 375-0 Psychological Tests and Measures Explores the science of psychological assessment, including its history, test construction and evaluation, and common measures of personality, psychopathology, and ability. Students create and evaluate their own psychological measures. Prerequisites: 205; 204, 215, or 303.

PSYCH 376-0 Cognitive Behavior Therapy Scientific foundations of cognitive behavior therapy for a wide range of disorders. Focus on the rationale for different treatments and evidence of efficacy and process. Comparisons with other scientifically validated treatments. Prerequisite: 303.

PSYCH 377-0 Child Psychopathology Major forms of psychopathology present during childhood, including disorders exclusive to childhood and those that may appear during any developmental period. Developmental models of the etiology and course of major psychopathologies. Prerequisites: 205; 218 or 303.

PSYCH 381-0 Children and the Law Examines from a developmental perspective research on children's involvement in the legal system as decision makers, witnesses, victims, and perpetrators. Prerequisites: 205, 218.

PSYCH 384-0 Close Relationships Social-psychological analysis of close relationships, with an emphasis on romantic relationships. Interpersonal processes associated with relationship formation, development, and dissolution. Prerequisite: 204.

PSYCH 385-0 Psychology of Attitudes Survey of social psychological research on attitudes; focus on the formation of attitudes, the relationship between attitudes and behavior, and attitude change. Prerequisite: 204.

PSYCH 386-0 Stereotyping and Prejudice Analysis of the causes and consequences of stereotyping and prejudice, as well as methods used to study these issues. Students conduct original research. Prerequisites: 204, 205.

PSYCH 392-0 Practicum in Child Development Direct contact with children and a site supervisor, under the direction of a faculty member. Weekly seminar.

Integration of current developmental research with practicum experience. Prerequisites: 205, 218.

PSYCH 397-1,2 Advanced Supervised Research Design, implementation, and reporting of a psychology research project. Prerequisites: 205 and consent of instructor; 397-2 must be taken with the same professor as 397-1.

Weinberg College limits on 398 and 399 enrollments (page 38) also apply to 397.

PSYCH 398-1,2,3 Senior Thesis Seminar (1–4 units) Senior honors research. Students must apply for admission in the spring quarter of their junior year.

PSYCH 399-0 Independent Study Consent of instructor required.

RELIGIOUS STUDIES

www.religion.northwestern.edu

The Department of Religious Studies offers undergraduates the opportunity to study religions as historical and cultural phenomena. This includes the scholarly exploration of religious traditions, histories, cultures, beliefs, practices, sacred texts, sacred stories, and material productions from around the world in their institutional as well as non-institutional (“on the ground”) forms. The department’s approach is fundamentally multidisciplinary, drawing from a variety of fields and critical perspectives: anthropology, history, philosophy, ethics, sociology, and literary and cultural studies, among others.

The wide variety of undergraduate courses range from large introductory classes to advanced seminars, and there are also independent studies and a senior thesis program for qualified students. The courses cover aspects of Buddhism, Hinduism, Taoism, Christianity, Islam, Judaism, Native American religions, new religious movements, and religion and culture in America.

The department offers a major and two minors.

The major and minor in religious studies provide a coherent and balanced set of departmental courses with work on general theories of religion and on the historical development of religions and their social manifestations. In consultation with the department adviser, students may organize highly individual major programs of study that include courses from this department and other departments in the University. To ensure coherence and balance within the individual programs, students submit their proposed programs for approval to the department’s director of undergraduate studies.

In the interdisciplinary minor in Catholic studies, students take courses from both religious studies and other departments and choose an area of focus within Catholic studies.

Major in Religious Studies

Major requirements (12 units)

- 170
- 395
- 10 additional religion courses
 - At least 9 must be beyond the 100 level.
 - At least 5 must be at the 300 or 400 level.
 - At least 2 must be in course group A (Hinduism, Buddhism, Taoism, Chinese religions)

- At least 2 must be in course group B (Judaism, Christianity, Islam, Native American religions, religion and culture in America).

- Students may substitute up to 2 courses on religion from outside the department. These must be chosen from ANTHRO 350, HISTORY 270, 371, or 374, PHIL 266, or SOCIOL 314 or approved in advance by the department’s director of undergraduate studies.

Minor in Religious Studies

Minor requirements: religious studies (6 units)

- 170
- 5 other departmental courses beyond the 100 level
 - At least 3 must be at the 300 or 400 level.
 - At least 1 must be in course group A (see above).
 - At least 1 must be in course group B (see above).

Minor in Catholic Studies

Roman Catholic ways of thinking, living, and organizing the world have been fundamental to cultures since the fifth century of the Common Era, and the story of modernity in all its variations cannot be told without Catholicism. The Catholic studies program offers the opportunity to look at civilizations and cultures through the lens of the interdisciplinary study of Catholicism, using the critical tools of contemporary academic research and conversation.

The minor requires at least 6 courses. These include a core course introducing contextual, interdisciplinary approaches to the subject and the interaction between Catholic ideas and institutions and the broader world. Five elective courses allow students to explore a particular topic more deeply. Students seek appropriate courses, including topics courses, from across the University, including art history, English, history, political science, and sociology. A list of approved courses can be found on the religious studies department web site.

Minor requirements: Catholic studies (6 units)

- At least 1 of the following: 381, 382, 383
- 5 additional courses
 - Must be chosen in consultation with the program director from 381, 382, 383, 384, 385, 386, and other relevant courses in religious studies and other departments.
 - Courses normally will be organized around a focus — for example, historical (medieval Catholicism); regional (Catholicism in Latin America); comparative (Catholicism and Islam); disciplinary (Catholicism in literature); thematic (political Catholicism, Catholic bioethics).

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

Honors in Religious Studies

Superior students in the department become eligible for departmental honors by writing a senior thesis in addition to completing the 12 courses required for the major. This is usually accomplished by enrolling in 2 quarters of 396 during the fall and winter quarters of their senior year. Students who intend to qualify for honors should notify the undergraduate adviser in writing by the end of the spring quarter of the junior year. For more information consult the director of undergraduate studies or the undergraduate honors coordinator. See also Honors in the Major on page 38.

General Introductory Courses

RELIGION 170-0 Religion in Human Experience

Religion as it has appeared in the past and as humans continue to express it in their personal and social lives.

RELIGION 171-0 Varieties of Religious Tradition Introduction to a variety of the world's major religious traditions.

RELIGION 173-0 Religion, Medicine, and Suffering in the West Examination of religious healing ceremonies and Christian perspectives on pain and suffering in light of the meaning of physical pain in the everyday lives of men and women.

American Religion Courses

RELIGION 260-0 Introduction to Native American Religions

Diversity and common elements of Native American religious traditions; comparative study of myth, ritual, spiritual philosophy, and practice.

RELIGION 261-0 American Religion, Ecology, and Culture

The historical rise of environmentalism in American culture and its impact on religious thought and practice.

RELIGION 264-0 American Religious History from 1865

to the Great Depression Topics include urban religion, African American churches, Christians and foreign policy, immigrant religion, the spiritual crisis of the 1920s, and Pentecostalism.

RELIGION 265-0 American Religious History from World

War II to the Present Religion and the making of contemporary America, including Cold War religion, the "Black Gods" of the Great Migration, the rise of the Christian Right, and modern American Catholicism and Judaism.

RELIGION 360-0 African American Religions Exploration of the historical diversity of African American religious experiences and identities.

RELIGION 361-0 Mystics of the American Wilderness

Intersections of mysticism, environmental literature, and art in American history.

RELIGION 362-0 Women, Ecology, and the Sacred The complex and often problematic relationships among religion, nature, culture, and gender.

RELIGION 363-0 Women and Religion in America Introduction to key figures, events, and dynamics in the history of American women and religion.

RELIGION 369-0 Topics in American Religion Content varies. May be repeated for credit with change of topic.

Bible Courses

RELIGION 220-0 Introduction to the Hebrew Bible Major genres of Old Testament literature. Basic theological views and the social-political history of ancient Israel.

RELIGION 221-0 Introduction to the New Testament

Beginning, development, and content of the New Testament; its Jewish and Hellenistic environment.

RELIGION 320-0 The Art of Biblical Narrative Ways in which the religious imagination of ancient Israel expresses itself through literary artistry.

RELIGION 321-0 Prophecy in Ancient Israel Historical evolution of Israelite prophecy; ancient Near Eastern parallels; major themes of prophetic thought.

RELIGION 329-0 Topics in the Bible Content varies. May be repeated for credit with change of topic.

Buddhism and East Asian Religions Courses

RELIGION 210-0 Introduction to Buddhism The Buddha's life and teachings, traditions that developed from these teachings, and systems of meditation, rituals, and ethics.

RELIGION 310-1 Buddhist Scripture Origins, development, and content of Buddhist sacred literature. Prerequisite: 170 or 210.

RELIGION 311-1 Theravada Buddhism and Culture

Theravada Buddhism in interaction with its culture.

RELIGION 312-0 Zen Buddhism Historical development of Zen Buddhist theory and practice.

RELIGION 313-0 Tibetan Buddhism Propagation of Buddhism in Tibet and formation of the major schools of Tibetan Buddhism.

RELIGION 314-0 Buddhism in the Contemporary World

Buddhism's reinterpretation of its thought and practice in response to postcolonial modernizations.

RELIGION 315-0 Contemporary Buddhist Philosophy

Creative interaction of selected Buddhist thinkers with the Western philosophical tradition.

RELIGION 318-0 Topics in East Asian Religions Content varies. May be repeated for credit with change of topic.

RELIGION 319-0 Topics in Buddhism Content varies. May be repeated for credit with change of topic.

Christianity Courses

RELIGION 240-0 Introduction to Christianity Doctrine, worship, and institutions in the various branches of Christianity.

RELIGION 271-0 Theology of Love The concept of love from theological, historical, philosophical, and biblical perspectives. True love of self, others, and God.

RELIGION 340-1,2,3 Foundations of Christian Thought

Survey of the development of Christian thought. **1.** Early or traditional Christianity. **2.** Christian thought from the Reformation to the 18th century. **3.** Christian thought from the 19th through the 21st centuries.

RELIGION 341-0 Medieval Christianity Christian thought, institutions, and figures of medieval Christianity, c. 500–1500.

RELIGION 342-0 Christian Mystical Theology Writings of mystics — e.g., Meister Eckhart, Cloud of Unknowing, Julian of Norwich, Teresa of Avila — in their cultural context.

RELIGION 343-0 Feminist Theology Content varies — e.g., feminist ethics, feminist theology, and women's spirituality. May be repeated for credit with change of topic.

RELIGION 344-0 Christian Ethics Four contemporary moral issues viewed from a variety of Christian approaches. Prerequisite: 170, 221, 240, or 260.

RELIGION 345-0 The Idea of Sainthood in Christianity Historical and contemporary conceptions of sanctity, especially in Roman Catholicism and Eastern Orthodoxy.

RELIGION 346-0 Church Architecture Survey of historical and recent churches: spatial dynamics, centering focus, aesthetic impact, and symbolic resonance.

RELIGION 349-0 Topics in Christianity Content varies. May be repeated for credit with change of topic.

RELIGION 381-0 Global Catholicism in the Contemporary World Historical and contemporary global Catholicism. Topics include the church and political modernity; local saints; controversies over worship styles; Catholics and political revolutions; the Vatican; the pontificate of John Paul II.

RELIGION 382-0 Catholicism in the Making of the Modern World 16th–17th-century Catholic influences on missions, colonial ventures, science, and the development of non-European history; the effects of these efforts upon Catholicism's understanding of itself and early "global culture."

RELIGION 383-0 Catholic Social Ethics Ecclesiastical, academic, and popular Catholic social ethics from 1891 to the present — for example, the living wage and Catholic Worker movements, peace initiatives, liberation ethics, and immigration, environment, sexuality, and gender issues.

RELIGION 384-0 Soundings in the Catholic Tradition Topics in Catholic religious thought or religious movements. May be taken multiple times with different content.

RELIGION 385-0 Topics in U.S. Catholicism Historical and contemporary subjects in the study of Catholic culture in the United States. May be taken multiple times with different content.

RELIGION 386-0 Topics in Latin American Catholicism Historical and contemporary subjects in the study of Catholic culture in Latin America. May be taken multiple times with different content.

Hinduism Courses

RELIGION 200-0 Introduction to Hinduism Unity and diversity of Hindu mythology, beliefs, and practices from ancient times to the present.

RELIGION 301-0 Indian Goddesses Role and function of goddesses and feminine divinities in Brahmanical and popular Hindu traditions.

RELIGION 302-0 Yoga and Tantra Origin and development of ascetic disciplines in the Hindu and heterodox traditions of India.

RELIGION 309-0 Topics in Hinduism Content varies. May be repeated for credit with change of topic.

Islam Courses

RELIGION 250-0 Introduction to Islam Principal beliefs and practices of Muslims set against the historic development of the faith.

RELIGION 350-0 The Qur'an Islam's sacred scripture and its origins; Muslim understandings of revelation and prophecy.

RELIGION 351-0 Muhammad, the Jews, and the Origins of Islam The rise of Islam, including a broad discussion of pre-Islamic Arabia.

RELIGION 352-0 Biblical Themes in Muslim Tradition

Case studies in religious and cultural borrowing — e.g., the Queen of Sheba's visit to the court of King Solomon.

RELIGION 353-0 Trends in Islamic Thought Qur'anic, medieval, and modern approaches to problems in faith and social action.

RELIGION 354-0 Sufism The Islamic mystical tradition. Content varies — e.g., Sufism and philosophy, Sufism in Africa. May be repeated for credit with change of topic.

HISTORY 355-0 Islam in Africa See History.

RELIGION 359-0 Topics in Islam Selected topics in Islamic history and thought. May be repeated for credit with different topic.

Judaism Courses

RELIGION 230-0 Introduction to Judaism Main concepts in the theology of Judaism, main rituals and customs, and main institutions.

RELIGION 330-0 Varieties in Ancient Judaism Introduction to the Judaisms that flourished from the fifth century B.C.E. to the third century C.E. Prerequisite: 220, 221, or 230.

RELIGION 331-0 Classical Jewish Thought Examination of the forms of expression of Rabbinic Judaism: legal, mystical, philosophical, and poetic.

RELIGION 332-0 Modern Jewish Thought How Judaism dealt with modernity and the problems it posed: Spinoza, Mendelssohn, Cohen, Buber, Rosenzweig, and Levinas.

RELIGION 333-0 Judaism in the Modern World Radical changes that emancipation and modernity have brought to the religious expression of Judaism.

RELIGION 339-0 Topics in Judaism Content varies. May be repeated for credit with change of topic.

Theory and Comparative Studies Courses

RELIGION 370-0 Religion and Mythology of the Ancient

Near East Myths, religious ideologies, and cultic practices of Sumer, Babylonia, Assyria, and Canaan, including Phoenicia; relation to ancient Greece and Israel, women, and literature.

RELIGION 371-0 Religion and Film Content varies — e.g., films of Robert Bresson; Kieslowski's *Decalogue*; Dreyer and Tarkovsky. May be repeated for credit with change of topic.

RELIGION 372-0 Asian Religions in Literature and Film Representations of Hinduism and Buddhism in Indian classical texts, Western literature, and recent Western and Asian films.

RELIGION 373-0 Religion and Bioethics Analysis of contemporary dilemmas in medicine and the life sciences; responses to these dilemmas from religious perspectives.

RELIGION 374-0 Contemporary Religious Thought Content varies — e.g., convergence between religious paths, science and religion, politics and religion. May be repeated for credit with change of topic.

RELIGION 379-0 Topics in Comparative Religion Content varies. May be repeated for credit with change of topic.

RELIGION 395-0 Theories of Religion Ways of critically analyzing religious experience and its meaning. Phenomenology of religion, history of religions, comparative religions.

RELIGION 396-1,2 Senior Seminar For honors students writing the senior thesis.

RELIGION 399-0 Independent Study Reading and conferences on special subjects for advanced students. Consent of instructor required.

RUSSIAN

See Slavic Languages and Literatures.

SCIENCE IN HUMAN CULTURE

www.shc.northwestern.edu

The Science in Human Culture Program prepares students to confront the impact of science, medicine, and technology on society — and on their own lives. The adjunct major and the minor welcome both science majors and premedical students interested in thinking beyond the problem sets assigned in their specialized courses. They also welcome students in the humanities who wish to surmount the compartmentalization of knowledge that accompanied the rise of modern science. Courses seek to foster critical thinking about the limits, authority, and impact of science, a mode of understanding that is often said to be the defining feature of modern culture.

For an up-to-date listing of courses and more information about the adjunct major and minor, consult the program web page. Questions may be directed to the program director at shc-program@northwestern.edu.

Adjunct Major in Science in Human Culture

Adjunct major requirements (10 units)

- Courses are chosen from the partial “Themes and Eligible Courses” list below or the approved list on the program web site and must relate to a theme developed in consultation with the program director.
- 3 must be core courses.
- 2 must be chosen from HISTORY 275-1,2, 325, 376-1,2, 377

- 1 must be chosen from from PHIL 268, 326, SOCIOL 205, 319.
- At least 6 of the 10 courses must be at the 300 level.
- Course substitutions may be allowed with the consent of the program director.
- All adjunct majors require completion of a stand-alone major as well. Up to 2 courses for the science in human culture adjunct major may be counted toward another major.

Minor in Science in Human Culture

Minor requirements (7 units)

- Courses are chosen from the partial list below or the approved list on the program web site and must relate to a theme developed in consultation with the program director.
- At least 1 must be a 300-level seminar.
- At least 5 courses must not be double-counted toward a major.

Adjunct Major Honors

To graduate with honors, students must take 9 courses and write a senior thesis of high quality during the 3-quarter sequence 398-1,2,3. See Honors in the Major on page 38.

Themes and Eligible Courses

Some of the themes adopted by students have included medicine and society, technology and social change, science and gender, religion and scientific knowledge, and philosophy of science. For example, students interested in medicine and society might explore the interaction of medical knowledge and practice, medical ethics, and the boundaries between sickness and health. Topics addressed might include the authority of the physician, the role of the hospital, the social dimensions of racial and gender differences, and the changing conception of disease and healing.

Eligible courses include (partial list)

ANTHRO 255, 315, 370

CLASSICS 342

COMM ST 229

ECON 307

GNDR ST 250

HISTORY 275-1,2, 325, 375-1,2, 376-1,2, 377

PHIL 254, 269, 325, 326, 354

POLI SCI 367

RELIGION 373

SOCIOL 205, 312, 319, 355

Other eligible courses are offered periodically and appear in the online quarterly class schedule available from the Office of the Registrar.

Course

SHC 398-1,2,3 Science in Human Culture Senior Seminar

For students who wish to qualify for honors by writing a senior thesis.

SLAVIC LANGUAGES AND LITERATURES

www.slavic.northwestern.edu

The Department of Slavic Languages and Literatures offers a full program of study in Russian language and literature and a range of other courses on the languages, culture, and history of Eastern Europe. Russian study encompasses a broad discipline that touches on many others. The rich heritage of Russia includes much that is fundamental to Western culture. For example, Turgenev, Dostoevsky, Tolstoy, and Chekhov probe philosophical, social, political, and psychological issues that are central to the 20th-century experience. Courses in Russian literature open up the artistry and ideas of this intellectual tradition. Russian language study may also serve as an entrée into other Slavic languages; with a foundation in Russian, one can branch off into related Slavic traditions.

Nonmajors as well as prospective specialists are served by the department's courses. Many courses offering a general acquaintance with some facet of Slavic studies have no prerequisite. All periods of Russian literature are represented, with emphasis on the 19th and 20th centuries. Russian language at all levels is taught by Americans and native speakers. Courses on Slavic linguistics are also offered. Northwestern's library is an excellent resource for undergraduate and graduate study in Russian literature.

Students major in Russian language and literature for a variety of reasons. Some want the rigorous intellectual training and the breadth of cultural exposure. Some students are primarily interested in acquiring language skills for use in government service, international law or trade, journalism, or scientific research. Others use the major as a foundation for graduate work in comparative literature, linguistics, history, or political science; a number of students combine the major in Russian with a second major in one of these fields.

Qualified advanced students may spend a fall quarter in Russia through a Northwestern study abroad program. Students should consult the undergraduate adviser in the department or an adviser in the Study Abroad Office to learn more about study abroad options.

Major in Slavic Languages and Literatures

Major requirements (17 courses)

- Intermediate Russian: 102-1,2,3 or equivalent
- 14 additional courses in Slavic languages and literatures and related fields in one of the following options:
 - Option A: No study abroad
 - 7 200-level courses: 203-1,2,3 and 4 courses chosen from 210-1,2,3; 211-1,2; 255
 - 7 advanced electives: 360 or 361; 5 other 300- or 400-level Slavic languages and literatures courses; and 1 course in a related field chosen with the undergraduate adviser

- Option B: Study in Russia
 - 4 200-level courses chosen from 210-1,2,3; 211-1,2; 255
 - 4 or more study abroad units
 - 6 advanced electives: 360 or 361 and 5 other 300- or 400-level Slavic languages and literatures courses
- Honors requires 2 additional courses.

Minor Concentrations in Slavic Languages and Literatures

The department offers minor concentrations in Central and Southeast European studies, Russian, and Slavic studies.

Central and Southeast European Studies

The minor concentration in Central and Southeast European studies prepares students to comprehend and confront the fascinating historical, cultural, linguistic, political, and sociological specificity of Europe's most misunderstood regions. Fostering a comparative and interdisciplinary approach to Central and Southeast Europe, the minor encompasses a wide variety of courses that deal with the lands stretching from Western Europe to Russia, from the Baltic Sea to the Mediterranean.

In consultation with the director of undergraduate studies, students develop a coherent theme that ties together their choice of 7 courses selected from an approved list of courses in history, Slavic languages and literatures, linguistics, political science, sociology, Jewish studies, and comparative literary studies.

Minor requirements: Central and Southeast European studies (7 units)

- 1 course each in three basic areas: history, culture, and contemporary society and linguistics
- At least 3 300-level courses
- Up to 1 course on Russia
- Up to 3 relevant language courses (e.g., Czech, Polish, Bosnian, Croatian, Serbian)
- Course selections require approval by the director of undergraduate studies.

Russian

The minor concentration in Russian is particularly suitable for students who wish to study the Russian language intensively (possibly for use in such fields as political science, international relations, law, or business) or for the increasing number of students of Russian background at Northwestern who major in other fields but wish to broaden their knowledge of their native language.

Prerequisite

- Completion of two years of college-level language or equivalent as demonstrated by course work such as 102-3 or equivalent

Minor requirements: Russian (7 units)

- 203-1,2,3
- 4 courses chosen from 303-1,2,3, 359-1,2, 360, 361

Slavic Studies

The minor concentration in Slavic studies offers a broad survey of literature and culture but does not include a sequence of language courses. The 200-level offerings provide a background in literature and culture, and the 300-level courses offer the opportunity to deal with more specific issues.

Minor requirements: Slavic studies (8 units)

- 4 200-level courses in Slavic languages and literatures
- 4 300-level courses
 - At least 2 must be in Slavic languages and literatures.
 - Up to 2 may be courses in a related field chosen with consent of the undergraduate adviser (HISTORY 345 is strongly recommended).

Honors in Slavic Languages and Literatures

The honors program in Slavic languages and literatures gives outstanding senior majors an opportunity to undertake a research project under the supervision of a faculty adviser. This honors thesis, together with the student's record in Slavic courses, forms the basis for faculty decisions on the award of departmental honors. Most honors candidates research and write the thesis in 2 quarters of 399. Another option is to take a 400-level seminar followed by 399, in which the student pursues a topic arising out of the 400-level course. Students interested in pursuing honors should consult the honors adviser by the end of their junior year. See also Honors in the Major on page 38.

Courses in Language and Linguistics

SLAVIC 101-1,2,3 Elementary Russian Russian language and culture. Basic reading, writing, listening, and speaking. Must be taken in sequence. Prerequisite: consent of language director.

SLAVIC 102-1,2,3 Intermediate Russian Russian language and culture. Reading, writing, listening, and speaking. Prerequisite: 101-3 or consent of language director.

SLAVIC 106-1,2,3 Elementary Czech Czech language and culture. Basic reading, writing, listening, and speaking. Must be taken in sequence. Prerequisite: consent of language director.

SLAVIC 107-1,2,3 Introduction to Bosnian/Croatian/Montenegrin/Serbian Basic reading, writing, listening, and speaking. Material presented in both Latin and Cyrillic alphabets. Students gain basic knowledge of similarities and differences among all linguistic varieties. Must be taken in sequence. Prerequisite: consent of language director.

SLAVIC 108-1,2,3 Elementary Polish Polish language and culture. Basic reading, writing, listening, and speaking. Prerequisite: consent of language director. Must be taken in sequence. Prerequisite: consent of language director.

SLAVIC 203-1,2,3 Russian Language and Culture Conversation, listening comprehension, reading, and composition. Contemporary readings on Russian culture and

society. Third-year, multiskill course. Prerequisite: 102-3 or consent of language director.

SLAVIC 206-1,2,3 Intermediate Czech: Language and Culture Continuation of 106; reading, writing, listening, and speaking on topics in Czech culture. Must be taken in sequence. Prerequisite: 106-3 or consent of language director.

SLAVIC 207-1,2,3 Intermediate Bosnian/Croatian/Montenegrin/Serbian: Language and Culture Continuation of 107; readings on topics in Bosnian/Croatian/Montenegrin/Serbian culture and society. Reading, writing, listening, and speaking. Must be taken in sequence. Prerequisite: 107-3 or consent of language director.

SLAVIC 208-1,2,3 Intermediate Polish: Language and Culture Continuation of 108; reading on topics in Polish culture and society. Must be taken in sequence. Prerequisite: 108-3 or consent of language director.

SLAVIC 303-1,2,3 Advanced Russian Language and Culture Conversation, listening comprehension, reading, and composition. Topics in advanced grammar. Exploration of Russian culture and society through reading, video, and film. Third- and fourth-year multiskill course. Prerequisite: 203-3 or consent of language director.

SLAVIC 304-1,2,3 Russian for Advanced and Native Speakers Russian for advanced speakers, including those who grew up in the United States. Stress on advanced levels of reading and writing as well as speaking. Taught entirely in Russian. Content varies; may be repeated for credit. Prerequisite: consent of language director.

SLAVIC 320-0 Structure of Serbian and Croatian Phonological and syntactic structure of Serbian and Croatian. Historical background.

SLAVIC 340-0 History of the Russian Language Russian phonology and morphology from Proto-Indo-European to modern Russian. Effects of the changes on the contemporary language.

SLAVIC 341-0 Structure of Modern Russian Theories and methods of linguistics as applied to the description of modern Russian. Phonetics, morphology, and other topics.

SLAVIC 358-1,2 Polish for Advanced and Native Speakers Polish for advanced speakers, including those who grew up in the United States. Stress on advanced levels of reading and writing as well as speaking. Taught entirely in Polish. Content varies; may be repeated for credit. Prerequisite: consent of language director.

Courses with Reading and Discussion in English

SLAVIC 210-1,2,3 Introduction to Russian Literature Comprehensive overview of the central prose works and literary movements in 19th-century Russia. 1. Thematic and formal study of major works by Pushkin, Gogol, Lermontov, Turgenev. 2. Tolstoy, Dostoevsky. 3. Turgenev, the late Tolstoy, Chekhov, Bunin.

SLAVIC 211-1,2 20th-Century Russian Literature Major works in cultural-historical context, from the revolutions

of 1917 through the present. Variable content depending on instructor. **1.** Focus on one of the following: Russian modernism in literature, music, film, and visual art; non-conformism in Soviet literature and visual arts (1940s to 1986); and contemporary Russian culture. **2.** Russian literature, film, and visual art in the transition from communism to postcommunism. Writers examined may include Pasternak, Bulgakov, Solzhenitsyn, and Sinyavsky/Tertz. **SLAVIC 255-0 Early Slavic Civilization** History, literature, and culture of the Slavs (Bulgarians, Macedonians, Serbs, Croats, Russians, Ukrainians, Byelorussians, Poles, Czechs, Slovaks) from antiquity through the 13th century.

SLAVIC 261-0 Polish Culture in the 20th Century Study of key developments in Polish history, literature, and thought by way of texts drawn from literature, history, politics, journalism, memoirs, essays, and film. Poland as a microcosm for recent European history and culture.

SLAVIC 267-0 Czech Culture: Film, Visual Arts, Music Cultural legacy of the Czech nation as represented in various media.

SLAVIC 310-0 Tolstoy Tolstoy's artistic and intellectual development through his major fiction.

SLAVIC 311-0 Dostoevsky Introduction to Dostoevsky's life and works: *Notes from the Underground*, *Crime and Punishment*, *Brothers Karamazov*.

SLAVIC 313-0 Nabokov Vladimir Nabokov's major Russian and American prose, from his émigré years (*The Defense*, *The Gift*, and *Invitation to a Beheading*) to his celebrated English-language works (*Lolita*; *Speak, Memory*; and *Pale Fire*).

SLAVIC 314-0 Chekhov Introduction to the fiction and plays of Anton Chekhov. Examination of Chekhov's writing in its Russian cultural context and his influence on English-language drama, fiction, and film.

SLAVIC 350-0 Folklore, Music, Poetry Traditional folk and religious folklore and poetry: from Biblical and Greek origins through East Slavic, Russian, and Western European works. Forms, literary and political implications, Russian and Western European poetic and rhythmic interrelations.

SLAVIC 367-1,2 Russian Film Development of Russian film and film theory from the silent era to the 1980s.

1. Golden Age of Russian cinema (Eisenstein, Pudovkin, Vertov, Protazanov, Vasiliev brothers, Dovzhenko, socialist realism). **2.** Russian film since World War II (more socialist realism, neorealism, Tarkovsky, Mikhalkov, Paradjanov, Abuladze; criticism and semiotic theory).

SLAVIC 368-0 Andrei Tarkovsky's Aesthetics and World Cinema Major films of Tarkovsky and of Russian and non-Russian directors whose work is related to his (Eisenstein, Wenders, Bergman, Kurosawa).

SLAVIC 369-0 20th-Century Russian Drama and Theater Modernist dramatic and theatrical traditions of Russia from the rise of the Moscow Art Theater to the advent of socialist realism. Dramas by Chekhov, Blok, Khlebnikov, Mayakovsky; productions of Stanislavsky, Diaghilev, Meierkhold; design innovations of Tatlin, Malevich, Exter.

SLAVIC 378-1,2 Visual Art in the Context of Russian Culture

Introduction to the history of Russian art: survey of major trends in Russian visual art in the dual contexts of Russian culture and European visual art. Focus on interconnections among visual arts, literature, and political history. **1.** Russian art from the medieval period to the beginning of the 20th century. **2.** Russian art of the 20th century.

SLAVIC 390-0 Literature and Politics in Russia More than in any other European tradition, Russian literature has played a central role in defining the nation's political agenda. The interaction of literature with Russian cultural and political history.

SLAVIC 392-0 Contemporary East European Literature Post-World War II literature of the Czech Republic, Hungary, Poland, Romania, and the former Yugoslavia; national identity, dissidence, and literary postmodernism.

Courses in Literature with Prerequisite in Russian

Unless otherwise indicated, the prerequisite for 300-level courses is 203-3, 303-3, or equivalent.

SLAVIC 359-1,2 Russian Prose Selected works of Russian masters. **1.** 19th century. **2.** 20th century. Content varies; may be repeated for credit. Prerequisite: consent of instructor.

SLAVIC 360-0 Survey of 19th-Century Russian Poetry

Introduction to the wealth of Russian 19th-century lyric poetry and basic techniques for its study: Pushkin, Baratynsky, Lermontov, Tyutchev, Fet. Prerequisite: consent of instructor.

SLAVIC 361-0 Survey of 20th-Century Russian Poetry

Introduction to the major currents of Russian 20th-century lyric poetry and basic techniques for its study: Tsvetaeva, Mayakovsky, Khlebnikov, Blok, Akhmatova, Mandelstam, Pasternak, Brodsky. Prerequisite: consent of instructor.

SLAVIC 398-0 Senior Seminar Topics vary yearly.

SLAVIC 399-0 Independent Study For majors selected as candidates for departmental honors; for other advanced students with consent of instructor.

SOCIOLOGY

www.sociology.northwestern.edu

The Department of Sociology offers preparation for students who want to pursue careers in social research, social policy applications, and teaching. It provides an excellent background for all professions involved in the major structures of modern society, such as business, public administration, law, medicine, journalism, and planning. The department also emphasizes the sociological perspective as a fundamental part of a liberal education and a discipline for developing a humane understanding of the world.

The department is particularly strong in the areas of urban studies, comparative historical sociology, the sociology of art and culture, deviance and social control, organizations, economic sociology, and the sociology of law, education, and science. The department offers a

wide variety of approaches to fundamental issues of social inequality and its origins and consequences, including class and economic domination, race, ethnicity, and gender. Unusually good opportunities are available for independent study, field internships, and the use of qualitative historical and comparative methods of research. In addition to the courses listed below, the department offers quarterly seminars on special topics of interest.

Major in Sociology

Department courses (11 units)

- 1 sociology course at the 100 or 200 level (except 101 and 226)
- 3 courses in methods of social research
 - 226 taken by the sophomore year
 - 303 and 329 taken in the junior year (CFS 393-1 may substitute for 329.)
- 306 (junior or senior year)
- 6 additional 300-level sociology courses
 - 398-1,2 (fall and winter quarters of the senior year) may count as 2 of the 6 courses.
 - Only 1 unit each of 376 and 399 may count.
 - CFS 393-2 may count for 1 of the 300-level courses.

Related courses (4 units)

4 300-level courses in African American studies, American studies, anthropology, Asian American studies, communication studies, economics, gender studies, history, international studies, linguistics, philosophy, political science, psychology, or statistics selected with the approval of the adviser

Minor Concentrations in Sociology

The Department of Sociology offers minor concentrations in sociological research and in sociological studies. Students seeking a minor in sociology must consult with the director of undergraduate studies.

Sociological Research

The minor concentration in sociological research prepares students to carry out their own research by offering an introduction to the discipline, followed by an array of courses in quantitative and qualitative methods. Students learn about the gathering and preparation of data for analysis as well as a variety of techniques and methods for presenting information, arguments, and conclusions; 2 300-level courses allow students to see how these methods are used in practice.

Minor in sociological research requirements (6 units)

- 110 or a 200-level sociology course
- 226
- 303 or equivalent
- 329
- 2 300-level sociology courses approved by the director of undergraduate studies

- Although they may be taken more than once, only 1 credit each of 376 and 399 may be counted toward the minor.
- 1 Chicago Field Studies internship course (CFS 393-1,2) may be substituted for 329 and another for 1 of the 2 additional 300-level courses.

Sociological Studies

The minor in sociological studies introduces basic information about the social world and provides the rudimentary tools to understand it. It prepares students to compare, evaluate, and critically analyze information about various institutions, processes of stratification, and social change.

Minor in sociological studies requirements (7 units)

- 110 or a 200-level sociology course
- 226
- 5 300-level sociology courses approved by the director of undergraduate studies
- Although they may be taken more than once, only 1 credit each of 376 and 399 may be counted toward the minor.
- 1 Chicago Field Studies internship course (CFS 393-1,2) may be substituted for 329 and another for 1 of the 5 additional 300-level courses.

Honors in Sociology

Students who complete all requirements for the major; maintain an overall grade point average of 3.3 or above and an average of 3.3 or above in their major courses; and complete an outstanding senior research project in 398-1,2 or its equivalent will be nominated for honors in sociology to the College Committee on Superior Students and Honors, which has final authority to grant the honors degree. For more information consult the director of undergraduate studies. See also Honors in the Major on page 38.

The Teaching of Sociology

Weinberg College students pursuing a major in sociology who also wish to be certified for secondary teaching of sociology with history must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP at the earliest opportunity.

Courses

SOCIOL 110-0 Introduction to Sociology Essential characteristics of group life. Interrelations of society, culture, and personality. Basic institutions and processes.

SOCIOL 201-0 Social Inequality: Race, Class, and Power Origins and functions of stratification. Class, prestige, and esteem. Interaction of racial and cultural groups in various settings. Black-white relationships in the United States.

SOCIOL 202-0 Social Problems: Norms and Deviance How issues emerge. Rules, rule enforcers, rule breakers; advocates,

opponents, and victims of problems. Blame, help, and entitlement. Current problems and systemic contradictions.

SOCIOL 203-0 Revolutions and Social Change Causes and outcomes of large-scale social change. Role of violence and revolution in the development of the modern world.

SOCIOL 204-0 Social Interaction: The Individual and Society Development of individual attitudes and behavior patterns through social interaction. Relation to students' everyday lives and problems.

SOCIOL 205-0 American Society How American society works as a whole. How major institutions relate and affect each other and how the different segments and strata of society experience such institutional processes. Tensions associated with differential experience of common and shared institutions.

SOCIOL 206-0 Law and Society Introduction to the role of law in American society. Relationship of law, inequality, and social change. Patterns of change in major legal institutions: the courts, the legal profession, and legal services for the poor.

SOCIOL 207-0 Problems of Cities Problems of American urban communities and possible solutions. Spatial, economic, and political trends; private and public decision making; class, race, and family needs. Consequences for adequate public services.

SOCIOL 215-0 Economy and Society Introduction to sociological approaches to economic life. Topics include property rights, illegal markets, money, economic inequalities, direct sales, and boycotts.

SOCIOL 216-0 Gender and Society Social determination of gender-appropriate behavior. Origins, values, and effects of sex-role stereotypes. How stereotypes fit social reality. Socialization (childhood and adult), values, economic opportunities in the United States, now and in the past.

SOCIOL 220-0 Health, Biomedicine, Culture, and Society Provides a broad introduction to controversies surrounding health and biomedicine by analyzing culture, politics, values, and social institutions. Taught with HUM 220; students may not earn credit for both courses.

SOCIOL 226-0 Sociological Analysis Logic and methods of social research, qualitative and quantitative analysis of social data, and ethical, political, and policy issues in social research. Foundation for further work in social research.

SOCIOL 232-0 Sexuality and Society Examination of the role of sexuality in the cultural, economic, political, and social organization of the United States. Sex work, sex tourism, sexual migration, LGBT social movements, and moral panics. Taught with GNDR ST 232; students may not earn credit for both courses.

SOCIOL 276-0 Introductory Topics in Sociology Introduction to different key issues in the field. Topics vary. May be repeated for credit with a different topic.

SOCIOL 301-0 The City: Urbanization and Urbanism

Theories of urbanization, housing, jobs, race and class, segregation, community and social networks politics,

reform policies and planning. Research projects. Prerequisite: 100- or 200-level course.

SOCIOL 302-0 Sociology of Organizations Structure and function of formal organizations, especially in business and government. Stratification, social control, and conflict. Discretion, rules, and information in achieving goals. Modes of participation. Development of informal norms. Prerequisite: 100- or 200-level course.

SOCIOL 303-0 Analysis and Interpretation of Social Data Introduction to quantitative methods: the interpretation of descriptive statistics, relationships between variables, and the logic of inferential statistics. Prerequisite: 226 or consent of instructor.

SOCIOL 305-0 Demography and Population Problems Social causes and consequences of population dynamics (fertility, mortality, marriage, divorce, migration) and population structures (age, sex, size, density). Possible roles of population changes in environmental and economic development problems. Prerequisite: 100- or 200-level course.

SOCIOL 306-0 Sociological Theory Sociological perspective as developed by classic theorists. Elucidation and testing of sociological principles in contemporary research. Primarily for sociology majors. Open to others with consent of instructor. Prerequisite: 226.

SOCIOL 307-0 School and Society Reciprocal influences between formal institutions of education and the broader society from different theoretical perspectives. Internal organization of schools. Extensively covers inequality in educational settings and outcomes by gender, class, and race/ethnicity. Prerequisite: 100- or 200-level course.

SOCIOL 308-0 Sociology of Deviance and Crime The social organization of crime and other misdeeds, explanations of crime and deviance, creating criminal law, policing, detection and investigation, prosecution, plea bargaining, the courts, sentencing, punishment, prisons, and alternatives to criminal law. Prerequisite: 110 or 202.

SOCIOL 309-0 Political Sociology Selected topics in political economy and sociology: revolutions, the development of the modern state, third world development, international conflict, politics of memory and civil society. Prerequisite: 100- or 200-level course.

SOCIOL 310-0 The Family and Social Learning Influence of socioeconomic and other structural and cultural resources and constraints on family structure and dynamics. Historical and comparative perspectives on the modern family. Prerequisite: 100- or 200-level course.

SOCIOL 312-0 Social Basis of Environmental Change The ways social patterns of production and consumption affect the natural environment, such as climate. Roles of social actors and structures in shaping environmental problems and policies. Prerequisite: 100- or 200-level course.

SOCIOL 314-0 Sociology of Religion Sociological approach to the study of American religion. Communities, practices, race, gender, and politics in the shaping of religion. Prerequisite: 100- or 200-level course.

SOCIOL 315-0 Industrial Revolutions Structure and culture of modern industry; consequences for class, status, management, and organization. Labor-force, formal, and informal organization. Union-management interaction. Industrialization and development. Prerequisite: 100- or 200-level course.

SOCIOL 316-0 Economic Sociology Sociological approach to production, distribution, consumption, and markets. Classic and contemporary approaches to the economy compared across social science disciplines. Prerequisite: 215 or ECON 202 or equivalent.

SOCIOL 317-0 Global Development Exploration of the economic and social changes constituting development, focusing on comparison between the historical experience in Europe and more recent processes in Africa, Asia, and Latin America. Prerequisite: 100- or 200-level course.

SOCIOL 318-0 Law, Courts, and Policies Sociological analysis of legal institutions such as courts, the police, and lawyers. Law, inequality, and social change. Prerequisite: 110 or 206.

SOCIOL 319-0 Sociology of Science Science as a social system. Personality, social class, and cultural factors in scientific development, creativity, choice of role, simultaneous invention, and priority disputes. Social effects on objectivity and bias.

SOCIOL 321-0 Armed Forces and Society Contemporary military institutions and sociological theory. Dynamics of combat, peacekeeping, race relations, gender, and other social issues. Prerequisite: 100- or 200-level course.

SOCIOL 322-0 Sociology of Immigration Sociological approach to immigration addressing such issues as assimilation, race/ethnicity, gender, transnationalism.

SOCIOL 323-0 American Subcultures and Ethnic Groups Differentiation, organization, and stratification by ethnicity, race, lifestyle, and other traits. Maintenance of subgroup boundaries and distinctiveness. Consequences of difference: identity, political and economic participation, group solidarity. Prerequisite: 100- or 200-level course.

SOCIOL 325-0 Sociology of Inequality Bases of social stratification. Effects on life conditions and social organization. Theoretical, methodological, and empirical dimensions. Emphasis on advanced industrial societies. Prerequisite: 226.

SOCIOL 327-0 Youth and Society How modern definitions of childhood and adolescence have evolved. Examines diversity across the lives of young people today and explores how they develop social networks and transition to adulthood. Prerequisite: 100- or 200-level course.

SOCIOL 329-0 Field Research and Methods of Data Collection Practicum in firsthand data collection using observation and structured and unstructured interviewing. Issues of reliability and validity and qualitative analysis. Prerequisite: 226.

SOCIOL 331-0 Markets, Hierarchies, and Democracies The forms and social structures for making economic and

political decisions in modern societies. Prerequisite: 100- or 200-level course.

SOCIOL 332-0 Work and Occupations: A Global Perspective Sociological perspectives on work. Work, class, status, and power. Society, economy, technology, and occupational structure; organization of workplace. Work in the global economy. Prerequisite: 100- or 200-level course.

SOCIOL 333-0 Law and Power How laws and social rules are related to the exercise of power by some people over others. Prerequisite: 100- or 200-level course.

SOCIOL 335-0 Sociology of Rational Decision Making Analysis of the role played by numerical and quantitative information in organizational decision making in the private and public sectors. Prerequisites: 215 and 302 or ECON 202 or consent of instructor.

SOCIOL 345-0 Class and Culture The role that culture plays in the formation and reproduction of social classes. Class socialization, culture and class boundaries, class identities and class consciousness, culture and class action. Prerequisite: 100- or 200-level course.

SOCIOL 347-0 Sociology of Time and Space Social construction of time and space. Standardization of time, maps as ideological documents, capitalist time and space, personal and social spaces and memories. Prerequisite: 100- or 200-level course.

SOCIOL 350-0 Sociology of the Arts Art as collective activity. Conventions in art and aesthetics. Professionals and audiences and other aspects of culture. Prerequisite: 100- or 200-level course.

SOCIOL 355-0 Medical Sociology Social construction of health and illness; inequalities in distribution of illness and health care; organization of health care work and occupations. Prerequisite: 100- or 200-level course.

SOCIOL 356-0 Sociology of Gender Gender and issues of social reproduction and social change with sexuality and reproduction emphasized. Prerequisite: 216 or 226.

SOCIOL 376-0 Topics in Sociological Analysis Advanced work on special topics in sociological study.

SOCIOL 380-7 Junior Year Tutorial Small seminar group in conjunction with various scheduled 300-level classes.

CFS 393-1,2 Field Studies in the Modern Workplace See Chicago Field Studies for a description.

SOCIOL 398-1,2 Senior Research Seminar Independent research projects carried out under faculty supervision. Prerequisite: 303, 329, or equivalent.

SOCIOL 399-0 Independent Study (1–2 units) Open with consent of department. Students may reenroll for consecutive quarters.

SPANISH AND PORTUGUESE

www.wcas.northwestern.edu/spanish-portuguese

The Department of Spanish and Portuguese offers courses in language, literature, and culture that speak to a variety of interests, whether focused on Latin America, Spain, or some aspect of literature, language, or culture that cuts across

geographic divides. Instruction in most courses is in Spanish, and the development of fluency in reading, speaking, and writing the language is an important goal of courses at all levels. The major and minor programs offered in Spanish and Portuguese are flexible and depend on students' initiative in pursuing particular interests within a framework of simple rules. Each student's major or minor program is subject to the approval of an adviser. Students who study Spanish are also encouraged to study Portuguese.

The Department of Spanish and Portuguese encourages all its students to study abroad, whether in the programs in Spain approved by Northwestern, the programs in Mexico, Argentina, or Chile sponsored by Cooperative Programs in the Americas (COPA), the summer programs at the Universidad de Guanajuato in Mexico, or other programs approved by the University's Study Abroad Office.

Spanish

Major in Spanish

The major in Spanish requires 15 courses taught in Spanish (with exceptions noted below). Each student, in consultation with an adviser, designs a program built around a concentration and representing a coherent pattern of study. Students may choose to concentrate on the literatures and cultures of Latin America, the literatures and cultures of Spain, or an appropriate combination of both. Many students fulfill some of the requirements for the major through courses taken abroad.

Prerequisite

- SPANISH 199, an AP score of 5, or a passing score on the oral section of the Spanish Language Placement Exam

Major in Spanish requirements (15 units)

- 201 or 202 (Heritage speakers of Spanish must take an appropriate substitute course.)
- 203 (Heritage speakers may take 207 as a substitute.)
- 204
- 220
- 3 courses chosen from 250, 251, 260, 261
- 6 300-level courses in the department that form an area of concentration, including at least 1 course that deals with a period earlier than 1800
- 2 elective courses at the 200 or 300 level taken in the department, in another department at Northwestern, or in study abroad programs, if these courses are related to the historical, literary, and/or cultural existence of Hispanic countries (courses taken outside the department must be preapproved by an adviser)
- A 300-level COMP LIT course that includes an important component of Latin American and/or Spanish literature and is taught by a member of the Department of Spanish and Portuguese may be substituted for

a 300-level course requirement. (Adviser approval is required to ensure nonduplication of courses.)

- A study abroad course taught in Spanish on any topic related to the historical and/or cultural existence of a Hispanic country may be substituted for 201, 202, or 301, if the course for which it is substituted has not already been taken.

Minor in Spanish

The minor in Spanish is primarily designed to enable students to achieve advanced competence in oral and written Spanish. It also offers the opportunity to explore the literatures and cultures of Latin America and Spain.

Prerequisite

- SPANISH 199, an AP score of 5, or a passing score on the oral section of the Spanish Language Placement Exam

Minor in Spanish requirements (8 units)

- All courses must be at or above the 200 level.
- At least 2 courses must be at the 300 level.
- Advanced heritage speakers may not count 201 or 202 toward the minor.

Honors in Spanish

The honors program in Spanish gives outstanding senior majors the opportunity to design and carry out a research project on the languages and literatures of Latin America and/or Spain under the close supervision of an adviser. The award of honors is made by a Weinberg College committee on the recommendation of the department. Students who desire more information about honors should check the department web site and contact a faculty adviser. See also Honors in the Major on page 38.

The Teaching of Spanish

Weinberg College students pursuing a major in Spanish who also wish to be certified for secondary teaching must be admitted to the Secondary Teaching Program in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Spanish Language Courses

SPANISH 101-1,2,3 Elementary Spanish For students who have studied Spanish less than two years. Communicative method. Development of speaking, listening, conversation, and grammar skills, as well as knowledge of Hispanic culture, through context. Three class meetings a week. Outside online video program twice a week.

SPANISH 115-1,2 Accelerated Elementary Spanish For students with some previous experience in Spanish. Communicative method. Development of speaking, listening, conversation, and grammar skills, as well as knowledge of

Hispanic culture, through context. Three class meetings a week. Outside online video program twice a week. Offered winter and spring. Prerequisite: Spanish Language Placement Exam.

SPANISH 121-1,2,3 Intermediate Spanish Communicative method. Further development of grammar, vocabulary, speaking, and writing skills through emphasis on cultural content and functional use of Spanish language. Three class meetings a week. Outside online video program twice a week. Prerequisite: 101-3, 115-2, or Spanish Language Placement Exam.

SPANISH 125-0 Accelerated Intermediate Spanish Communicative method. Further development of grammar, vocabulary, speaking, and writing skills through readings and short films. Three class meetings a week. Outside online video. Offered in fall only. Prerequisite: AP score of 3 or Spanish Language Placement Exam.

SPANISH 199-0 Language in Context: Contemporary Spain Intensive review and development of fluency and grammatical accuracy in speaking and writing through examination of contemporary Spanish culture. Prerequisite: 121-3, 125, AP score of 4, or Spanish Language Placement Exam.

SPANISH 201-0 Conversation on Human Rights: Latin America First course of a sequence designed to develop speaking strategies and structures through analysis of modern (20th- and 21st-century) Latin American culture. Emphasis on accurate informal conversation. Prerequisite: 199 or Spanish Language Placement Exam.

SPANISH 202-0 Conversation on Current Topics Second course of sequence designed to develop speaking strategies and structures through examination of culturally related topics in the Spanish-speaking world. Emphasis on formal conversation and specialized vocabulary. Prerequisite: 201, AP score of 5, or Spanish Language Placement Exam.

SPANISH 203-0 Individual and Society through Written Expression First course of a sequence designed to develop writing skills and structures through examination of the relationship between the individual and society. Emphasis on short texts and essays. Prerequisite: 201, AP score of 5, or Spanish Language Placement Exam.

SPANISH 204-0 Reading and Writing the Art of Protest Second course of a sequence designed to develop writing skills and structures through analysis of socially committed art. Emphasis on cultural analysis and development of longer essays. Prerequisite: 203 or 207.

SPANISH 207-0 Spanish for Heritage Speakers For heritage speakers without prior formal training in Spanish. Emphasis on writing, syntax, and formal modes of the language. Prerequisite: consent of department.

SPANISH 301-0 Topics in Language Special topics in historical, grammatical, or other linguistic aspects of Spanish. Prerequisites: 201 or 202; 203 or 207; 204.

Courses in Literature and Culture with Prerequisites in Spanish

SPANISH 210-0 Icons, Legends, and Myths in Spain

Diverse representations of historical, literary, and popular figures in Spain, such as the *caudillo*, the *obispo*, El Cid, and Don Juan. Prerequisites: 201 or 202; 203 or 207; 204 (may be taken concurrently).

SPANISH 211-0 Icons, Legends, and Myths in Latin America

Diverse representations of historical, literary, and popular figures in Latin America, such as the *conquistador*, the dictator, the *gaucho*, Simón Bolívar, Che Guevara, Evita, La Malinche, and Carlos Gardel. Focus on forms of representation such as films, documentaries, musical theater, biography, narrative fiction, poetry, and commercial art. Prerequisites: 201 or 202; 203 or 207; 204 (may be taken concurrently).

SPANISH 220-0 Introduction to Literary Analysis

Introduction to textual analysis and to topics such as genre, narratology, prosody, and figurative language, aiming to prepare the student to read, discuss, and write analytically in Spanish about literature and culture. Prerequisites: 201 or 202; 203 or 207; 204 (may be taken concurrently).

SPANISH 250-0 Literature in Spain before 1700 Survey of the origins of the Spanish language and the development of Spanish literature from the Middle Ages to the end of the Spanish Golden Age. Study of representative figures and major literary developments in conjunction with political and cultural history. Prerequisite (may be taken concurrently): 220.

SPANISH 251-0 Literature in Spain since 1700 Survey of literature in Spain from the 18th to the 20th century. Study of representative figures and major literary developments in conjunction with political and cultural history. Prerequisite (may be taken concurrently): 220.

SPANISH 260-0 Literature in Latin America before 1888

Survey of pre-Hispanic, colonial, and romantic traditions in Latin America. Focus on authors and texts such as Popul Vuh, Cristóbal Colón, Inca Garcilaso de la Vega, Sor Juana Inés de la Cruz, Domingo Faustino Sarmiento, and Martín Fierro. Prerequisite (may be taken concurrently): 220.

SPANISH 261-0 Literature in Latin America since 1888

Survey of the modern period, including modernismo, the historical avant-garde, the “Boom,” and recent literary trends. Authors such as Delmira Agustini, Jorge Luis Borges, Julio Cortázar, Rubén Darío, Gabriel García Márquez, José Martí, Pablo Neruda, Cristina Peri Rossi, and Elena Poniatowska. Prerequisite (may be taken concurrently): 220.

SPANISH 310-0 Origins of Spanish Civilization Spanish literature from its beginnings to the end of the Middle Ages: epic poems, lyrics, and romances. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 320-0 Golden Age of Poetry and Prose Major authors of the 17th century, including Garcilaso de la Vega, Fray Luis de León, and Santa Teresa de Jesús. Works by Cervantes other than *Don Quixote*. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 321-0 Golden Age Drama Major dramatists of the 17th century, including Lope de Vega, Tirso de Molina, and Calderón de la Barca. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 323-0 Cervantes Close reading of *Don Quixote*, with attention to its historical and cultural context. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 330-0 The Age of Romanticism in Spain Analysis of the principal literary forms of the romantics in relation to major themes and ideas of the age and to key historical events such as the end of the Spanish Empire and the establishment of the new liberal regime. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 331-0 Realism in Spain: The Problem of Representation Theories and practices of realist authors in modern Spanish literature. Issues of literary representation and mimesis. Aesthetic and ideological foundations of realism in the 19th century and in 20th-century variants such as social realism, antirealism, and postmodern documentarism. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 332-0 Avant-Garde Writers and Experimental Fiction in Spain Aesthetic principles, modes of writing, and uses of media of avant-garde writers and artists in 20th-century Spain. The use of experimental forms in the critique of the bourgeois order and late capitalist society. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 333-0 The Spanish Civil War: The Good Fight Analysis of the Spanish Civil War (1936–39) and its effects on 20th-century Spanish culture and society. Issues may include the relationship between utopic thought and artistic avant-gardes during this period; literary and filmic representations of the war; and the war's connections to Nazi Germany and World War II. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 334-0 Memory, History, and Fiction in Spain since 1930 The uses of memory and history in fiction and film produced after the proclamation of the Second Republic. Approaches to rewriting myth and history in autobiography, historiography, and historical fiction. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 335-0 Modern Fiction in Spain: Studies in Genre Study of literary genres (narrative, poetry, drama) or subgenres (detective fiction, autobiography, the fantastic). May be repeated for credit with different topic. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 340-0 Colonial Latin American Literature Major texts and writers of the early colonial period, including chronicles of discovery and conquest from both indigenous and Hispanic sources. Works by authors such as Alvar Núñez Cabeza de Vaca, Hernán Cortés, Bernal Díaz del Castillo, Inca Garcilaso de la Vega, Felipe Guaman Poma de Ayala, Bartolomé de las Casas, Sor Juana Inés de la Cruz, and Carlos de Sigüenza y Góngora. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 341-0 Latin American Modernismo Significant poetry, narrative, and criticism from the late 19th and early 20th centuries. Topics such as decadence, aestheticism, the *flâneur* and the *rastacuero*, cosmopolitanism, the modern city, and exoticism. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 342-0 Region and Rootedness in Latin America Literary traditions evolving from Latin American conceptions of regional and indigenous cultures in the 19th and 20th centuries. Authors such as José María Arguedas, Miguel Ángel Asturias, Rosario Castellanos, Rómulo Gallegos, José Hernández, José Carlos Mariátegui, Clorinda Matto de Turner, and José Eustasio Rivera. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 343-0 Latin American Avant-Gardes Poetry, prose, and visual art by major figures and groups in 20th-century vanguard movements. Works by authors such as Roberto Arlt, Jorge Luis Borges, Alejo Carpentier, Nicolás Guillén, Felisberto Hernández, Vicente Huidobro, Manuel Maples Arce, and César Vallejo. Prerequisite: 250, 251, 260, or 261.

SPANISH 344-0 Borges The poetry, essays, and short fiction of Jorge Luis Borges. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 345-0 Reading the “Boom” Historical, literary, and cultural characteristics of the “Boom” in the 1960s and 1970s and the development of the “new” narrative in Latin America. Readings include novels, short fiction, and essays by authors such as Guillermo Cabrera Infante, Julio Cortázar, José Donoso, Carlos Fuentes, Gabriel García Márquez, Manuel Puig, Juan Rulfo, and Mario Vargas Llosa. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 346-0 Testimonial Narrative in Latin America Study of the tradition of testimonial writing in Latin America with attention to cultural, political, and historical contexts and questions of truth, memory, and subjectivity. Works by authors such as Miguel Barnet, Gabriel García Márquez, Rigoberta Menchú, Alicia Partnoy, Elena Poniatowska, Jacobo Timerman, and Rodolfo Walsh. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 347-0 Literature and Revolution in Latin America Revolutionary practices in Latin American literatures as well as literary representations of revolution. Authors such as Mariano Azuela, Nellie Campobello, Alejo Carpentier, Roque Dalton, Carlos Fuentes, Pablo Neruda, and Rodolfo Usigli. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 360-0 Spain: Studies in Culture and Society Significant issues in the social, political, and cultural development of Spain. Prerequisites: 201-1 or 201-2; 202-1 or 207; 202-2; and 1 other 200-level literature or culture course.

SPANISH 361-0 Latin America: Studies in Culture and Society Analysis of the history of culture in Latin America with an emphasis on the intersection of politics, society, and literature and on the relationship between literary and visual culture. Prerequisite: 201 or 202; 203 or 207; 204; and 1 other 200-level literature or culture course.

SPANISH 380-0 Topics in Film: The Silver Screen in Latin America and/or Spain Introduction to film in Latin America and/or Spain during the 20th century. Topics vary and may include a historical survey of film, a study of films of a specific period, a comparative analysis of literary works and cinematic adaptations, or the work of specific filmmakers. May be repeated for credit with different topic. Prerequisite: 201 or 202; 203 or 207; 204; and 1 other 200-level literature or culture course.

SPANISH 390-0 Undergraduate Seminar Advanced course on topics in literature and culture; oriented toward the development of an individual research project. Open to qualified seniors with consent of an adviser. Prerequisite: consent of adviser.

SPANISH 395-0 Special Topics in the Literatures of Latin America and/or Spain Advanced study of topics in the literary traditions of either Latin America or Spain. Possible topics include intellectual history, transatlantic exchanges, the short story, literature of the fantastic, feminist traditions, hybrid cultures, and history and fiction. May be repeated for credit with different topic. Prerequisite: 1 course from 250, 251, 260, or 261.

SPANISH 399-0 Independent Study Independent reading under supervision. Consultation with director of undergraduate studies required.

Courses with Reading and Discussion in English

These courses may not be taken for major or minor credit.

SPANISH 223-0 Cervantes Study of *Don Quixote* and other selected works with attention to the historical and cultural context of the 17th century.

SPANISH 225-0 Nationalism, Borders, and Immigration in Spain Interdisciplinary approach to national identity and nationalism in Spain with attention to political and cultural struggles for regional autonomy and to social conflicts arising from immigration.

SPANISH 230-0 Margins and Centers in Latin American Literature and Culture Interdisciplinary analyses of the complex dynamic between social, political, and cultural peripheries and centers as represented in literary and cultural production. Topics include city and country, cosmopolitanism and localism, graphic and oral cultures, and the original and its derivatives.

SPANISH 231-0 The "New" Latin American Narrative Emphasis on novels and short fiction from the Latin American "Boom" of the 1960s and 1970s, with attention also to important precursors and recent trends. Focus on works by writers such as Isabel Allende, Jorge Luis Borges, Julio Cortázar, Carlos Fuentes, Gabriel García Márquez, Manuel Puig, Severo Sarduy, and Luisa Valenzuela.

SPANISH 397-0 Topics in Hispanic Literatures and Cultures Aspects of the literatures and cultures of Latin America and Spain. Possible topics include postcolonial criticism and its reception in Hispanic cultures, notions of translation, theories of poetics, orality and oral culture, literature

and film, the memoir, and travel writing. May be repeated for credit with different topic.

Portuguese

Portuguese Language Courses

PORT 111-1,2,3/112-1,2,3 Intensive Portuguese This three-quarter, rapid-study course sequence emphasizes spoken Brazilian Portuguese. With six hours in class and two hours of independent laboratory work per week, it covers the content of a traditional first- and second-year language acquisition sequence in one academic year. Each quarter students must register for both 111 and 112, for which they earn two credits. Prerequisites for 111-1 and 112-1: None. For 111-2 and 112-2: 111-1 and 112-1 or placement examination. For 111-3 and 112-3: 111-2 and 112-2 or placement examination.

Portuguese 115-1, 2 Accelerated Elementary Portuguese For students proficient in Spanish. Comparative sociolinguistic and interactive approach to communicative competence emphasizing pronunciation, intonation, sentence structure, and patterns of spoken and written Portuguese. Prerequisite: SPANISH 207 or equivalent proficiency in Spanish.

PORT 201-0 Reading and Speaking Portuguese This intermediate course is designed to expand mastery in reading and speaking Brazilian Portuguese through select cultural videos, readings of literary *crônicas*, periodicals, and the Internet. Prerequisite: 111-3/112-3 or placement examination.

PORT 202-0 Reading and Writing Portuguese Instruction in reading and writing expository and narrative prose. Emphasis on vocabulary, linguistic skills, and syntax appropriate to formal written Portuguese. Prerequisite: 111-3/112-3 or placement examination.

PORT 210-0 Icons, Legends, and Myths in Brazil Representations of historical, literary, and popular figures who live in the national imagination. The course focuses on graphic materials, documentaries, film, theater, folklore, narrative fiction, and popular music. Prerequisites: 201, 202, or placement examination.

PORT 303-0 Topics in Advanced Portuguese Advanced review of grammar concepts and idiomatic use of spoken and written Portuguese. Deals with a variety of topics in the context of Brazilian culture, history, literature, and current events. May be taken more than once for credit with change of topic. Prerequisite: 202 or equivalent.

PORT 399-0 Independent Study Independent study under supervision. Consultation with the director of undergraduate studies required.

STATISTICS

www.statistics.northwestern.edu

Statistics is the scientific discipline that deals with the collection, organization, analysis, and interpretation of numerical data. Statistical methods are widely used in observational

studies and for the design and analysis of experiments, sample surveys, and censuses. Such analysis involves both description of the properties of groups of observations and problems of drawing inferences from such data. Applications to the biological, social, and physical sciences are widespread, and statistical analyses are increasingly required in actuarial work, accounting, finance, engineering, medicine, and law.

Major in Statistics

Department courses (9 units)

- 1 introductory course: 202, 210, or equivalent
- 320-1,2, 325, 350
- 4 additional 300-level courses offered by the department. MATH 310-2 (or IEMS 315) and IEMS 305 may each substitute for 1 of these 4 courses.

Related courses (*units depend on mathematics sequence taken*)

- MATH 220 and 224 (or 212, 213, and 214)
- MATH 230, 234, and 240 (or 281-1,2,3 or 285-1,2,3 or 290-1,2,3 or 291-1,2,3)

Minor in Statistics

Students who complete the minor in statistics receive serious exposure to probability theory, statistical estimation theory, statistical analysis, and the design of statistical data collection. Students choosing to minor in statistics are required to complete MATH 220 and 224 (or 212, 213, and 214) and 230, 234, and 240 (or 281-1,2,3 or 285-1,2,3 or 290-1,2,3 or 291-1,2,3).

Minor requirements (6 units)

- 202, 210, or equivalent
- 320-1,2, 325
- 350 or ECON 381-2
- 1 other 300-level statistics course

Honors in Statistics

Departmental majors with outstanding records both overall and within the department may apply for graduation with departmental honors. A departmental recommendation for honors requires that students take 2 quarters of 399, during which a research paper is developed. In addition, students must have a grade point average of at least 3.5 in courses for the major beyond the basic courses. For more information consult the director of undergraduate studies. See also Honors in the Major on page 38.

Courses

STAT 201-0 Statistics and Public Policy Basic statistical concepts and techniques introduced via case studies of interesting public policy issues. The cases illustrate methods of data collection and analysis.

STAT 202-0 Introduction to Statistics Data collection, summarization, correlation, regression, probability, sampling, estimation, tests of significance. Does not

require calculus and makes minimal use of mathematics. 202 and 210 cannot both be taken for credit.

STAT 210-0 Introductory Statistics for the Social Sciences

A mathematical introduction to probability theory and statistical methods, including properties of probability distributions, sampling distributions, estimation, confidence intervals, and hypothesis testing. 210 is primarily intended for economics majors. 202 and 210 cannot both be taken for credit. Prerequisite: strong background in high school algebra (calculus is not required).

STAT 232-0 Applied Statistics Basic concepts of using statistical models to draw conclusions from experimental and survey data. Topics include simple linear regression, multiple regression, analysis of variance, and analysis of covariance. Practical application of the methods and the interpretation of the results will be emphasized. Prerequisites: 202, 210, or equivalent; MATH 220.

STAT 320-1,2 Statistical Methods 1. Distribution functions, densities, measurement of location and scale, random sampling, random variables, sampling statistics, hypothesis tests, confidence intervals, parameter estimation, and nonparametric methods. **2.** Correlation and regression, contingency tables, analysis of variance, design and analysis of experiments. Students may not receive credit for both 320-1 and any of MATH 310-2, 383, 385, or EECS 302. Prerequisites for 320-1: 202 or 210, MATH 234; for 320-2: 320-1.

STAT 325-0 Survey Sampling Probability sampling, simple random sampling, error estimation, sample size, stratification, systematic sampling, replication methods, ratio and regression estimation, cluster sampling. Prerequisites: 2 quarters of statistics or consent of instructor.

STAT 338-0 History of Statistics Historical survey of the development of modern statistics, from Bernoulli's law of large numbers to the contributions of R. A. Fisher. Prerequisite: 320-2 or equivalent.

STAT 344-0 Statistical Computing Theoretical and practical problems in the development and use of statistical computing systems for numerical and graphical analysis of data. Prerequisites: 2 courses chosen from 320-2, 350, 351, PSYCH 351, MATH 240, or equivalent.

STAT 345-0 Statistical Demography Introduction to statistical theory of demographic rates (births, deaths, migration) in multistate setting; statistical models underlying formal demography; analysis of error in demographic forecasting. Prerequisite: 350, MATH 240, or equivalent.

STAT 350-0 Regression Analysis Simple linear regression and correlation, multiple regression, residual analysis, selection of subsets of variables, multicollinearity and shrinkage estimation, nonlinear regression. Prerequisite: 320-2 or equivalent.

STAT 351-0 Design and Analysis of Experiments Methods of designing experiments and analyzing data obtained from them: one-way and two-way layouts, incomplete block

designs, factorial designs, random effects, split-plot and nested designs. Prerequisite: 320-2 or equivalent.

STAT 352-0 Nonparametric Statistical Methods Survey of nonparametric methods, with emphasis on understanding their application. Prerequisite: 320-2 or equivalent.

STAT 355-0 Analysis of Qualitative Data Introduction to the analysis of qualitative data. Measures of association, log-linear models, logits, and probits. Prerequisite: 320-2 or equivalent.

STAT 359-0 Topics in Statistics Topics in theoretical and applied statistics to be chosen by instructor. Prerequisite: consent of instructor.

STAT 365-0 Introduction to the Analysis of Financial Data Use of time series and regression models in the analysis of financial data. Topics covered include models for returns, portfolio theory, capital asset pricing model, and options pricing. Prerequisites: MATH 240 and at least 2 courses in probability and statistics.

STAT 398-0 Undergraduate Seminar

STAT 399-0 Independent Study Independent work under the guidance of a faculty member. Permission of department required.

Relevant Courses in Other Departments

- IEMS 202, 305, 315 (see McCormick School chapter)
- MATH 310-1,2,3

SWAHILI

See African and Asian Languages.

TURKISH

See African and Asian Languages.

URBAN STUDIES

www.urbanstudies.northwestern.edu

The Program in Urban Studies enables a student with another major in Weinberg College or another Northwestern school to not only master that major but also to complement it with a second major in urban studies. The purpose of the program is to introduce students to an interdisciplinary perspective on the city and its problems and promises, bringing together faculty and students who share common interests but have different academic backgrounds. Courses are drawn primarily from such social sciences as anthropology, economics, geography, history, political science, and sociology, as well as from other departments when relevant. In addition to the following requirements, it is recommended that students who major in urban studies complete a methods or statistics course in one of the social science departments and participate in an urban-related field studies program.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

Adjunct Major in Urban Studies

Adjunct major requirements (9 units)

- 7 urban-relevant courses
 - Courses must be approved by the program director, who maintains a list of routinely approved courses.
 - At least 4 courses must be at the 300 level.
- 398-1,2 senior thesis seminar, to be completed during fall-winter or winter-spring quarters of the senior year. Students who complete a thesis in another department may substitute 2 other 300-level urban-relevant courses with the approval of the program director.
- All adjunct majors require the completion of a stand-alone major as well. No course may be double-counted toward the urban studies adjunct major and another major.

Honors in Urban Studies

All urban studies majors who complete a senior thesis in the area are considered for departmental honors. Those who earn a minimum grade point average of 3.3 in urban studies courses and whose thesis is judged by the program's honors committee to be of sufficiently high quality are recommended to the college for graduation with honors in urban studies. See also Honors in the Major on page 38.

Course

URBAN ST 398-1,2 Urban Studies Seminar Open to senior majors in urban studies. Interdisciplinary approach to urban studies entailing design and execution of a research project over 2 quarters. Grade of K given in 398-1 changed to letter grade after completion of 398-2.

URBAN ST 399-0 Independent Study Independent work under the guidance of a faculty member. Permission of the program director required.

WRITING PROGRAM

www.writingprogram.northwestern.edu

The Writing Program is an independent Weinberg College unit that seeks to help all Northwestern undergraduates learn to write clearly and persuasively. A core faculty of experienced writing instructors teach the program's main sequence of introductory, intermediate, and advanced expository writing courses. These are listed as ENGLISH 105, 105-6, 106, 205, and 305. Writing courses are limited to 15 students, allowing instructors to comment extensively on students' writing and to meet regularly with students in individual conferences. Courses at every level emphasize revision, with the goal of strengthening each student's ability to think clearly, analyze carefully, argue convincingly, and communicate effectively.

The Writing Program also operates the Writing Place, a center that provides free composition tutoring and consulting for all Northwestern students. The Writing

Place, located in University Library, is open most mornings, afternoons, and evenings during the academic year. Students may make appointments, use the schedule of drop-in hours, or interact with Writing Place tutors through the campus computer network.

In addition, the Writing Program helps to oversee writing requirements — and thus provides writing advising — for undergraduates in Weinberg College, the McCormick School, and the Henry and Leigh Bienen School of Music. Members of the Writing Program faculty teach specialized courses and workshops, as needed. In recent years the Writing Program has collaborated extensively with other University programs and departments, developing new ways to integrate writing instruction with instruction in other disciplines, such as engineering design. In all its courses and special offerings, the Writing Program concentrates on helping students develop skill, confidence, and insight as writers.

Students interested in a writing major should see the English Major in Writing in the English section.

Courses

ENGLISH 105-0 Expository Writing See English.

ENGLISH 106-1,2 Writing in Special Contexts See English.

ENGLISH 205-0 Intermediate Composition See English.

ENGLISH 304-0 Practical Rhetoric See English.

ENGLISH 305-0 Advanced Composition See English.

YIDDISH

See German.

School of Communication

www.communication.northwestern.edu

Communication is at the root of nearly everything we do, and mastering the art of communication can open doors in a wide range of careers, from law and medicine to acting, directing, writing, and producing.

The School of Communication's mission is based on a philosophy of performance. We seek to improve the practice of communication, whether on the stage or screen, at the podium, in the clinic, or in everyday life.

The school is committed to building the basic and applied sciences of communication; developing theoretical and critical perspectives on communicative performances; creating new technologies for communication and new modes of artistic expression; and helping students to be more effective in their work, at home, and in civic life by applying principles of communication. Undergraduates work in partnerships with world-class faculty to create new understandings and develop new approaches to human communication. The curriculum provides students with a solid liberal-arts education that broadens and enriches their studies of human expression and interaction.

Founded by Robert Cumnock in 1878, the School of Communication is now the third largest of Northwestern's six undergraduate divisions. It annually enrolls more than 1,200 undergraduate majors and 400 graduate students.

Originally, the curriculum and its related activities were concerned with public speaking and interpretative reading as performing arts. As the field grew, the school added instruction in theatre, speech pathology, audiology, radio, television, film, and other specialties in oral communication. Throughout its history the school has often been a pioneer in new fields of study, including film and audiology.

Today the five departments of instruction represent the diverse spectrum of study in the field of communication: communication sciences and disorders; communication studies; performance studies; radio/television/film; and theatre (including dance). All departments offer graduate courses. The School of Communication sponsors dance, debate, media arts, and theatre arts divisions of Northwestern's National High School Institute.

This wide range of educational activities is housed in the Frances Searle Building — which includes administrative offices, a student resource center, two departmental offices, and laboratory and research spaces — as well as in the school's original building, Annie May Swift Hall; two former residences on Chicago Avenue; the Theatre and Interpretation Center; and John J. Louis Hall, a state-of-the-art studio production facility.

In 2008 Northwestern opened a branch campus in Qatar, where programs in communication and journalism are offered. (See Campuses in The University chapter of this catalog.)

ACADEMIC POLICIES

Requirements for the Degree of Bachelor of Science in Communication and the Degree of Bachelor of Arts in Communication

The School of Communication grants the degree of bachelor of science in communication upon (1) the satisfactory completion of 45 course units; (2) the fulfillment of the distribution requirement of the student's major department; and (3) the completion of an approved program of study in communication and related fields suited to the student's special interests and needs. In the Departments of Communication Studies and Radio/Television/Film, the required program of study includes language requirements. Please see the major requirements for details. If students interrupt the program of study for an extended period of time and degree requirements are changed during this period, they are normally held to the new requirements.

In addition to and independent of the requirements set by the School of Communication, students must satisfy the Undergraduate Residence Requirement (see page 17).

The Departments of Communication Studies, Performance Studies, Radio/Television/Film, and Theatre (including dance) offer the bachelor of arts in communication. The requirements for this degree are identical to the requirements for the bachelor of science in communication with the addition of a foreign language requirement. To earn the bachelor of arts in communication, students — in addition to completing the degree requirements for the bachelor of science — must demonstrate two-year proficiency in a classical or modern foreign language. Proficiency is established in precisely the same manner as in the Weinberg College of Arts and Sciences; see page 36 in the Weinberg College chapter of this catalog.

General Requirements

Of the 45 courses required for all major programs in the School of Communication, the last 23 courses must be taken while the student is enrolled as an undergraduate in Northwestern University, and the student must be enrolled in the School of Communication for the last 3 quarters preceding the granting of the degree. Credit for summer

work taken at other colleges or universities as part of the last 23 courses requires approval by petition.

Of the required 45 units, 35 must be completed with grades of A, B, or C (grades of C- do not satisfy this requirement). A minimum of 18 courses must be taken outside the major department (see distribution requirements, below). All courses applied to a major, minor, and adjunct major and all distribution courses must be completed with a grade of C- or higher. Courses offered by the major department may not be taken for a P grade regardless of how they are applied to degree requirements. D and P grades may apply only to the elective requirement.

A transfer student will be required to complete at least 11 courses in the School of Communication at Northwestern. A communication placement interview is required at the time of first registration for all transfer students.

Distribution Requirements

All major programs in communication require 18 courses outside the major department in the following areas:

- Science, mathematics, and technology
- Individual and social behavior
- Humanities and fine arts

Students should consult the department concerned for the range of disciplines within each category and the number of courses required.

Major Programs in Communication and Related Requirements

All students in the School of Communication must meet the requirements of one of the following major programs: human communication sciences, communication studies, performance studies, radio/television/film, theatre, or dance. Basic communication courses are required in all programs, and provisions are made for study in other divisions of the University to complement the major program.

Student Conduct in Communication Courses

All undergraduate students enrolled in School of Communication courses are held accountable to the University's standards of academic integrity (see Academic Integrity on page 22 in the Undergraduate Education chapter of this catalog). They also are responsible for compliance with the following standards:

- Attendance is required in all courses, and excessive absence is cause for failure.
- Credit will not be given for 2 courses that meet at the same time.
- All assigned work must be completed to receive course credit.
- Assignments must be turned in on time, and examinations must be taken as scheduled; assignments cannot be made up or grades of incomplete given without prior approval from the instructor.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

ACADEMIC OPTIONS

Minor Programs

The School of Communication offers five minor programs: dance, film and media studies, human communication sciences, sound design, and theatre. Students cannot earn both a major and a minor in the same area. Students wishing to pursue a minor should contact the appropriate department to be assigned a minor adviser. No course for the minor may be taken utilizing the P/N option, and all classes must be completed at a grade of C- or higher in order to be counted toward the minor. School of Communication minors are open to all Northwestern undergraduate students. Please see the appropriate departmental sections for descriptions of the minors in human communication sciences, theatre, and dance. The Department of Radio/Television/Film administers the minor programs in film and media studies (see page 169) and sound design (see page 169).

Certificate Programs

The Department of Radio/Television/Film administers the Certificate Program in Creative Writing for the Media (see page 169). The Certificate in Music Theatre is jointly offered by the Department of Theatre (see page 173) and the Bienen School of Music's voice and opera program.

Independent Study

Independent study is available by petition to juniors and seniors who have a minimum 3.0 grade-point average. Petitions are available in the Undergraduate Resource Center at Frances Searle 1-102, in department offices, and online at www.communication.northwestern.edu/src/forms. Students must secure a faculty sponsor to guide their independent study. The undergraduate dean must approve all independent study proposals. The School of Communication does not limit the number of independent studies that a student may take, but only 2 units of 399 may apply to the major degree requirements and only 2 units of 399 to the distribution requirements. Additional units of 399 are counted as electives. Independent study may not be taken using the P/N option. Some majors have additional rules regarding independent study; see the major requirements for details.

Internships

www.communication.northwestern.edu/learn/internships/about.php

Internships (also sometimes referred to as field studies) allow students to gain valuable organizational experience

and apply theoretical knowledge to situations outside the classroom. Students may receive up to four academic credits by enrolling in a weekly seminar led by an internship coordinator as well as working at an internship. One credit may be applied to the major requirements, and the remaining credits are electives. Full-time internships are available in Chicago, Los Angeles, and New York City and may be coordinated in other cities on a case-by-case basis. Internships are coordinated through the Office of External Programs, Internships, and Career Services (EPICS). Interested students should visit the web site and contact their advisers.

Junior Tutorials

Junior tutorials are small seminars, open to juniors only, taught by School of Communication professors on unique topics. The tutorials may count as School of Communication courses and as major courses if taught by a professor in the student's major department. They are listed in CAESAR under CMN-related courses and are distributed through Spotlight every quarter. Students may take one junior tutorial; additional enrollments require approval of the undergraduate dean.

Student-Organized Seminars

A student-organized seminar (SOS) consists of a small group of students (under the sponsorship of one or more faculty members) who explore a specific topic not covered in the University curriculum. Typically, nine or fewer students participate, each preparing a written seminar paper and making an oral presentation at one of the class meetings. Before the School of Communication approves an SOS course, a copy of the seminar's proposal, signed by the sponsor and the department chair, must be submitted to the undergraduate dean. Guidelines for proposing an SOS are available in the Student Resource Center at Frances Searle 1-101 and online at www.communication.northwestern.edu/src/forms.

Research Practica

Opportunities sometimes arise for a student to work on a faculty member's research team. Sometimes faculty will invite students to participate in a practicum, but students may also approach a professor whose research particularly interests them.

Students are registered for research practica through the Student Resource Office at Frances-Searle 1-101 or via permission number from the professor. Professor approval is required to register.

Study Abroad

www.northwestern.edu/studyabroad

Students are encouraged to study abroad because it is an important educational experience. Most aspects of

study abroad are handled by the Study Abroad Office, 630 Dartmouth Place. For more information see the Undergraduate Education chapter of this catalog.

Graduate Study

The School of Communication has been a national center for graduate study and research in the fields of communication arts and sciences for many years. Programs for the master of arts, master of fine arts, and doctor of philosophy degrees with majors in communication are administered by the Graduate School of Northwestern University. All candidates for these degrees must satisfy the Graduate School requirements. The school itself offers the doctor of audiology and master of science in communication degrees.

Requirements for the departmental and thesis master's degrees, the master of fine arts, and the doctor of philosophy degrees in any division of the School of Communication are described in the Graduate School catalog. Requirements for the master of science in communication and doctor of audiology degrees are available from the School of Communication.

STUDENT RESOURCES

Academic Advising

Each student is assigned an adviser within the School of Communication. This adviser is available for consultation, especially for the purpose of planning for the next registration. Freshmen have a separate advising period before the fall registration. Ultimate responsibility for meeting degree requirements rests with the student.

Cocurricular Activities and Programs

A variety of cocurricular opportunities are available to School of Communication students. Each fall Northwestern's Activities Fair offers information on options in addition to those listed here.

Arts in the City

Arts in the City is a program offered exclusively to students of the School of Communication. It gives them the opportunity to experience the best arts in Chicago for a nominal fee that includes ticket and transportation. These events particularly showcase the talents of those connected with Northwestern and allow students to socialize with faculty and peers.

Block Cinema

Dedicated to providing the campus, the North Shore, and Chicago with a high-quality venue for repertory cinema, Block Cinema screens classic and contemporary films three nights a week in the Block Museum's state-of-the-art projection facility.

Dean's Advisory Council

The Dean's Advisory Council consists of 20 undergraduate students currently enrolled in the school (4 from each of the five departments, representing the freshman, sophomore, junior, and senior classes). The council meets once each quarter and holds additional meetings as needed. Applications are available during winter quarter from the Student Resource Center at Frances Searle 1-102.

Debate Society

The Northwestern debate program was founded in 1855, making it the oldest in the country. Debaters develop valuable analytical and communication skills by participating in more than 600 rounds of intercollegiate competition each season, in addition to hosting debate tournaments on campus and debating teams from other countries. Headquartered in Hardy House, the debate program has achieved unequalled success in competition, winning the National Debate Tournament a record 13 times. For more information contact the Department of Communication Studies.

Inspire Films

Inspire Films is a Northwestern student initiative aiming to produce social-issue films that engage with topics affecting our local and international communities. Believing that film has the power to motivate thoughtful discussion and action, Inspire Films produces media and relevant programs that inspire thought, dialogue, critical discussion, and action with regard to various social issues. Inspire's goal is to create an interdisciplinary approach to filmmaking, allowing students from across disciplines to work together in creating socially responsible and critical media. For more information see www.inspirefilms.org.

Lambda Pi Eta

Lambda Pi Eta is the official communication studies honor society of the National Communication Association (NCA). Its purpose is to recognize, foster, and reward outstanding scholastic achievement in communication studies; stimulate interest in the field of communication; promote and encourage professional development among communication majors; provide an opportunity to discuss and exchange ideas in the field of communication; establish and maintain closer relationships between faculty and students; and explore options for graduate education in communication studies. The Pi Theta chapter was established at Northwestern as a selective academic honor society that seeks to represent and serve the School of Communication through academic and social events and projects. The chapter also seeks to provide resources and information to the student community; encourage a free exchange of ideas among the student body; and create a common meeting ground for the diverse fields of interest within the School of Communication.

Niteskool

Niteskool Productions is Northwestern's student-run music, music video, and concert production company. It is the oldest undergraduate student-run label in the country. Supported by the School of Communication and Northwestern's Associated Student Government, Niteskool has established itself as the leader in promoting and producing student music in the Chicago area. Niteskool's goal is to develop and distribute the nation's highest-quality music album that is completely conceived, performed, directed, and produced by students. For more information see groups.northwestern.edu/niteskool.

Speech Team

Sponsored by the School of Communication, Northwestern's speech team serves to develop what is arguably the most important skill of any profession — the art of communication. Through the forum of public speaking, students learn to communicate effectively in a competitive environment that stresses logic, quick thinking, breadth of knowledge, and, ultimately, persuasion. Eligibility is open to any Northwestern undergraduate, regardless of major, who wishes to explore or cultivate public speaking skills. No prior experience is necessary. For more information see www.nuspeechteam.org/speech/index.htm.

Student Theatre and Performance Groups

Northwestern offers many performance-oriented student theatre groups. For a listing see groups.northwestern.edu/?d=9.

Studio 22

Studio 22 Productions is a student-run not-for-profit film production company dedicated to student productions and creativity. Based at Northwestern, the group is funded through contributions from the School of Communication and generous individual donors. Each year Studio 22 gives grants for student projects: major grants for two or three projects, a minor grant, and a number of minigrants. Also, multimedia grants are awarded for a variety of projects. All Studio 22 productions are screened in the Technological Institute's Ryan Family Auditorium the first week of June. For more information e-mail info@studio22.org.

Theatre, Performance Studies, and Dance Productions

All students are eligible to audition for theatre, performance studies, and dance productions. Audition notices are posted on the Theatre and Interpretation Center's first-floor bulletin board. For more information on the school's mainstage productions, see www.communication.northwestern.edu/tic.

Undergraduate RTVF Student Association

The Undergraduate RTVF Student Association (URSA) is the official student council of the Department of Radio/Television/Film. The council meets with faculty to voice student concerns, fosters community within the program, and develops programs to enhance the radio/television/film experience.

WNUR

WNUR 89.3 FM is a noncommercial radio station operated and managed by students. Staff membership is open to all Northwestern students. WNUR's studios are located in John J. Louis Hall. For more information see www.wnur.org.

Facilities

The School of Communication provides outstanding facilities where faculty and students work, perform, pursue research, and engage in media ventures. The Theatre and Interpretation Center encompasses multiple performance and rehearsal spaces as well as scene shops. The Marjorie Ward Marshall Dance Center houses two dance studios. Cahn Auditorium offers the largest performance space on campus. Fisk Digital Media Studio is a lab where radio/television/film students complete film and media projects. John J. Louis Hall, home to production and postproduction facilities for the Department of Radio/Television/Film, includes the studios of WNUR-FM and the Barbara and Garry Marshall Studio wing, a film sound stage. Block Cinema, part of the Block Museum, screens repertory film. The Media Services Group circulates and services technical equipment for students and faculty. The interdepartmental Kresge Digital Media Lab is a high-end teaching facility.

Annie May Swift Hall, completed in 1895, was the school's original home. Recently renovated, it houses the departmental and faculty offices of performance studies and radio/television/film as well as a film library, a lecture theater-auditorium, and classrooms. The Frances Searle Building is the epicenter of the School of Communication, housing the Dean's Office, digital centers, classrooms, and research laboratories and clinics. 1815 Chicago Avenue houses offices for faculty in the Department of Communication Studies. Hardy House is home to the debate team.

ACADEMIC OFFERINGS

INTRODUCTORY AND RELATED COURSES IN GENERAL COMMUNICATION

GEN CMN 101-0 Interpersonal Communication Laboratory experience in human interaction. Analysis of communication within groups.

GEN CMN 102-0 Public Speaking Theory, composition, delivery, and criticism of public speeches.

GEN CMN 103-0 Analysis and Performance of Literature

Critical reading, written analysis, and performance of literary texts; general introduction to performance studies.

GEN CMN 104-0 Argumentation and Debate Theories of argumentation and debate, with many opportunities for practice. Analysis and evaluation of the discourse related to public controversies.

GEN CMN 108-0 Human Communication Disorders Basic facts and principles of human communication and its disorders. Laboratory experience provides an introduction to research in human communication science.

GEN CMN 110-0 Voice for Performance Intensive individual development and use of voice for performance. Open to theatre majors only.

GEN CMN 115-0 Freshman Seminar Small courses that feature investigations of complex contemporary social issues explored in pedagogically innovative ways.

GEN CMN 204-0 Paradigms and Strategies of Leadership Theoretical models of leadership. Group vision, change, and decision making. Weekly student-led small groups discuss case studies.

GEN CMN 206-1,2 Leadership Education Seminar Open to students in the Undergraduate Leadership Program.

COMMUNICATION SCIENCES AND DISORDERS

www.communication.northwestern.edu/departments/csd

The Roxelyn and Richard Pepper Department of Communication Sciences and Disorders offers a major in human communication sciences, providing undergraduate students with a foundation for the study of disorders of hearing, speech, language, and learning. The department's classroom, clinical, and research facilities are located in the Frances Searle Building on the Evanston campus.

The undergraduate program emphasizes the basic science principles underlying all human communication and cognition and introduces students to clinical issues and research findings that pertain to disorders of communication and learning. The major in human communication sciences is particularly appealing to students who plan to attend graduate or professional school in fields such as medicine, dentistry, and neuroscience as well as audiology and hearing sciences, learning disabilities, and speech and language pathology. Students who do not pursue medical, clinically based, or research graduate degrees may enter careers in health-related private industry or the public sector.

Undergraduate majors in human communication sciences have the option of pursuing a general course of study, typical for most premed students, or of choosing among three areas of concentration: audiology and hearing sciences, learning disabilities, and speech and language pathology.

Audiology and hearing sciences encompasses the study of hearing, hearing disorders, and the treatment of hearing disorders. Emphasis is on basic communication science,

including study of the anatomical, physiological, and physical bases of hearing. Undergraduate courses present information on normal communication processes and provide an introduction to audiologic assessment and hearing loss management.

Learning disabilities is concerned with learning processes and their dysfunctions, including disorders of perception, memory, language, and conceptualization. Such disorders lead to problems in the acquisition and use of oral language, reading, writing, and math skills that require specialized remediation. Undergraduate course work stresses theoretical, scientific, clinical, and educational issues as a foundation for advanced training.

Speech and language pathology introduces students to the psychological, linguistic, neurological, acoustic, anatomical, and physiological bases of normal speech and language behavior. As their knowledge of normal speech, language, learning, and hearing processes increases, students are introduced to the communicative disorders that result from the disruption of these processes. Advanced undergraduate courses are concerned with the nature, recognition, and management of common communicative disorders and present issues related to administration and public policy.

Accelerated Degree Program in Medical Education

Students admitted to the Honors Program in Medical Education with an emphasis in human communication sciences must meet the 300- and 400-level course requirements of the department (see following description). However, because they spend only three years on the Evanston campus, they take fewer 100- and 200-level courses in the department and the School of Communication than some four-year undergraduates.

For information on applying to HPME, see Special Admission Programs on page 11. For a description of the program, including requirements, see page 29 in the Cross-School Options chapter of this catalog.

Honors in Communication Sciences and Disorders

An honors program is available for students in their senior year who have maintained an outstanding undergraduate record through their junior year. Upon successful completion of an honors project, they will graduate with honors in communication sciences and disorders. Also see Honors and Prizes on page 23 in the Undergraduate Education chapter of this catalog.

Independent Study

Students may register for units of independent study, in which they work closely with a faculty member on a topic of mutual interest. Students interested in independent study should select courses that may lead to more advanced library or laboratory research.

Major in Human Communication Sciences

There is one set of requirements for a major in human communication sciences. However, well-designed course plans are recommended for each area of concentration. Students should consult their adviser for details.

Major requirements (15–16 units)

- 2 GEN CMN courses: 108 and a choice of 101, 102, or 103; both must be passed with a grade of C (not C-) or higher
- 13 CSD courses, all of which must be passed with a grade of C (not C-) or higher, and which include the following:
100-level course: 112
200-level course: 202
10 300- and 400-level courses in communicative disorders, including 3 clinically oriented courses (typically chosen from 318, 336, 339, 373, 376, 396, 419, 438, 444, 465, 491, and 493) and 3 basic science courses (typically chosen from 301, 302, 303, 305, 306, 307, 309, 310, 342, 392, 399, and 406)
- Statistics: a choice of 304 (which fulfills both the statistics requirement and 1 of the 13 CSD course requirements) or 1 of 2 non-CSD statistics courses — PSYCH 201 or STAT 210 — neither of which fulfills 1 of the 13 CSD course requirements

Additional requirements (29–30 units)

- Writing proficiency: requirement for all students
- Distribution requirements: 18 courses outside the department, including 3 in the School of Communication's science, mathematics, and technology distribution area (1 in mathematics, 1 in biology, and 1 in physics or chemistry; either the biology or the physics/chemistry course must have a lab component); 3 in the school's individual and social behavior distribution area; 3 in the school's humanities and fine arts distribution area; and 9 additional courses outside the department, including 3 in any combination of science, mathematics, technology, and/or individual and social behavior
- Electives in communication and other areas to complete a minimum of 45 courses

Also see the description of requirements for students admitted to the Honors Program in Medical Education on page 29.

Minor in Human Communication Sciences

www.communication.northwestern.edu/programs/minor_human_communication_sciences

A minor in human communication sciences requires at least 7 courses in the communication sciences and disorders department. No courses for the minor may be taken using the P/N option, and all classes must be completed with a grade of C- or higher in order to be counted toward the minor.

Minor requirements (7 units)

- 202 (or another 200- or 300-level course if granted a waiver based on course work in another department)
- At least 3 300- or 400-level basic science courses typically chosen from 301, 302, 303, 305, 306, 307, 309, 310, 342, 392, 399, and 406 (students should consult with their adviser for other course options)
- At least 3 300- or 400-level clinical courses typically chosen from 318, 336, 339, 373, 376, 396, 419, 438, 444, 465, 491, and 493 (students should consult with their advisers for other course options)

Courses for Undergraduates and Graduates

Undergraduates may take 400-level courses with permission of the instructor.

GEN CMN 108-0 Human Communication Disorders See Introductory and Related Courses.

CSD 112-0 The Scientific Exploration of Communication Introduction course to the biology and physics of human communication. Basic properties of speech sounds and how they are produced and received by the listener; relation between human anatomical structures involved in sound production, modulation, and reception; brain mechanisms involved in processing the sounds of speech.

CSD 202-0 Neurobiology of Communication Human anatomy, physiology, and neurology in relation to communicative behavior. Sensory, perceptual, cognitive, and motor processes.

CSD 205-0 Study of Learning and Learning Problems in the Classroom Study of children's learning in classroom settings. Field placement, using informal assessments of social, cognitive, and communication functioning, for children with and without exceptionalities.

CSD 207-0 Seminar in Communication Sciences and Disorders Major topics of research interest in communicative disorders. Principles of research in communicative disorders.

CSD 301-0 Anatomy and Physiology of the Vocal Mechanism Anatomical and physiological mechanisms of breathing, phonation, and articulation. Laboratories include dissection and participation in physiological research. Prerequisite: sophomore standing or above.

CSD 302-0 Anatomy and Physiology of the Peripheral Hearing Mechanism Gross and fine structure; function of the peripheral auditory system. Prerequisites: junior standing or above, 202, 307, or consent of instructor.

CSD 303-0 Brain and Cognition Neural bases of cognitive processing with emphases on neuroimaging approaches in the areas of encoding, perception, attention, memory, language, reading, motor control, and executive functioning. Taught with PSYCH 365; students may not earn credit for both courses.

CSD 304-0 Statistics in Communication Sciences and Disorders Introduction to research design and data analysis in communication sciences and disorders; statistical inference.

CSD 305-0 Phonetics Training in transcription of English speech sounds. Introduction to phonological analysis, dynamics of articulation, and dialect variations.

CSD 306-0 Psychoacoustics Principles underlying perception of pitch, loudness, auditory space, auditory patterns, and speech. Psychophysical procedures for studying psychoacoustics and the impact of hearing impairment are considered.

CSD 307-0 Acoustic Phonetics Acoustic theory of speech production and perception. Emphasis on acoustic cues underlying speech sound identification and their physiologic correlates. Laboratory and lecture.

CSD 309-0 Culture, Language, and Learning Language and culture; transmission of culture through language; effects of cultural variety on perception, cognition, and learning; implications of cultural and linguistic diversity in communicative disorders.

CSD 310-0 Biological Foundations of Speech and Music Anatomy and physiology of the central auditory pathway, experience-related neural plasticity, right/left brain specialization, audiovisual integration, auditory learning and perception, and neural encoding of speech and music. Prerequisite: junior standing or consent of instructor.

CSD 311-0 Motor Development and Learning (.5) Stages of development for speech production, principles of motor learning, and differences between oral and limb motor development. Tools and procedures for assessing motor development and learning related to speech production. Prerequisite: 301.

CSD 314-0 Topics in Cognitive Neurosciences Introduction to the study of cognitive neuroscience, with emphasis on cross-disciplinary approaches to understanding the mechanisms of the mind.

CSD 318-0 Introduction to Audiology Introduction to the measurement of hearing in humans. Basic anatomy of the ear, measurement of hearing, potential disorders of hearing. Lecture/laboratory.

CSD 331-0 Clinical Studies and Writing Critical observation skills for working with adults and children with communication disorders; clinical writing skills. Students discuss and write about clinical sessions that they observe both in videos and in actual clinical settings. Prerequisite: graduate standing or consent of instructor.

CSD 332-0 Clinical Assisting in Speech and Language Pathology Introduction to clinical practice, the dynamics of the client-clinician relationship and general clinical protocol, and the development and execution of therapy goals and procedures. Prerequisites: 305, 392, and 331, or consent of instructor.

CSD 334-0 Delivery Systems in Speech and Language Pathology Organization and administration of speech-language pathology services in schools, health care agencies, and private practice. Prerequisites: 397 and senior standing.

CSD 336-0 The Field of Special Education Criteria for in-school evaluation, eligibility, and intervention for students with disabilities. Legal basis of policies and regulations.

CSD 339-0 Early Communication Intervention with Infants and Toddlers Models of service systems, current practices in early intervention, legislation, infant development processes, and risk factors. Emphasis on individual family service planning, assessment, and intervention.

CSD 342-0 Typical and Atypical Development in Infants and Toddlers Description and theory relevant to the physical, motor, cognitive, linguistic, and social development of both typical and atypical children during the first three years of life.

CSD 343-0 Family Systems: Theory and Intervention Strategies in Early Intervention Models of family-systems theory and application pertaining to the functioning of families with disabled infants or toddlers. Intervention strategies appropriate for early-intervention professionals. Prerequisite: advanced status in developmental disabilities or consent of instructor.

CSD 350-0 Cognitive Development in Atypical Learners Normal cognitive development in perception, attention, memory, language, conceptualization, and problem solving with application to atypical children with genetic and brain abnormalities.

CSD 351-0 Development and Disorders of Memory Scientific models and evidence for memory development. Memory disorders in relation to developmental and life-span issues.

CSD 369-0 Special Topics in Speech and Language Pathology Current scientific and professional problems in speech and language pathology. Topics vary by quarter.

CSD 370-0 Special Topics in Learning Disabilities Current scientific and professional problems in learning disabilities.

CSD 373-0 Introduction to Learning Disabilities Psychological, neurological, and linguistic theories of language and learning as related to learning disabilities.

CSD 374-0 Behavior Assessment and Management in Children Theories and application of behavior analysis and management principles. Emphasis on assessment techniques, classroom management approaches, and strategies for the facilitation of learning.

CSD 376-0 Diagnostic and Remedial Approaches for Children with Learning Problems Introduction to the field of learning disabilities and its theoretical perspectives, assessment principles, and instruction and to the process of clinical teaching. Emphasis on instruction, accommodation, service delivery, progress monitoring, and transition.

CSD 377-0 Learning Disabilities in Early Childhood Theoretical issues, assessment, and educational principles for young children with learning disabilities. Emphasis on problems of language, cognition, and pre-academic learning. Instruction and home management.

CSD 380-0 Introduction to Clinical Procedures in Learning Disabilities Practicum experience in clinical settings.

Learning processes and application of instructional approaches. Field studies, reading, and weekly seminars. Prerequisites: 375 and 376.

CSD 381-0 Social Development in Normal and Learning-Disabled Children Current theories of and empirical research on social-emotional development from infancy through adolescence; identification and treatment of social deficits in learning-disabled children.

CSD 388-0 Attention Deficit Disorder and Related Disorders Identification and treatment of attention deficit disorders and related childhood behavior disorders. Emphasis on objective and subjective assessment, life-span issues, and medical and psychological interventions.

CSD 392-0 Language Development and Usage Development of spoken and written language as it relates to child development; includes phonological, morphological, syntactic, semantic, and pragmatic components. Cultural and individual linguistic diversity.

CSD 396-0 Diagnostic Procedures in Speech and Language Pathology Evaluation of speech and language disorders. Interviewing, report writing; use of standardized tests; examination of speech sensory and motor functions. Prerequisite: senior standing or above, 392, or consent of instructor.

CSD 397-0 Introduction to Clinical Procedures in Speech and Language Pathology Beginning practicum experience in a clinical setting. Emphasis on planning and executing a remedial program for individuals with problems of speech sound production and language usage. Prerequisite: consent of instructor.

CSD 399-0 Independent Study Prerequisite: consent of undergraduate dean after submission of petition.

COMMUNICATION STUDIES

www.communication.northwestern.edu/departments/communicationstudies

The Department of Communication Studies offers courses that explore the major media, practices, and problems of a communication-intensive society. Topics include — but are not limited to — bargaining and negotiation, collective decision making, organizational innovation, human-computer interaction, Internet use, public opinion formation, popular culture, social movements, and the history of political discourse in the United States. Students work with scholarship from the humanities and the social sciences, and course work emphasizes the analytical and ethical requirements of responsible persuasion. Both required and elective courses are intended to prepare students for personal success and civic leadership.

Honors in Communication Studies

The Undergraduate Honors Program in Communication Studies offers an opportunity for highly motivated students to conduct original scholarly research. Through the senior

year, each student works closely with faculty to produce an original research project in an interest area determined by the student. Seniors who successfully complete the program will be eligible to graduate with departmental honors. Also see Honors and Prizes on page 23 in the Undergraduate Education chapter of this catalog.

Major in Communication Studies

Program requirements (14 units)

14 School of Communication courses:

- GEN CMN 102
- 205 and 270; students should complete these courses and 220 (see below) before the end of the sophomore year because the material covered is prerequisite to more advanced courses
- A 2-course writing sequence consisting of 220, for which students will complete shorter essay assignments, and 394, for which students will complete a longer (25-page) research paper on a topic related to the seminar theme; 394 is taken during the junior year
- 9 additional 200- or 300-level School of Communication courses, at least 6 of which must be in the department; of those 6, at least 4 must be at the 300 level (the following courses may be combined to fulfill no more than 2 of the required units: 1 unit of 290 Forensics, 1 unit of 393 Field Study, 1 or 2 units of 389 Practicum in Communication Research, 1 or 2 units of 399 Independent Study)

Additional requirements (31 units)

- A field of concentration outside the School of Communication (normally one of the disciplines of the Weinberg College of Arts and Sciences), consisting of at least 6 courses; of these 6, at least 3 must be 300- or 400-level courses (courses taken to satisfy the School of Communication distribution requirement may be applied to the field of concentration if they fall within the discipline in which the student chooses to concentrate; a non-School of Communication minor, dual major, or adjunct major satisfies this requirement)
- Language requirement: proficiency in a classical or modern foreign language equivalent to the work covered in a second-year college-level course (proficiency is established in precisely the same manner as in the Weinberg College of Arts and Sciences; see the section on foreign language requirements on page 36 in the Weinberg chapter of this catalog)
- Distribution requirements: 18 courses outside the department, including 3 courses from each of the three School of Communication distribution areas: science, mathematics, and technology; individual and social behavior; and humanities and fine arts
- Electives in communication and other areas to complete a minimum of 45 courses

Courses used to satisfy the major and distribution requirements must receive a grade of C- or higher and cannot be taken P/N.

Courses Primarily for Freshmen and Sophomores

GEN CMN 101-0 Interpersonal Communication See Introductory and Related Courses.

GEN CMN 102-0 Public Speaking See Introductory and Related Courses.

GEN CMN 104-0 Argumentation and Debate See Introductory and Related Courses.

COMM ST 201-0 Research Methods in Communication

Foundations of knowledge in many areas of the field, including the nature of interpersonal interaction and the impact of mass media. How communication researchers do their work; how to judge the quality of research products. Prerequisite for many other courses in the department.

COMM ST 205-0 Theories of Persuasion Survey of major theories that explain how to change another person's attitudes and behaviors. Applications to persuasion within a variety of contexts, including relationships, organizations, legal campaigns, and the mass culture.

COMM ST 210-0 The Arts of Controversy: An Introduction to Rhetorical Thinking Controversy as a rhetorical practice essential to healthy political culture. Use of rhetoric to appreciate different (and frequently conflicting) approaches to issues.

COMM ST 215-0 Principles of Rhetorical Criticism Introduction to the critical study of political, legal, and ceremonial rhetoric. Development of skills in analyzing and assessing such rhetoric and appreciating how it reflects and shapes basic social and cultural values.

PERF ST 216-0 Performance and Culture See Performance Studies.

COMM ST 220-0 Theories of Argumentation Fundamental principles and practice of critical reasoning and public argument. For students interested in legal, academic, or political realms of communication and advocacy.

COMM ST 221-0 Speech Writing Theory and practice in the principles of composition and in the preparation and delivery of manuscript speeches.

COMM ST 229-0 Communication Technology, Community, and Personal Identity Philosophical, critical, and scientific analysis of how the intensification of technology in cultural, professional, and recreational domains is affecting our social relations and personal identities.

COMM ST 241-0 Theories of Relational Communication An overview of communication theories and research dealing with developing, sustaining, and terminating interpersonal relationships. Direct application to friendship, work, and romantic relationships.

COMM ST 250-0 Team Leadership and Decision Making

Theories and research relating to communication in small groups and group decision making.

COMM ST 270-0 Theories of Mediated Communication

Introductory survey of current issues in research on the mass media, the Internet, and computer-mediated communication.

COMM ST 275-0 Persuasive Images: Rhetoric of Contemporary Culture

Analysis of image-making in all forms of popular culture — in film and television but also shopping malls, supermarkets, car dealers, and doctors' offices.

COMM ST 290-0 Forensics Independent research and analysis in conjunction with participation in intercollegiate forensics. Credit may not be earned for 290 more than once.

COMM ST 298-0 Undergraduate Seminar Student- or faculty-initiated seminars to consider special topics. Credit for 298 may be earned more than once. No more than 2 units of such credit may be applied toward fulfillment of the major requirements.

Courses Primarily for Juniors, Seniors, and Graduate Students**COMM ST 310-0 Rhetoric, Democracy, and Empire in**

Classical Athens Students will read Thucydides' *History of the Peloponnesian War* along with texts in classical rhetoric to address perennial problems regarding the role of speech in a democratic society.

PERF ST 311-0 Performance in Everyday Life See Performance Studies.

COMM ST 315-0 Rhetoric of Social Movements Study of traditional theories of opposition derived from sociological and rhetorical analyses of mass movements. Examines new social movements such as advocacy groups related to abortion, animal rights, feminism, and other local and national issues.

PERF ST 316-0 Folklore and Oral Traditions See Performance Studies.

COMM ST 322-0 Rhetoric of the American Presidency Offers students the opportunity to conduct an in-depth, quarter-long study of the rhetoric of particular presidents. May only be taken twice for major credit; additional credits count as electives.

COMM ST 324-1,2 Rhetoric of U.S. Women's Rights Today women cause no sensation when they address public gatherings, but in the 1820s, when American social reformers broke the taboo, such behavior was scandalous. **1.** Development of the new women's oratorical tradition from its origins through the early 20th century. **2.** Continued development from 1920 to the present.

COMM ST 325-1,2,3 Rhetorical History of the United States History of the United States, as studied through key rhetorical texts. Focus on moments of political crisis and cultural change. **1.** Colonial period to the outbreak of the Civil War. **2.** Civil War to World War I. **3.** World War I to the 1960s.

COMM ST 326-0 African American Rhetoric Survey of key texts of 20th-century African American public discourse

as well as a forum to discuss those texts and engage them analytically and critically.

COMM ST 327-0 Contemporary Rhetorical Practice Contemporary history from a rhetorical perspective. Analysis of public communications and rhetorical study of non-oratorical events; emphasis on social movements and political controversy in the United States since 1960.

COMM ST 328-0 The Rhetoric of War The genre of war rhetoric; American experience in the 20th century as drawn from speeches, diaries, newspaper reports, government documents, films, and poetry.

COMM ST 329-0 Rhetoric, Science, and Technology Contemporary debates on the standing and production of scientific argument. Current controversies over the social constitution and consequences of science and technology.

COMM ST 330-1,2 Contemporary Problems in Freedom of Speech Personal freedom and public communication under the U.S. Constitution. **1.** Principles, forms of reasoning, and court decisions governing conflicts between freedom of speech and public order, property rights, personal security, morality, and racial and gender equality in traditional, mass, and new electronic media. **2.** Analysis of selected issues introduced in 330-1. Prerequisite: 330-1.

COMM ST 331-0 Deliberative Democracy Examination of the idea that legitimate democracy issues shape the public deliberation of citizens. Topics include questions of pluralism, equality, reason, and rhetoric in public deliberation.

COMM ST 332-0 The Rhetoric of Multiculturalism Examination of debates about the meaning and significance of cultural pluralism in American and global politics and about the rhetorical, communicative, and political challenges this condition raises.

COMM ST 335-0 Philosophy of Language and Communication Relationship between language and human communication behavior. How language structures individual world views; the process of meaning formation; therapeutic communication; the experience of creativity.

COMM ST 340-0 Community Integration of Labeled People Examination of local integration initiatives, the role of professionals, the language used to describe the initiatives, the social service system's responses, and the agents and communities that have constructed inclusive environments for people labeled with disabilities.

COMM ST 341-0 Communication and Aging Relationship between adult developmental processes and changes in communication behavior. Prerequisites: 201 and 250.

RTVF 341-0 Technological Innovations See Radio/Television/Film.

COMM ST 343-0 Health Communication Examination of how communication can enhance and maintain the well-being of citizens in intentional health care contexts.

COMM ST 344-0 Interpersonal Conflict In-depth analysis of theories and research examining conflict within relationships. Special emphasis on conflict within friendships,

dating relationships, and family. Prerequisites: 201 and 205.

COMM ST 350-0 Computer-Mediated Communication and Information Systems Examination and analysis of the tools of and issues in computer-mediated communication and networked information systems; effects of new communication technologies at the interpersonal, group, organizational, and societal levels.

COMM ST 355-0 Audience Analysis Methods used to analyze electronic media audiences; emphasis on quantitative research techniques. Prerequisites: 201 (or equivalent) and 270.

COMM ST 360-0 Theories of Organizational Communication Theories and research dealing with communication in formal organizations and institutions. Prerequisites: 201 and 250.

COMM ST 361-0 Intergroup Communication and Urban Change The small group as an agent of social change in urban society; internal and external communication in such change. Prerequisites: 201 and 250.

COMM ST 362-0 Professional-Client Communication Communication between professionals and clients in medicine, law, education, psychotherapy, and social services. Alternatives to the professional-client model of problem solving. Prerequisites: 201 and 250.

COMM ST 363-0 Bargaining and Negotiation Communication in bargaining and negotiation in organizational settings. Cognitive and motivational theories emphasizing bargaining and negotiation strategies. Prerequisites: 201, 205, and 360.

COMM ST 364-0 Collective Decision Making and Communication in Organizations Research on how organizations make, communicate, and implement collective decisions. Assessing decision effectiveness, group decision making, leadership in organizations, and organizational design. Prerequisites: 201 and 360.

COMM ST 365-0 Solving Problems in Applied Organizational Communication Advanced concepts and techniques for defining and analyzing organizational problems. Preparation for recognizing and working with problems in business organizations. Prerequisites: 201 and 360.

COMM ST 366-0 Organizational Behavior and Innovation Organizations and communities depend on innovative ideas, products, or processes to help them solve their problems and grow in new directions. This course looks at a number of interpersonal and organizational variables as they relate to the production, acceptance, and adoption of new ideas.

COMM ST 370-0 Current Perspectives in Mass Communication Research In-depth study of theories currently applied to the study of mass communication. Prerequisites: 201 and 270.

COMM ST 371-0 Public Opinion Nature of public opinion; history of techniques for expressing and assessing public opinion. Theories about the relationships among media, public opinion, and policy. Prerequisites: 205 and 270.

COMM ST 372-0 Mass Communication and Campaign

Strategies Communication components of political campaigns, including broadcast advertising, direct mail, candidate speeches, debates, and news coverage. Campaign professionals share their expertise; students critically examine the effectiveness and appropriateness of campaign strategies and tactics. Prerequisites: 201, 205, and 270.

COMM ST 373-0 News and Information as Politics and Culture

Examination of the news form, content and meaning of the news, and the role of the news media in social continuity and change. Prerequisite: 270.

COMM ST 374-0 Information and Communication Technology in American Society

Historical, sociological, and philosophical analysis of how developments in information and communication technologies have altered our understanding of ourselves and our world.

COMM ST 376-0 The Rhetoric of Popular Criticism How critics communicate their ideas and values to the public. Prerequisite: 275.

COMM ST 377-0 Developing and Marketing of Popular Culture

The invention and packaging of popular culture products, including film, music, television, and celebrities. Prerequisite: 275.

COMM ST 378-0 Online Communities Examination of the types of computer-mediated interactions and collaborations that occur among people who share common (or perhaps uncommon) interests and of the language they use to express themselves.

COMM ST 380-0 Political Communication Nature and functions of communication within established political institutions; decision-making strategies, deliberative discourse, and electoral campaigns; field study of advocacy and interest groups. Prerequisites: 220 and either 205 or 210.

COMM ST 382-0 Family Communication Behavior An overview of the family as a communication system. Intergenerational interaction patterns, intimacy and conflict patterns, decision making, environmental and cultural factors, and enrichment efforts. A wide range of family types and research methods are considered. Prerequisite: 241.

COMM ST 383-0 Satellites Historical development and contemporary issues regarding satellites. Government, research, military, and corporate uses of satellites and the relationships between satellites and telecommunications, geostrategic issues, information society, cyberspace, and economic development.

COMM ST 384-0 Global Media and International Affairs

Analysis of public diplomacy and comparative media systems across nations, exploring the relationships between sovereign states and private media systems.

COMM ST 385-0 Technology and the American Cultural Landscape

Research seminar focusing on the history of technology in American culture and how it might affect our experience.

COMM ST 386-0 Science, Technology, and Society Examination of developments in information and communication technology in the larger context of American science and technology since 1900. Prerequisite: previous course work on the historical or social dimensions of information and communication technology.

COMM ST 388-0 Internet and Society The social, cultural, political, and economic implications of information technologies.

COMM ST 389-0 Practicum in Communication Research Collaboration with a faculty member on design and execution of a communication research project. Students learn how to complete a research project and write a report. Prerequisite: 201.

COMM ST 390-0 Children's Culture Examination of children's media technologies from psychological, sociological, historical, and other perspectives. Reflection on and engagement in the creation of new media for children are intrinsic parts of the course.

COMM ST 391-0 Ethical Issues in Communication Ethical problems in public, group, and interpersonal communication; criteria for their resolution.

COMM ST 392-0 Global Culture and Communication Examination of current topics and events to familiarize students with the cultural dimensions of globalization and the critical importance of culture and communication in understanding the globalized world.

COMM ST 393-0 Field Study in Communication Enrollment only by petition in advance. Arrangements for winter quarter must be made by November 1 and for spring quarter by February 1.

COMM ST 394-0 Undergraduate Research Seminar Small seminars in research topics led by different members of the department faculty. Provides students an opportunity to conduct research. Prerequisite: 220.

COMM ST 395-0 Topics in Communication Studies Reading, research, and discussion in areas of significance. Topics vary.

COMM ST 397-0 Senior Honors Thesis Students work on a yearlong project, culminating in a senior thesis, with the guidance of a faculty adviser. Upon successful completion a student is eligible to graduate with departmental honors.

COMM ST 398-0 Undergraduate Seminar Student- or faculty-initiated seminars to consider special topics. Credit for 398 may be earned more than once. No more than 2 units of such credit may be applied toward fulfillment of the major requirements.

COMM ST 399-0 Independent Study Enrollment only by petition in advance.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

DANCE

See Theatre.

HUMAN COMMUNICATION SCIENCES

See Communication Sciences and Disorders.

PERFORMANCE STUDIES

www.communication.northwestern.edu/departments/performancestudies

The Department of Performance Studies integrates artistic and analytical approaches to a wide range of performance texts, events, and processes. The courses explore an interdisciplinary range of literary, cultural, and personal texts in performance. The department has particular strengths in the study of literature through solo performance; the ensemble adaptation and staging of poetic, narrative, and nonfictional texts; intercultural performance; performance art; cultural studies and the ethnography of performance; performance theory and criticism. Internships and field study for performance studies majors extend and deepen their classroom work with experiential learning. Extracurricular work provides students with a variety of opportunities to perform, adapt, and direct, enabling their creative work to reach an audience outside the classroom.

Performance studies majors have been successful in many professions that require intelligence and imagination as well as critical and creative skills. In addition to pursuing careers in professional theatre and arts development, many graduates teach literature, theatre, humanities, and performance studies. Majors have found performance studies an excellent preparation for law school and complementary to their interests in creative writing, communication, new media, anthropology, dance, literature, or social work. Performance studies can be thought of as a major that bridges artistic expression and conceptual analysis, theory and practice. Performance, in its manifold forms, is the subject and the method of study.

Honors in Performance Studies

Performance studies majors may apply in their junior year to participate in the departmental honors program. The program is intended to provide highly qualified students with an opportunity to complete a substantial research investigation; to introduce students to graduate-level, faculty-mentored research; and to provide formal honorary recognition to students who have excelled in course work and in independent research. More information is available from the department office.

Major in Performance Studies

Program requirements (16 units)

- Introductory courses: GEN CMN 102 and 103
- A minimum of 4 200-level courses in communication, including the following courses in the department: 216, 224, and 2 units of 210-1, 210-2, or 210-3

- Production courses in theatre: 2 quarters of THEATRE 119; 2 quarters of PERF ST 119; or 1 quarter of THEATRE 119 and 1 quarter of PERF ST 119 (0 units)
- 10 additional courses in communication, at least 8 of which must be in the department at the 300 or 400 level; not more than 1 unit of either 399 Independent Study or 331 Field Study may apply toward the required 8 300-level performance studies courses, and not more than 2 units of 399 Independent Study and 1 unit of 331 Field Study may apply toward the required total of 10 courses in communication

Additional requirements (29 units)

- 6 courses at the 200 level or above outside communication; if they apply, courses taken to meet the distribution requirement may be used to satisfy this requirement
- Distribution requirements: 18 courses outside the school, including 10 courses from the School of Communication distribution areas: 2 from science, mathematics, and technology; 3 from individual and social behavior; and 5 from humanities and fine arts
- Electives in communication and other areas to complete a minimum of 45 courses

Courses Primarily for Freshmen and Sophomores

GEN CMN 103-0 Analysis and Performance of Literature

See Introductory and Related Courses.

PERF ST 119 Production Laboratory Registration for performance studies majors fulfilling production crew requirements. Students perform duties for run crews and house crews in connection with department-sponsored productions in Annie May Swift Hall's Krause Performance Lab.

PERF ST 210-1 Performance of Poetry Introduction to the analysis and performance of poetry. Prerequisite: GEN CMN 103 or equivalent.

PERF ST 210-2 Performance of Narrative Fiction Introduction to the study of narrative performance. Prerequisite: GEN CMN 103 or equivalent.

PERF ST 210-3 Performance of Drama Introduction to drama and theatricality from a performance studies perspective. Prerequisite: GEN CMN 103 or equivalent.

PERF ST 216-0 Performance and Culture Performative bases of culture; ritual, festival, and ceremony.

PERF ST 224-0 Adapting Narrative for Group Performance Introduction to theories and methods of adapting narrative for the stage, with special emphasis on chamber theatre. Prerequisite: GEN CMN 103 or equivalent.

Courses Primarily for Juniors, Seniors, and Graduate Students

Unless otherwise indicated, 1 200-level course in the department is a prerequisite.

PERF ST 307-1,2 Studies in Gender and Performance

1. Introduction to theories on gender in relation to selected literary texts. How gender is prescribed, reinforced, and transgressed; how race, class, and sexuality disrupt and/or

affirm these representations. **2.** Examination of theories of gender performance from a cultural studies perspective. Close attention to live performance, including drag, performance art, and film. A third course in this series (THEATRE 307) is offered by the Department of Theatre.

PERF ST 308-0 Performing Modern and Contemporary Poetry Use of performance in the analysis and criticism of modern and contemporary poetry.

PERF ST 309-0 Performance of Black Literature Exploration of black poetry, short fiction, and novels, as literary texts and cultural texts, through solo, duo, and group performance. The literary genre will vary from year to year.

PERF ST 310-0 Literature and Performance of Women of Color Literary expressions by native, Latina, African, and Asian American women reflecting intersections of gender, sexuality, ethnicity, class, and culture in the United States. Feminisms considered across race and culture. Includes poetry, fiction, autobiography, drama, and critical theory.

PERF ST 311-0 Performance in Everyday Life Conceptual view of human beings as actors. Dramatism and the perspective of life as theatre.

PERF ST 315-0 Nonfiction Studies Exploration of the dramatic impulse in nonfiction texts. Emphasis on autobiographical one-person shows.

PERF ST 316-0 Folklore and Oral Traditions Genres of oral literature and an introduction to the methods and aims of folklore research. The nature of verbal art as performance and the importance of cultural context.

PERF ST 318-1 Shakespeare's English Histories Use of performance in the analysis and criticism of Shakespeare's two tetralogies of English history plays.

PERF ST 318-2 Shakespeare Adaptations Use of performance in the analysis and criticism of selected Shakespeare plays and their adaptations by other writers.

PERF ST 321-0 Performing the American '50s Use of performance in the analysis and criticism of selected postwar American literature.

PERF ST 322-0 Performing the Psychological Novel Use of performance in the analysis and criticism of selected 19th- and 20th-century novels.

PERF ST 324-1,2 Presentational Aesthetics **1.** Theatrical convention, presentational mode, and conscious artifice in the performance of dramatic literature, poetry, and nonfiction. **2.** Theory and practice of chamber theatre, its conventions and presentational modes; adaptation, staging, and performance of prose fiction. Choice of performer's or director's perspective. Prerequisite: 224.

PERF ST 326-1,2 Performance Art **1.** History, development, and theories of performance art as a live-art genre from the modernist avant-garde to contemporary cross-cultural forms. Media in all forms, with emphasis on performance process and audience relationship. **2.** Further theoretical and laboratory exploration of compositional processes and political strategies of performance, media, and event/audience contexts.

PERF ST 327-0 Field Methods in Performance Studies Theory and practice of fieldwork on performance; practical fieldwork experience.

PERF ST 328-0 Studies in James Joyce Primary emphasis on extensive critical study and performance of Joyce's *Ulysses*, resulting in either a lecture-performance, a recital, or a research paper.

PERF ST 329-0 Performing Individual Poetic Styles

Content varies. Major poems of a significant writer or writers, permitting in-depth encounter with the writer, cultural context, and performance-related issues.

PERF ST 330-0 Topics in Performance Studies Readings, discussion, and creative work in performance studies research and artistic practice. Topics vary. May be repeated for credit.

PERF ST 331-0 Field Study/Internship in Performance Studies Intensive participation in off-campus production and/or field research experience. Departmental approval required.

PERF ST 332-0 Urban Festivity Ethnographic study of festivals, parades, exhibitions, civic celebrations, and other genres of urban cultural performance. Multiethnic expressions of Chicago identity. Field research methods.

PERF ST 334-0 Human Rights and Radical Performance How social movements, local communities, and individual activists from specific regions around the world use performance to seek political empowerment and social justice. Performance as theory, method, and event in the arts of resistance; human rights as ideology and praxis within indigenous histories, imaginaries, and contexts.

PERF ST 335-0 Social Art Tactics Exploration of historical and theoretical foundations of social art practice, including work focused on social change in such genres as performance, digital media, relational art, and photography. Performance/art workshops; development of performance-based interventions.

PERF ST 336-0 Performance of Latina/o Literature

Exploration of U.S. Latina/o literature through narratives of migration, annexation, exile, and diaspora; focus on the arrival and development of Latina/o cultural enclaves in the United States. Use of performance to understand further such materials as autobiography, narrative fiction, drama, poetry, and radio commentary.

PERF ST 338-0 Family Stories, Memoirs, and Diaries Use of performance to explore family stories, memoirs, diaries, and other biographical and autobiographical sources.

PERF ST 399-0 Independent Study Prerequisite: consent of undergraduate dean after submission of petition.

RADIO/TELEVISION/FILM

www.communication.northwestern.edu/departments/rtf

The Department of Radio/Television/Film offers education in the history, theory, and production of media. Broad-based and interdisciplinary in orientation, the department offers a range of perspectives on media forms from cinema to broadcast and cable television to alternative media to

emerging technologies. Courses emphasize that media are social and cultural practices in dialogue with the broader context of the humanities. The department is dedicated to integrating theory and practice, creating intersections with other disciplines, and fostering cutting-edge media production. Originality, critical analysis, and vision are valued in both scholarly research and creative work. The department's goal is to educate students and citizens to critically interpret contemporary media, envision alternative structures in theory and practice, and reinvent the media of the future.

Production facilities include 16mm film and HD equipment, sound stage, and editing; field video and multiple-camera television studio facilities; linear and nonlinear video editing; advanced audio postproduction; and state-of-the-art computer graphics. Students operate the 7,200-watt FM radio station WNUR, which serves the Chicago area and also broadcasts on the Internet. The School of Communication funds four active student-run cocurricular production groups and offers juniors and seniors numerous opportunities for internships at television and radio stations and production companies in the Chicago, New York, and Los Angeles areas. Frequent guest lectures are offered by alumni with careers in media and by other well-known professionals.

Major in Radio/Television/Film

Program requirements (15 units)

- Introductory courses: 190 (190 and second-year standing — not through AP credits — are the prerequisites for all 300-level production courses); a minimum of 3 courses in communication at the 100 or 200 level outside the department
- 3 200-level courses: 220, 230, and 1 other 200-level course in the department or COMM ST 275
- 8 additional courses in communication at the 300 and 400 levels, including at least 6 courses in the department at the 300 and 400 levels; not more than 1 unit of 349 Internship in Radio/Television/Film and 1 unit of 399 Independent Study may be applied toward the 6 courses required in the department; the remaining internship and 399 units count as elective credits

Additional requirements (30 units)

- 6 courses at the 200 level or above outside communication, including at least 3 courses at the 300 level or above; courses taken to meet the distribution requirement may be used to fulfill this requirement
- Language requirement: competency in a modern foreign language, which may be established by a placement exam; completion of the fourth quarter or a higher class; or an AP score of 3, 4, or 5
- Distribution requirements: 18 courses outside the school, including 8 courses from the School of Communication distribution areas: 2 from science,

mathematics, and technology; 3 from individual and social behavior; and 3 from humanities and fine arts

- Electives in communication and other areas to complete a minimum of 45 courses

Minor in Film and Media Studies

www.communication.northwestern.edu/programs/minor_film_media_studies

The Film and Media Studies Program brings together faculty and students from across the University who are interested in thinking about film and media within a broad intellectual framework. Students in this interdisciplinary program acquire critical tools for analyzing traditional and new media, as well as knowledge of some crucial historical and interpretive problems raised by the study of media within the context of the humanities and social sciences. Students who minor in film and media studies are encouraged to participate in the rich and varied media offerings of the University, including film series and individual film screenings, workshops, performances, exhibitions, and presentations by invited speakers. Students must formally apply to minor in film and media studies in the School of Communication's Department of Radio/Television/Film.

Minor requirements (7 units)

- RTVF 220 Analyzing Media Texts
- COMP LIT 206 Literature and Media
- 5 additional courses with a primary emphasis on film and/or media studies, including at least 3 at the 300 level

Relevant courses are offered by departments and programs in both Weinberg College and the School of Communication, including comparative literary studies, some language departments, and radio/television/film. A list of eligible courses is available from program advisers and on the program's web site. Other courses also may be counted toward the minor with the approval of a film and media studies adviser.

Minor in Sound Design

www.communication.northwestern.edu/programs/minor_sound_design

The minor in sound design allows students to study and create work in sound as it relates to film/video, new media, theatre, radio, and installation/exhibition projects. The minor draws on courses offered through the School of Communication, Bienen School of Music, and Weinberg College of Arts and Sciences. The minor is open to all Northwestern undergraduate students.

Minor requirements (6 units)

The minor requires 6 courses, selected from the following:

- RTVF 379 Topics in Film/Video/Audio Production (sound design topics may include Advanced Audio Post-production, Sound Design for Horror, Sound Design for Comedy, Advanced Foley, Sound Design for the Web)

- RTVF 383 Sound Production
- RTVF 384 Foundations of Sound Design
- RTVF 398 Symposium: Issues in Radio/Television/Film (History/Aesthetics of Sound Design)
- RTVF 399 Independent Study
- THEATRE 263 Theatre Sound
- THEATRE 363 Theatre Sound
- MUS TECH 321 Producing in the Virtual Studio
- MUS TECH 335 Selected Topics in Music Technology (sound design topics may include Recording and Basic Audio, Studio Techniques for Electroacoustic Media)
- MUS TECH 337 Multimedia for the Web
- MUS TECH 338 Programming
- MUS TECH 340 Composing with Computers
- MUS TECH 342-1,2 Computer Sound Synthesis
- MUS TECH 348 3-D Sound and Spatial Audio
- MUS TECH 441 Advanced Computer Composition
- MUS TECH 450 Advanced Audio Processing

Certificate in Creative Writing for the Media

www.communication.northwestern.edu/programs/certificate_creative_writing_media

The Department of Radio/Television/Film administers the Program in Creative Writing for the Media. Designed for students seriously interested in pursuing careers as writers for film, television, or theatre, the program includes courses in playwriting, writing for film and television, and other specialized areas, taught by faculty from the performance studies, theatre, and radio/television/film departments. Sophomores in the School of Communication may apply (incoming freshmen with sophomore status through advanced placement credits are not eligible to apply); up to 12 are accepted each year. Students must be available to participate in the program for all six quarters. Registration each quarter is for CMN 350. Students must maintain a yearly average of B- in the courses and must complete all six courses to earn the certificate.

Program requirements (6 units)

- A 2-year (6-quarter) sequence of 6 Creative Writing for the Media courses

Courses Primarily for Freshmen and Sophomores

RTVF 190-0 Media Construction Introduces the core components of media — idea, image, sound, and sequence — while teaching the technical fundamentals involved in shooting and editing video. Students work with SLR and digital video cameras, with Photoshop and Final Cut Pro editing software. Four projects in different genres must be completed over the course of the quarter. This course is a pre-requisite for all upper-level production courses. Required for majors; typically taken in freshman year.

RTVF 202-0 Freshman Topics Seminar Beginning seminar focused around a special topic of media analysis, history, or theory. Freshmen will learn research, analytic, and writing

skills while focusing on issues relevant to film, media and/or digital arts and culture.

RTVF 220-0 Analyzing Media Texts Introduction to the study of the moving image. Basic elements of style across media including film, television, and interactive media. Focus on close analysis of texts to find significance. Prerequisite for upper-level courses in the department. Required for majors; typically taken in freshman year.

RTVF 230-0 Understanding Media Contexts Media industries as social and cultural forces; economic and political dimensions of the global media. Required for majors; typically taken in freshman year.

RTVF 260-0 Foundations of Screenwriting Introduction to writing for the screen (film, television, and/or computer). Structure, character, dialogue, format, voice, scope, pace, context. Lecture/workshop. Prerequisite for upper-level writing courses in the department.

COMM ST 275-0 Persuasive Images: Rhetoric of Contemporary Culture See Communication Studies.

RTVF 298-0 Studies in Media Topics Theoretical or practical or both; emphasis on evolving trends.

Courses Primarily for Juniors, Seniors, and Graduate Students

RTVF 301-0 Race and Ethnicity in Film and TV How race and ethnicity are depicted in film and media; audience response, activism, and/or alternative media production by groups of color.

RTVF 310-0 Television History Political, cultural, social, and industrial history of television, from the classic network era to the postnetwork contemporary period of media convergence. Exploration of programs as well as major events and shifts in television history.

RTVF 312-1, 2 History of Film International survey of motion pictures as a distinctive medium of expression from its prehistory to the present.

RTVF 313-1 Documentary Film: History and Criticism Survey of the schools, styles, and purposes of documentary film as a unique form of artistic expression and sociopolitical persuasion.

RTVF 313-2 Documentary Film and Video Contemporary work and issues in documentary film and video.

RTVF 321-0 Radio/Television/Film Authorship Idea of authorship in the media and an examination of different uses of author theory related to the work of particular artists.

RTVF 322-0 Radio/Television/Film Genre Concept of genre in the media, with reference to popular American forms.

RTVF 323-1 Experimental Film: History and Criticism Films and theories of experimentalists since the 1920s; contemporary underground movement.

RTVF 323-2 Experimental Film and Video Contemporary work in experimental film and video.

RTVF 325-0 Film, Media, and Gender Explores issues of gender in film and media. Introduces students to major

debates and theories regarding gender and sexuality in the media.

RTVF 326-0 Film and TV Criticism Contemporary critical methods applied to film and/or television. Students read literature on critical methods and analysis and write critical analyses of films and television programs.

RTVF 330-0 Culture Industries Overview of business and social organization of film and television industry. Introduction to how media industries produce cultural products for local, national, and transnational audiences.

RTVF 331-0 Regulation of Broadcasting Government regulation and industry self-regulation; historical perspective and examination of current issues.

RTVF 334-0 Media Arts and Visual Culture An exploration of the way artists use electronic media as forms of visual expression and how artists have historically appropriated communication technologies such as radio, video/television, and computers.

RTVF 341-0 Technological Innovations How technology develops and is assimilated into mass media.

RTVF 342-0 Program Planning and Programming Programming broadcast stations, networks, and cable in relation to audiences, markets, coverage, policies, and facilities.

RTVF 345-0 History of Hollywood Cinema Overview of the development of the classical Hollywood cinema, with particular emphasis on the 1920s through the early 1960s. Explores the relationship between industry practices and aesthetic features of classical narrative film genres.

RTVF 349-0 Internship in Radio/Television/Film (1–4 units) Selected students work in production departments of radio and television stations and film studios. Guided research and reading.

RTVF 351-0 National Cinema Historical aspects of cinema in a culture outside the United States or a social/cultural/intellectual movement within the general evolution of cinema.

RTVF 353-0 Film, Media, and Globalization Explores theories of media's role in the globalization of cultures. Examines transnational production, marketing, and reception of film, television, and/or digital media.

COMM ST 355-0 Audience Analysis See Communication Studies.

RTVF 360-0 Topics in Screenwriting Various approaches to screenwriting, emphasizing different modes and genres, such as the short film, the feature film, screenplays based on preexisting material, the teen film, interactive computer scenarios. May be taken twice for credit, depending on the change in topic. Prerequisite: 260.

RTVF 372-0 Editing The technique and art of editing for film. Topics include editing for continuity, controlling pace and rhythm, and editing nonlinear narratives. Prerequisites: 190, 380, and second-year standing (not through AP credits).

RTVF 375-0 Designing for the Internet Design concepts as they relate to the web in an intensive studio/workshop

environment. Prerequisites: 190 and second-year standing (not through AP credits).

RTVF 376-0 Interactive Media Exploration of the techniques and aesthetics of interactivity using various media. Prerequisites: 190, second-year standing (not through AP credits), and consent of instructor.

COMM ST 377-0 Marketing Popular Culture See Communication Studies.

RTVF 379-0 Topics in Film/Video/Audio Production In-depth study and practice of one area of film, video, or television. May be taken more than once for credit, depending on changes in topic. Prerequisite: 380.

RTVF 380-0 Lighting and Cinematography Techniques, aesthetics, and technologies of lighting and camera skills, including film and video. Prerequisites: 190 and second-year standing (not through AP credits).

RTVF 383-0 Sound Production Techniques and technologies of audio production, emphasizing location recording. Survey of techniques used for film, video, experimental audio, and radio production. Postproduction includes work with a digital audio workstation. Lecture/laboratory.

RTVF 384-0 Foundations of Sound Design Aesthetics and techniques of the sound/image relationship in media.

RTVF 385-0 Integrated Media Arts Introduction to theory and practice of media using microcomputers. For nonmajors.

RTVF 390-0 Directing Single-camera dramatic directing, including visualization and breakdown of scripts, camera blocking, and working with actors. Prerequisites: 190 and second-year standing (not through AP credits).

RTVF 391-0 TV Studio Directing Directing, crewing, and technical skills for multiple camera live-on-tape television production in narrative and nonnarrative genres; pre-production, directorial communication, blocking, pacing, visualization. Prerequisite: 380.

RTVF 392-0 Documentary Production Students examine documentary practices and produce their own shorts. Prerequisites: 190 and second-year standing (not through AP credits).

RTVF 393-0 2-D Computer Animation Animation techniques in the 2-D sphere and incorporation of visual design principles.

RTVF 394-0 Experimental Media Production Creation of an experimental work as a linear film or video, an interactive web site, an installation, a game, or a multidisciplinary performance. Prerequisites: 190 and second-year standing (not through AP credits).

RTVF 395-0 Computer Animation: 3-D The fundamental concepts and techniques of 3-D computer modeling and animation. Use of concepts acquired in camera-based production techniques to create a rendered animation. Prerequisites: 190 and second-year standing (not through AP credits).

RTVF 397-1,2 Advanced Production, Advanced Postproduction

Two-quarter sequence for students creating advanced artistic production, with critique of work throughout the production and postproduction process; conceptual resources offered as needed. Students may work in any genre (documentary, narrative, experimental) and any medium. Admission based on portfolio of previous media work and proposal for project, including script and budget.

RTVF 398-0 Symposium: Issues in Radio/Television/Film

Special issues and topics in the analysis of radio, television, film, and popular culture.

RTVF 399-0 Independent Study Prerequisite: consent of undergraduate dean after submission of petition.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

THEATRE

www.communication.northwestern.edu/departments/theatre

Of all the performing arts, none draws on the rich variety of human experience more fully than theatre. Theatre communicates the drama of life — whether the past, present, or future, and whether real or imagined — with immediacy, excitement, and eloquence. The student of theatre, therefore, must be a student of human society and must understand how social forces impinge on human behavior. To paraphrase Boswell, students of the theatre take as their subject the entire system of human life.

For this reason students who major in theatre at Northwestern combine a liberal arts education with intensive training in the theories and arts of the theatre. At the heart of the theatre program lies the idea that the best theatre artist is the one who combines a broad knowledge of the literature and theory of the field with highly developed skills in its practice.

Students spend approximately one-third of their program studying in the Department of Theatre, including courses in history, literature, and criticism; acting, voice, and movement; directing; devising theatre; stage production; design; playwriting; dramaturgy; creative drama and theatre for young audiences; and dance. Students develop the ability to approach problems and issues from a variety of perspectives while developing skills in research and writing, laboratory work, group discussion, oral presentation, performance, and production. Another third of the program comprises distribution requirements outside the department, and a final third is devoted to elective courses selected from a wide spectrum of University offerings.

A major in dance is also available within the Department of Theatre (see page 176).

Honors in Theatre

The honors program provides theatre majors who have demonstrated records of academic achievement with the opportunity to explore a sustained project in their senior year. It exposes majors to the rigors of research and creative work comparable with graduate-level programs in theatre studies and offers preparation for future graduate-level study. Projects may be proposed in any area of the theatre department's pursuits (design, directing, choreography, performance, history, criticism, or playwriting), provided that supervisory personnel are available and willing to participate, and provided that appropriate facilities are available.

Eligibility for the honors program will be determined by the faculty. Contact the theatre department for more information.

Major in Theatre

Program requirements (15 units)

- Introductory courses
THEATRE 140-1, 140-2, 140-3
GEN CMN 110
GEN CMN 103 or 1 performance studies or radio/television/film course
- Production: one registration for 119, taken in the sophomore year (0 units)
- 10 200- and 300-level theatre courses, with a minimum of 5 courses at the 300 level or above, with courses from each of the following groups:

Performance (at least 2 courses)

210 Training the Actor's Voice
243-1,2,3 Acting I: Principles of Characterization
253-1,2 Mime
260 Fundamentals of Stage Directing
310 Advanced Voice/Styles
311 Dialects for the Stage
312-1 The Art of Storytelling
330 Special Topics
340-1,2 Stage Directing
341-1,2,3 Acting II: Analysis and Performance
346-1,2,3 Playwriting
347 Theatre for Young Audiences
348-1 Creative Drama
348-2 Advanced Creative Drama
349-1,2,3 Acting III: Problems in Style
359 Directing for the Open Stage
(see Graduate School catalog)
442 Theatre Practice (includes the Children's Theatre Tour; see Graduate School catalog)

Design/technology (at least 2 courses at the 200 level)

240-1,2,3 Stagecraft
241-1,2,3 Design Process
242 Stage Makeup
249-1 Introduction to Stage Management

249-2 Advanced Stage Management
263 Theatre Sound
330 Special Topics
342 Lighting Design II
343 Scene Design II
344 Costume Design II
350 Production Management
353 Topics in Stagecraft
354 History of Costume and Décor
355 Scene Painting
356-1,2,3,4 Graphic Arts for the Stage Designer
357-1,2 Freehand Drawing for the Stage Designer
361 Textile Arts and Crafts for the Costume Designer
363 Theatre Sound
364-1,2,3 Period Pattern Drafting and Draping
379 Topics in Stage Management and Leadership

History, literature, and criticism (at least 3 courses)

2 of the 3 courses must come from the same area of study; for a copy of the current academic year's "Linked Sequences in History, Literature, and Criticism," see a theatre adviser

Additional requirements (30 units)

- Courses outside communication: 6 courses at the 200 level or above, including at least 3 courses at the 300 level or above (may include courses taken to meet the distribution requirement)
- Distribution requirements: 18 courses outside the school, including 8 courses from the School of Communication distribution areas: 2 from science, mathematics, and technology; 3 from individual and social behavior; and 3 from humanities and fine arts
- Electives in communication and other areas to complete a minimum of 45 courses

Minor in Theatre

www.communication.northwestern.edu/programs/minor_theatre

The minor in theatre encourages students majoring in other fields to organize their theatre studies in a coherent manner. The minor requires students to gain both depth and breadth in the study and practice of theatre.

The minor in theatre requires 7 courses. Of these 7 courses, 3 must be 300-level courses. At least 5 of the 7 courses for the minor must be offered by the theatre department; the other 2 may be approved courses in departments or programs outside theatre (e.g., performance studies, gender studies, comparative literature). No courses for the minor may be taken using the P/N option, and all classes must be completed with a grade of C- or higher in order to be counted toward the minor.

Minor requirements (7 units)

- 2 courses in theatre history, literature, criticism, or theory
- 1 course in theatre performance
- 1 course in theatre design
- 2 additional courses in one of the above areas to form a required concentration
- 1 elective

Certificate in Music Theatre

www.communication.northwestern.edu/programs/certificate_music_theatre

The Certificate in Music Theatre is jointly offered by the Department of Theatre and the Bienen School of Music's voice and opera program. The program provides the opportunity for Bienen School of Music students majoring in voice and School of Communication students majoring in theatre to create a second area of specialization that is important to their development as musical theatre artists. For voice majors the program provides training in acting and other theatre courses. Theatre majors have weekly voice classes and exposure to other music offerings.

The prescribed sequence of courses is open only to students accepted into the program through audition. The auditions are held annually in the spring quarter and are limited to freshman and sophomore theatre and voice majors. Auditionees are required to perform a vocal selection and a monologue and to participate in a dance audition.

Program requirements for theatre majors (9 units)

- VOICE 102 (1.5 units)
- MUSIC 127 (1 unit)
- VOICE 202 (1.5 units)
- THEATRE 352-1,2 (2 units)
- THEATRE 367 (1 unit)
- 6 dance classes (.33 unit each; 2 units total)

It is also recommended that sophomores enroll in THEATRE 272.

For certificate requirements for voice majors, see page 252.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

Theatre Courses Primarily for Freshmen and Sophomores

THEATRE 119-0 Production Laboratory (0 units) Registration for students fulfilling production crew requirements.

THEATRE 140-1,2 Theatre in Context 1. Combination of lecture, discussion, assignments, play viewing, and text analysis. 2. Seminar in three sections emphasizing theatre history, literature, and criticism; research; and writing skills. Prerequisite: consent of department.

THEATRE 140-3 Production in Context A combination of lecture, discussion, and production lab participation implementing the directing and design process of a theatrical production. Prerequisite: consent of department.

THEATRE 141 Introduction to Design for the Theatre Introduces the principles and elements of visual design as they relate to the theatre design areas of scenery, costume, and lighting. Applies these principles and elements to a play by creating scenery, costume, and lighting design ideas based on text analysis, point of view, and research in a production notebook format. Does not count toward the requirements for the theatre major. Course is a requirement and prerequisite for all 200-level design courses for the theatre minor.

THEATRE 143-0 Acting: Basic Techniques For nonmajors. Introduction to the study of acting: sensory response, imagination, and characterization work leading to prepared scenes from selected plays.

THEATRE 210-0 Training the Actor's Voice Training and development of the actor's voice, integrating work in GEN CMN 110 with use of heightened text. Students work to develop optimal pitch and vocal range, improve articulation, and develop skills in intonation and stress through performance of scenes, monologues, and Shakespeare sonnets. Prerequisites: GEN CMN 110 and consent of instructor.

THEATRE 240-1,2,3 Stagecraft Craft and technology used in mounting a theatrical production. Crew participation in department productions. 1. Lighting: mechanics, physics, and practices of the stage lighting technician. 2. Scenery: construction, rigging, and handling. 3. Costumes: sewing techniques, fitting, equipment, and fabrics. Prerequisite: sophomore standing or consent of instructor.

THEATRE 241-1,2,3 Design Process Development of stage design for the theatrical designer, from initial reading of the script to final design. Crew participation in department productions. 1. Scene design I. 2. Costume design I. 3. Lighting design I. Prerequisite: sophomore standing and consent of instructor.

THEATRE 242-0 Stage Makeup Theory and practice of stage makeup. Crew participation in department productions. Prerequisite: consent of instructor.

THEATRE 243-1,2,3 Acting I: Principles of Characterization 1. Basic concepts. 2. Dramatic imagination. 3. Dramatic characterization. Prerequisites: 140-1,2 (or equivalent) and consent of instructor.

THEATRE 244-1,2 Development of Contemporary Theatre Critical study of major dramatists, theories, and production styles. 1. 1870–1920. 2. 1920–present.

THEATRE 249-1 Introduction to Stage Management Preproduction, rehearsal, and technical rehearsal process of theatrical productions. Basic stage management tools taught in theory: assembling a production book, blocking, scheduling, communication, and cueing. Prerequisite: consent of instructor.

THEATRE 249-2 Advanced Stage Management Problem solving in the stage manager's leadership role; advanced study in production realization and communication. Students will be required to stage manage or assistant stage manage a department production and will prepare a production book based on the production. Prerequisite: consent of instructor.

THEATRE 253-1,2 Mime 1. Basic training in the arts of mime, including physical awareness, imagination, object techniques, illusion, sculpture, creation of environments, and the process of formulating performable mime pieces. **2.** Creation of solo and group mime dramas, culminating in a recital performance at the end of the quarter. Prerequisite: consent of instructor.

THEATRE 260-0 Fundamentals of Stage Directing An introductory course focusing on defining the role of the director while discovering a variety of directorial strategies. Prerequisite: consent of instructor.

THEATRE 263-0 Theatre Sound An introductory class in sound design for the theatre. Crew participation in department productions. Prerequisite: consent of instructor.

THEATRE 272-0 Special Topics: Music Theatre (2 quarters, .5 units each) Recommended for sophomore theatre majors interested in music theatre.

Theatre Courses Primarily for Juniors, Seniors, and Graduate Students

Unless otherwise noted, these courses are open only to students who have completed the departmental 200-level requirements or their equivalents.

THEATRE 307-0 Studies in Gender and Performance

Exploration of recent research on the social and political background of gender, particularly women's access to performative expressions. Historical aesthetics: changing debates on women's participation in the public theatre and the significance of the body in performance. PERF ST 307-1,2 are the first 2 courses in this series.

THEATRE 310-0 Advanced Voice/Styles Advanced vocal techniques of the stage actor. Vocal styles include Molière, Restoration comedy, Shaw, Coward, Stoppard. Prerequisites: GEN CMN 110 (or equivalent) and consent of instructor.

THEATRE 311-0 Dialects for the Stage Using the International Phonetic Alphabet, dialect recordings, and selected text, students learn dialects for stage and film performance. Principal dialects covered: standard British, Cockney, Irish, French, Russian, German. Prerequisites: GEN CMN 110 (or equivalent) and consent of instructor.

THEATRE 312-1,2 The Art of Storytelling Ancient traditions and current renaissance of storytelling. Strategies for selecting, preparing, and sharing stories in performance. Applications in theatre, communication, education, religion, law, healing professions, leadership, and business. **1.** Basic techniques. **2.** Advanced techniques of research, preparation, and performance, culminating in a public event. Students

use storytelling in presentations and performance. Prerequisites for 312-2: 312-1 and consent of instructor.

THEATRE 330 Special Topics Content varies. May be repeated with change of topic. Prerequisite: consent of instructor.

THEATRE 339 Advanced Acting Scene-study course in advanced acting techniques emphasizing scene analysis and character development. Focus on creation of realistic characters from modern theatre. Primarily intended for graduate students and undergraduate transfer students. Prerequisite: consent of instructor.

THEATRE 340-1,2 Stage Directing 1. Staging fundamentals: blocking, movement, business, tempo, script selection and analysis, casting, and rehearsal planning. **2.** Special problems: exposition, suspense, surprise, marking of climaxes, and creation of mood. Prerequisite: consent of instructor.

THEATRE 341-1,2,3 Acting II: Analysis and Performance Theory, principles, and techniques of interpretation of drama from the point of view of the actor. **1.** Greek tragedy. **2.** Shakespeare. **3.** Modern drama. Prerequisite: consent of instructor.

THEATRE 342-0 Lighting Design II For advanced undergraduate lighting design students and graduate students studying lighting design as a secondary area. Lectures and design projects. Prerequisites: 241-3 and consent of instructor.

THEATRE 343-0 Scene Design II For advanced undergraduate set design students and graduate students studying scene design as a secondary area. Lectures and design projects. Prerequisites: 241-1 and consent of instructor.

THEATRE 344-0 Costume Design II For advanced undergraduates studying costume design and graduate students studying costume design as a secondary area. Lectures and design projects. Prerequisites: 241-2 and consent of instructor.

THEATRE 345-1,2,3 History of Western Theatrical Practice Comprehensive survey of the theory and history of theatre and drama. **1.** The classical period. **2.** The Middle Ages, Renaissance, and early 17th century. **3.** Late 17th century through the modern era.

THEATRE 346-1,2,3 Playwriting Fundamental techniques of playwriting. A yearlong sequence aimed at developing an original full-length play. Prerequisites: junior or senior standing and consent of instructor.

THEATRE 347-0 Theatre for Young Audiences Selection, evaluation, direction, and production of plays for children. Prerequisite: consent of instructor.

THEATRE 348-1 Creative Drama Process-centered improvisation and its applications to teaching, performance, therapy, writing, recreation, and other areas. Prerequisite: consent of instructor.

THEATRE 348-2 Advanced Creative Drama Explores improvised drama as a teaching method and a means of learning for the elementary school child. Theory and practice through reading, discussion, films, and observation. Course culminates in extended teaching projects with children

from local schools. Prerequisites: 348-1 (or equivalent) and consent of instructor.

THEATRE 349-1,2,3 Acting III: Problems in Style Advanced problems in acting theories and styles. **1.** Comedy.

2. Contemporary drama. **3.** Special topics. Prerequisite: consent of instructor.

THEATRE 350-0 Production Management Role and duties of a production manager. Experience in production management. Production management of modern shows in different venues. Prerequisite: consent of instructor.

THEATRE 351-0 Staging of Contemporary Drama

Production problems peculiar to directing of plays for contemporary theatre. Prerequisite: 340-1,2 or equivalent.

THEATRE 352-1,2 Music Theatre Techniques Various performance styles of musical theatre. Current topic will be listed in the quarterly class schedule. May be repeated for credit with change of topic. Open to students in the Music Theatre Certificate Program or by consent of instructor. Prerequisites: junior standing and 243-1,2,3.

THEATRE 353-0 Topics in Stagecraft Seminars with guest or resident faculty on topics in stagecraft. Prerequisite: consent of instructor.

THEATRE 354-0 History of Costume and Décor Style and aesthetics of art, architecture, fashion, and decorative arts. Special emphasis on periods of theatrical production. Current topic will be listed in the quarterly class schedule. May be repeated for credit with change of topic. Prerequisite: consent of instructor.

THEATRE 355-0 Scene Painting Traditional and contemporary theory and practice of scene painting. Lecture and studio. Lab fee required. Prerequisite: consent of instructor.

THEATRE 356-1,2,3,4 Drawing and Painting for the Theatre: Techniques and Materials Techniques and materials of graphic communication for the stage designer. **1.** Model Building. **2.** Rendering Theatrical Space and Light. **3.** Rendering the Theatrical Figure. **4.** Hand Drafting. May be repeated for credit with change of topic. Prerequisite: consent of instructor.

THEATRE 357-1,2 Drawing and Painting for the Theatre: Principles of Drawing and Composition Drawing and composition using a variety of drawing materials and media for scenery, costume, and lighting designers. **1.** Freehand Drawing. **2.** The Figure in Space. Lecture and studio. Prerequisite: consent of instructor.

THEATRE 361-0 Textile Arts and Crafts for the Costume Designer For advanced undergraduate and graduate students studying costume design. Topics may include fabric dying, fabric modification, wig ventilation, millinery construction, and yarn arts. May be repeated for credit with change of topic. Prerequisites: 344 and consent of instructor.

THEATRE 362-0 20th-Century Stage Design Major stylistic developments in 20th-century scenography and scene, costume, and lighting design. Emphasis on the American

artist in context of the major influences that have shaped the craft. Prerequisite: consent of instructor.

THEATRE 363-0 Theatre Sound Planning and execution of sound for theatrical production; design of the actor's acoustical environment. Crew participation in department productions. Prerequisites: junior standing and consent of instructor.

THEATRE 364-1,2,3 Period Pattern Drafting and Draping Techniques of flat pattern drafting and advanced construction used to create historical garment patterns for the stage. **1.** Flat patterns. **2.** Draping. **3.** Period patterns. Prerequisites: junior standing and consent of instructor.

THEATRE 365-1,2 American Theatre and Drama Survey of American theatre and drama; examines relevance of plays, performances such as pageants and blackface minstrelsy, theatre companies, and their original contexts to their national identity. **1.** Beginnings through the 1930s. **2.** 1940s to present. Prerequisite: 140-1,2 or consent of instructor.

THEATRE 366-0 Special Topics in History, Literature, or Criticism Content varies. Studies of individual playwrights, national or regional theatres, historical periods, performance practices, or theoretical inquiries. Prerequisite: 140-1,2 or consent of instructor.

THEATRE 367-0 History of the Lyric Theatre Three-part course, covering the major movements in the histories of dance, opera, and musical comedy. Examination of artists and their works.

THEATRE 368-0 African Theatre and Drama Major practices in African theatre and drama. Topics may include festival practices, traveling and popular theatres, Anglophone drama, nationalist dramas, reappropriation of the Western canon, or theatre for development. Prerequisite: 345-1, -2, or -3 or AF AM ST 259 or consent of instructor.

THEATRE 369-0 Latin American Theatre Explores the intersection of theatre and politics in modern and contemporary Latin American theatre by linking dramatic texts to readings in history, genre, and theory.

THEATRE 373-0 Computer Graphics for the Theatre Artist Computer graphics for the stage designer. Investigation of available software programs and strategies for use in theatre. Current topic will be listed in the quarterly class schedule. May be repeated for credit with change of topic. Lecture/laboratory. Crew participation in department productions may be required. Prerequisite: consent of instructor.

THEATRE 374-0 Text Analysis for Theatrical Production Seminar in analysis of dramatic and nondramatic texts as it relates to the problems of realized theatrical production. Prerequisite: consent of instructor.

THEATRE 376-0 Participation Theatre for Young Audiences Participation and story theatre, incorporating improvisation into the structure of a scripted play for the child audience. Prerequisite: consent of instructor.

THEATRE 379-0 Topics in Stage Management and Leadership

Leadership versus management, delegating, team building, theatrical hierarchy, organizing the design process.

Advanced study in leadership, management, communication, and actor-director-designer relationships. Course requires stage managing a mainstage production. Prerequisite: consent of instructor.

THEATRE 380-0 Internship in Theatre Practice (3 units for undergraduates; 2 units for graduates) Production and/or management activities in a theatre company. Prerequisite: consent of department.

DANCE 387-0 Theatre/Dance Practicum See Dance.

THEATRE 399-0 Independent Study Prerequisite: consent of undergraduate dean after submission of petition.

Major in Dance

www.communication.northwestern.edu/programs/major_dance

The Department of Theatre also offers a major in dance. The dance major prepares students for further advanced academic work or a wide range of positions in professional dance. The major's comprehensive curriculum emphasizes the study of dance as well as the act of dancing. Students are prepared for lifetime involvement in the field and for continued development intellectually, artistically, and professionally within the dance world. In addition to dance technique and choreography, the program provides students with opportunities for writing, research, and analysis in the field. The major presents a well-integrated view of dance while also providing sound technical training in a variety of forms, with modern dance and jazz as the foundation techniques. The department offers a number of dance organizations and performing opportunities.

Honors in Dance

The Dance Program offers an honors program for students who have demonstrated academic excellence in the dance major. Contact the Dance Program for more information on eligibility and requirements.

Requirements for a Major in Dance**Program requirements (19 units)**

- Introductory courses: 101-1,2,3; THEATRE 140-3 (dance majors' section)
- Production: one registration for THEATRE 119 (0 units)
- Upper division core requirements: 202, 225, and 395
- 200- or 300-level communication courses: 3 courses
- Dance technique classes: a minimum of 4 units from the list below (each dance technique class carries .34 units; three classes add up to 1 unit of credit) plus an additional .34 unit of 140 Cultural Forms; as part of the 4 units, at least 1 unit of modern and at least 1 unit of Jump Rhythm Technique (a section of Jazz I and II) must be

taken sequentially, each in consecutive quarters in a single academic year

110 Movement for the Stage

120 Topics in Preparation for Performance

130 Music Theatre Dance

140 Cultural Forms

150 Modern I

160 Jazz I

170 Ballet I

180 Tap I

250 Modern II

260 Jazz II

270 Ballet II

280 Tap II

350 Modern III

360 Jazz III

370 Ballet III

380 Tap III

- At least 5 courses chosen from the following categories:

Performance (at least 2 units)

235 Choreography for Music Theatre

325 Advanced Choreographic Study

326 Advanced Improvisation

345 Studies in Collaboration

387 Theatre/Dance Practicum

465 Studies in Dance (see Graduate School catalog)

History, theory, and criticism (at least 2 units)

201 Cultural Studies of Dance

215 Dance History

315 Dance Criticism

335 Special Topics in Dance Research

(methods or history topics)

365 American Rhythm Dancing and the

African American Performance Aesthetic

THEATRE 367 History of the Lyric Theatre

399 Independent Study

Professional studies (at least 1 unit)

335 Special Topics in Dance Research

355 Dance in Education

356 Theories of Dance and Expressive Arts

Therapies

375 Summer Dance Institute

THEATRE 380 Internship in Theatre Practice

399 Independent Study

465 Studies in Dance (see Graduate School catalog)

Additional requirements (26 units)

- Courses outside communication: 6 courses at the 200 level or above, including at least 3 courses at the 300 level or above (may include courses taken to meet the distribution requirement)
- Distribution requirements: 18 courses outside the school, including 8 courses from the School of Communication distribution areas: 2 from science, mathematics,

and technology; 3 from individual and social behavior; and 3 from humanities and fine arts

- Electives in communication and other areas to complete a minimum of 45 courses

Minor in Dance

www.communication.northwestern.edu/programs/minor_dance

The Dance Program offers courses that introduce the many areas of study within the dance world as well as the many opportunities to contribute to the field. Technique study in the program focuses primarily on contemporary modern dance and Jump Rhythm Technique supported by study in ballet, tap, and other movement classes.

All students are eligible for this minor, as space allows.

The minor in dance requires 7 courses in the program. No courses for the minor may be taken using the P/N option, and all classes must be completed with a grade of C- or higher in order to be counted toward the minor.

Minor requirements (7 units)

- 3 courses from the primary and secondary core:
 - DANCE 101-1
 - DANCE 101-2
 - DANCE 225
- 1 course in dance history, theory, or criticism
- 2 units of dance technique in modern and Jump Rhythm techniques (each dance technique class carries .34 unit, so 6 classes add up to the 2-unit requirement); these classes do not need to be taken in a 3-course sequence
- 1 elective reflecting the student's special interests (a dance technique sequence may not be used to satisfy this requirement)

Dance Technique Courses Open to Undergraduates

DANCE 110-0 Movement for the Stage Movement and body awareness. Improvisational techniques using time, space, weight, and effort as the instrument of expression.

DANCE 120-0 Topics in Preparation for Performance

Different techniques each quarter to help prepare students for performance. Techniques include Pilates, yoga, Alexander technique, and the Feldenkrais method.

DANCE 130-0 Music Theatre Dance Choreography from Broadway shows. Explores various styles of original Broadway choreography through study of jazz, tap, modern, and ballet repertoire (not technique). Each class includes a short warm-up period. Course may be taken once with the topic Music Theatre Styles and once with the topic Music Theatre Ballet; students may not repeat the same topic.

DANCE 140-0 Cultural Forms Sections offer instruction in different ethnic dance forms; sections offered in the past include flamenco, Indian, salsa, and African.

DANCE 150-0, 250-0, 350-0 Modern Offered at levels I, II, and III each quarter to develop modern dance technique.

Higher levels progress more rapidly with a greater level of complexity, as class work focuses on a wider range of qualities and aesthetics. Style of modern technique varies with each instructor.

DANCE 160-0, 260-0, 360-0 Jazz Offered at levels I, II, and III each quarter to develop jazz technique. As class advances, students learn more advanced rhythmic phrases, more complex body-part isolations, and quicker direction changes in space. Style of jazz technique varies with each instructor.

DANCE 170-0, 270-0, 370-0 Ballet Offered at levels I, II, and III each quarter to cover ballet from basic principles through advanced skills. Terminology and movements are based on class level. Dancers begin at the barre and continue in the center, across the floor, and from the corner with combinations of steps, including turns and jumps.

DANCE 180-0, 280-0, 380-0 Tap Tap technique. One level is offered each quarter, starting at beginning level. The fundamentals of tap are developed through each level, and rhythmic awareness is expanded.

Dance Academic Courses Open to Undergraduates

DANCE 101-1,2,3 Introduction to the Dance Experience

Foundation for further studies in dance technique, science, history, and analysis. **1.** Introduction to body-mind approaches to movement study, including Laban movement analysis, yoga, tai chi, body-mind centering, and Feldenkrais. **2.** Dance in context: places dance in the context of other aspects of human behavior, exploring social dance, ritual, and theatrical performance. **3.** Introduction to improvisation: dance and movement improvisation as a tool for developing a personal movement vocabulary.

DANCE 201-0 Cultural Studies of Dance Dance as a force in culture and society amid ethnic, social, and theatrical traditions. Participation in labs, class lectures, and discussions. Required readings; independent video viewing and concert attendance.

DANCE 202-0 Experiential Anatomy for Performers The language and analysis of anatomy; heightening of bodily awareness using kinesthetic sensation and imagery. Combines theory and practice to achieve both intellectual and experiential awareness of the kinesthetics of anatomy.

DANCE 215-0 Dance History Choreographic accomplishments in the major developmental periods of American dance. Readings, discussion, video screenings, movement workshops, and research.

DANCE 225-0 Dance Composition Fundamental choreographic elements: time, space, shape, form, dynamics, and design. Choreographic exploration of the basic principles of dance composition.

DANCE 235-0 Choreography for Music Theatre How to manipulate space, time, and energy in short movement studies; creating a movement study in dramatic action that relies on those manipulations; choreographing a

short dance to music for other dancers using the previous movement studies as guideposts.

DANCE 315-0 Dance Criticism Critical and theoretical thought of writers on Western theatrical dance.

DANCE 325-0 Advanced Choreographic Study Manipulation of space, time, and energy according to the principles of organic compositional development to produce personal, poetically charged choreographic statements. Lecture-laboratory investigation of advanced choreographic concepts; abstraction, style, use of music, group work, humor in dance. Prerequisite: 225 or consent of instructor.

DANCE 326-0 Advanced Improvisation Improvisation as a source for composition and performance. Recommended for musicians and actors wishing to expand knowledge and/or command of dance vocabulary and for dancers wishing to investigate the musical and theatrical dimensions of their art. Emphasis on interrelationships between people moving and between the performing arts that students bring to the course. Prerequisite: 101-3 or consent of instructor.

DANCE 335-0 Special Topics in Dance Research Research methodologies, dance scholarship, criticism, and historical reconstruction. Critical issues and contemporary problems. Content varies.

DANCE 345-0 Studies in Collaboration Workshop exploration of collaboration as well as historical and theoretical perspectives. Seminar, practicum. Through studio work, reading, and discussion, dancers and musicians will explore our shared language.

DANCE 355-0 Dance in Education Organizing and teaching dance technique and creative movement for children and adolescents. Creative play, movement exploration, acquisition of basic motor skills, links to the classroom. Lecture, laboratory, and field experiences.

DANCE 356-0 Theories of Dance and Expressive Arts Therapies Overview of dance, drama, and art therapies as currently practiced in treating disabled, mentally ill, or other special populations. Introduces diverse theoretical perspectives in the role and use of art forms as therapeutic modalities. Symbolic meaning, group dynamics, and the language of movement as it relates to personality, body image, and expression.

DANCE 365-0 American Rhythm Dancing and the African American Performance Aesthetic Viewing (via video) and evaluating the sources and contemporary influences of jazz, tap, Broadway, and other vernacular forms of theatre dance. Light movement exercises to convey the kinesthetic basis of American rhythm dancing.

DANCE 375-0 Summer Dance Institute One-week summer workshop exploring various forms of dance with guest artists.

DANCE 387-0 Theatre/Dance Practicum Offered during the summer to provide academic credit to students participating in a Northwestern performance.

DANCE 395-0 Senior Seminar A forum for addressing issues of transition, career planning, and support, providing a

structure for analyzing opportunities in the professional dance world. The seminar is also responsible for creating and producing the Senior Concert, the culminating activity of the dance major. The course meets as a year-long sequence with grade and 1 credit unit awarded in the spring.

DANCE 399-0 Independent Study Prerequisite: consent of undergraduate dean after submission of petition.

School of Education and Social Policy

www.sesp.northwestern.edu

The mission of the School of Education and Social Policy (SESP) is to understand and improve learning communities, defined as groups of people working together in structured social and/or technical environments that influence human development. Learning communities include not only schools and classrooms but also workplaces, families, neighborhoods, and other societal arrangements where learning takes place. Through broad-based interdisciplinary research, teaching, and outreach activities, SESP's faculty strive to better understand how social, psychological, and economic factors shape human development and learning and how innovations in pedagogy, technology, and social policies can benefit lives. They learn to understand human development and improve learning in its various social contexts by applying the social and behavioral sciences.

The school provides undergraduates with an interdisciplinary curriculum, practical experiences, and research activities that are closely linked to its faculty and graduate programs. Four concentrations lead to the degree of bachelor of science in education and social policy. The intellectual core of the human development and psychological services and social policy concentrations comes from SESP's human development and social policy graduate program. The intellectual core of the learning and organizational change and secondary teaching concentrations is grounded in the school's learning sciences graduate program.

The four concentrations offer preparation for a number of career options. Students are encouraged to design their concentrations with career objectives or graduate and professional school admission policies in mind. They enroll with a wide variety of academic and career goals. Some intend to go immediately to graduate and professional schools, while others plan to enter a profession upon graduation.

Students in Northwestern's other schools may choose to complete the requirements of SESP's secondary teaching concentration in order to qualify for teacher certification.

SESP offers advanced degrees and programs in elementary and secondary teaching, higher education, learning and organizational change, learning sciences, and human development and social policy.

ACADEMIC POLICIES

Bachelor's Degree in Education and Social Policy

A minimum of 45 course units are required for the degree of bachelor of science in education and social policy. The

concentrations in human development and psychological services, learning and organizational change, and social policy have similar distribution and core requirements, though each has different major courses; the secondary teaching curriculum is markedly different, largely due to Illinois Board of Education requirements.

Grade and Residency Requirements

The following requirements concerning grade point average (GPA) and residency apply to all students seeking the bachelor's degree:

- 45 course units are required for graduation.
- Students are required to maintain a minimum GPA of 2.0 in all work presented for the degree. To qualify for teacher certification, students must earn a minimum grade of C in all professional core courses and maintain minimum GPAs of 2.5 overall and 3.0 in teaching subject-area courses. Students in the human development and psychological services, learning and organizational change, and social policy concentrations must earn a minimum grade of C- in all distribution requirements, core courses, and concentration courses.
- Full-time students may elect to enroll in some Northwestern courses with the understanding that they will not receive a regular letter grade but the notation P (pass) or N (no credit). They may elect 1 unit per quarter under the P/N option, which may be used only toward elective requirements.
- Not more than six of the grades in courses taken at Northwestern and presented for graduation may be P's and D's.
- Students may double-count up to 3 course units from their concentration toward a second major and up to 2 units toward an adjunct major or a minor. Required related courses in Weinberg College are not subject to these limits.
- Course work taken at institutions other than Northwestern that is to be counted toward SESP requirements must be approved in advance by the student's adviser and the SESP assistant dean for student affairs. Students taking community college courses must earn a grade of B or higher for SESP to accept the credit.
- A student typically may not have more than a total of three majors plus minors: three majors, two majors and one minor, or one major and two minors. Exceptions require permission from the SESP assistant dean for student affairs and are not granted during the freshman year.

- All degree candidates must file an application for the degree with their advisers in advance of their degree completion. The adviser will forward the application, when approved, to the Office of the Registrar.
- Students who wish to transfer into SESP from another Northwestern school must
 - Have a minimum cumulative GPA of 2.0 (students in the secondary teaching concentration must maintain minimum GPAs of 2.5 overall and 3.0 in teaching subject–area courses).
 - Attend the appropriate information and orientation sessions.
- Students transferring from another university must complete their final 23 units at Northwestern.
- Additional requirements are stipulated in the *SESP Undergraduate Handbook*. All students are expected to be familiar with and observe these policies. When requirements or policies change, notification is provided on the SESP web site.

In addition to and independent of the requirements set by SESP, all students must satisfy the Undergraduate Residence Requirement (see page 17).

Probation

In addition to the University regulations regarding academic probation, undergraduate students in SESP are ordinarily placed on academic probation when, in any one quarter, they do not receive at least three final grades of A, B, C, or P, or they have a cumulative GPA below 2.0. Students on probation must work with their advisers to meet the conditions set by the probation and address the deficiencies that resulted in probation. Failure to do so may result in dismissal from the University.

Petitions for Exemptions

Students must petition if they wish to be exempted from or request a change in any of the regular degree or specific course requirements of SESP. Petition forms may be obtained from the SESP Office of Student Affairs. No petition is considered unless it is signed by the student's adviser and the SESP assistant dean for student affairs. Petitions requesting that a course substitute for a degree requirement must be submitted before the posted deadline.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

ACADEMIC OPTIONS

SESP concentrations are interdisciplinary and flexible, allowing many undergraduates to enroll in University-wide certificate programs or to pursue up to two additional majors, one additional major and one minor, or as many as two minors along with their concentration. Two of these certificate programs — the five-quarter Civic Engagement

Certificate and the one-quarter Field Studies programs — are administered by SESP and open to all Northwestern undergraduates; see page 189 for more information. Many students also elect to spend one or more quarters in a University-approved study abroad program.

Honors

Students who maintain records of academic distinction may qualify for the honors program. Any student who has attained a cumulative GPA of 3.5 or above after winter quarter of the junior year is eligible for provisional admission to the program beginning in spring quarter of the junior year. Students considering both study abroad and the honors program must plan their study abroad programs accordingly.

Students who successfully complete SESP 391 Advanced Research Methods in spring quarter of the junior year and are recommended for the honors program may formally enter the honors program by registering for SESP 398 Honors Thesis in fall quarter of the senior year. In this three-quarter program students work with a faculty adviser on a research project. If progress is satisfactory, students are eligible to register for 398 in winter and spring quarters of the senior year. Grades are based on performance throughout the program and on readers' evaluations of the project report. All honors students present their projects to SESP faculty, students, and guests at a poster session at the end of the year. Students earn 3 units for successful completion of an honors thesis. They receive departmental honors only on the recommendation of the faculty adviser and the approval of the program director.

Additional information about the honors program is available from the program coordinator in the SESP Office of Student Affairs and at www.sesp.northwestern.edu/ugrad/opportunities/honors.

Other Academic Opportunities

Many programs offered by other Northwestern undergraduate schools or across the University are popular among SESP students. They include the following.

Business Institutions

Students pursuing the business institutions minor study business through an investigation of the cultural, political, and social consequences of business institutions. More information is in the Weinberg College chapter of this catalog and at www.wcas.northwestern.edu/bip.

Global Health Studies

Combining course work and international experience, this interdisciplinary minor is designed to provide skills for dealing with national and international health issues. Students learn about health crisis management and get perspectives on health issues within the diverse U.S. population. More information is in the Weinberg College

chapter of this catalog and at www.wcas.northwestern.edu/globalhealth.

International Studies

In the undergraduate minor or adjunct major in international studies, students explore our interconnected world system and its political and economic organization. More information is in the Weinberg College chapter of this catalog and at www.intstudy.northwestern.edu.

Legal Studies

In the minor or adjunct major in legal studies, students apply various academic perspectives and methodologies to study legal issues and use the conceptual framework of the law to illuminate empirical and theoretical concerns in the social sciences and humanities. More information is in the Weinberg College chapter of this catalog and at www.northwestern.edu/legalstudies.

Study Abroad

Students are encouraged to explore the myriad options for study abroad. Credit may be applied toward concentration, distribution, and elective requirements with the consent of the student's adviser. For more information see the Undergraduate Education chapter of this catalog and www.northwestern.edu/studyabroad.

Undergraduate Leadership

The Undergraduate Leadership Program, a cross-school certificate program open to all undergraduates, helps students understand the nature of leadership and prepares them to become leaders. See the Cross-School Options chapter of this catalog and www.northwestern.edu/ulp for more information.

Undergraduate Research

The school's curriculum includes a variety of innovative learning opportunities. Students taking SESP 390 complete an apprenticeship as assistants in faculty research projects. In SESP 399 students carry out their own independent research under faculty supervision. Additional information about undergraduate research opportunities and faculty research projects may be obtained through the academic advisers in the SESP Office of Student Affairs and the *SESP Undergraduate Handbook*.

Student-Organized Seminar

As its title denotes, SESP 298 Student-Organized Seminar is a course in which the topic, reading list, assignments, written examinations, prerequisites, and meeting schedule are proposed by students in consultation with a faculty sponsor. Proposals must be submitted by the posted deadline and approved by the director of undergraduate education before the seminar can be offered.

STUDENT RESOURCES

Academic Advising

Each student is assigned to an adviser in the SESP Office of Student Affairs. For the advising system to work, students must take all academic questions to their advisers. Advisers are responsible for helping students plan academic programs that meet the requirements for completion and graduation. Advisers also help students make use of academic, professional, and personal development resources. Students consult with faculty as well about research and professional interests.

Students are encouraged to meet with their advisers at least once per quarter to develop an individualized plan of study. Failure to do so may result in a hold being placed on a student's registration.

Organizational Involvement

Membership in the student organization Promote 360: A Cycle of Minority Empowerment and Support is open to all SESP students. The organization promotes, supports, and sponsors efforts to enhance the social, academic, and professional well-being of students from minority and underrepresented groups. The group organizes career-exploration, academic skill-building, and social support programs for SESP students and mentoring for Chicago high school students. See www.sesp.northwestern.edu/ugrad/opportunities/promote360 for more information.

Support for Research and Special Projects

The SESP Undergraduate Opportunities Fund provides support for special academic projects and community endeavors that students or student organizations undertake either on their own or under a faculty member's direction. Students who pursue research may also seek support from the G. Alfred Hess Jr. Fund to defray the costs of data collection and analysis, travel, equipment, and other expenses directly related to their projects. Further information about SESP undergraduate research opportunities and awards programs is available at www.sesp.northwestern.edu/ugrad/opportunities/research.

ACADEMIC OFFERINGS

NONSECONDARY TEACHING PROGRAMS

Human Development and Psychological Services; Learning and Organizational Change; Social Policy

Students in SESP's human development and psychological services, learning and organizational change, and social policy concentrations focus on the interdisciplinary study of human behavior as it is influenced by social institutions, understanding the behaviors that people bring to various institutional contexts, identifying and analyzing how

behaviors are shaped in these environments, and establishing criteria by which to evaluate the purposes and effectiveness of institutional activities.

Common Course Work

Distribution and core requirements are the same for all students in these concentrations. Students also complete the one-quarter SESP 383 Practicum that entails 30 hours per week in an off-campus setting — such as a governmental entity, community agency, legal organization, hospital, juvenile home, or a for-profit entity's learning and development department. It must be taken in the junior year (or in the preceding or following summer) in the Chicago area or, during Summer Session, in San Francisco or Washington, D.C.

Concurrent with the practicum, students meet weekly for SESP 385 Practicum Analysis Seminar, which is taught by a faculty member and culminates in a final research paper.

Up to 3 units of SESP 390 Research Apprenticeship or SESP 399 Independent Study may be counted toward the concentration requirements. Credit for SESP 298 Student-Organized Seminar may be used only as elective credit.

Students are encouraged to develop a course plan that reflects their individual interests and career goals. Many students work with their advisers to develop an optional interdisciplinary specialization within their concentration by selecting 5 or more courses from across the University around a particular theme. See individual concentration requirements for examples.

Distribution Requirements (10 units)

- 2 natural sciences courses
- 2 formal studies courses (math, logic, etc.)
- 2 historical studies courses
- 2 ethics and values courses (philosophy, religion, etc.)
- 2 literature and fine arts courses

Selected courses from Weinberg College and professional schools across the University may be used to fulfill distribution requirements with the consent of the student's adviser and the SESP assistant dean for student affairs.

Elective Requirements (9 units)

Courses from any school across the University may be used to fulfill elective requirements.

SESP Core (8 units)

Basic courses — 2 units

- SESP 201 or 203
- 1 additional human development course: SESP 201, 203, 316, 317, 318, 319, or LOC 212

Research methods — 2 units

- SESP 210
- SESP 372 (prerequisite for 383/385)

Practicum — 4 units

- SESP 383
- SESP 385

These courses (2 units each) are taken together for 1 quarter during the junior year or for nine weeks during the Summer Session before or after the junior year; no fifth unit may be taken concurrently without special permission. At least 2 quarters before registering for 383, students must consult the practicum director in the SESP Office of Student Affairs regarding procedures and site-placement application materials. (For Summer Session practicums, consultation should be scheduled at least 3 quarters in advance.)

Courses

First-year students are restricted from most SESP 300-level courses, with the exception of research courses.

SESP 195-1,2 Community Engagement Critical reflection on community service experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community.

SESP 201-0 Human Development: Childhood and

Adolescence Personal, social, and cognitive development from birth through adolescence. Interplay of biological and experiential factors on linguistic and conceptual development, ego, and personality.

SESP 202-0 Introduction to Community Development

Historical and contemporary community-building efforts, focusing on Chicago's neighborhoods. Community development strategies: the settlement house, community organizing, and community economic development.

SESP 203-0 Human Development: Adulthood and Aging

Psychological, sociological, and biological factors influencing socialization and development from young and middle adulthood through old age. Influences of family, school, and work on the individual.

SESP 210-0 Introduction to Statistics and Research

Methodology Definitions and classifications of terms used in quantitative methods; measures of typical and maximum performance, reliability, and validity checks; reporting and displaying data; interpreting results.

SESP 298-0 Student-Organized Seminar Courses proposed by students and supervised by faculty sponsors on topics not covered in regular courses. Offered only after course content and design have been formally approved by the SESP director of undergraduate education. May be taken only once per quarter; pass/no credit only. Consultation with the SESP assistant dean for student affairs recommended.

SESP 299-1,2 Civic Engagement Capstone Research

Independent study courses leading to completion of the capstone project for the Civic Engagement Certificate.

SESP 303-0 Program Development and Implementation

Characteristics of successful programs in a variety of areas, including human development, education, social welfare, and health promotion.

SESP 316-0 Moral Values and Human Development:

An Introduction Moral development of the individual from several perspectives: age-developmental differences, cross-

cultural and gender differences, relationship of moral reasoning to moral behavior.

SESP 317-0 Gender and the Life Course How age and sex serve as a basis for the social construction of men's and women's lives. How social forces operate to create contrasting life trajectories, role patterns, and transitions; the role of social policies. Comparative view of different societies and periods in recent history.

SESP 318-0 Adult Development and Work Careers

Adult development and careers from the perspectives of psychology, sociology, and organizational behavior. Individual career-development strategies and alternative career systems.

SESP 319-0 Family Development in a Changing Society

Societal changes and their effects on the family.

SESP 351-0 Special Topics Advanced work on special topics.

SESP 372-0 Methods of Observing Human Behavior

Guided practice in systematic and participant observation. Observer bias, field notes, unobtrusive measures.

SESP 383-0 Practicum (2 units) Real-world participant observation in relevant professional activities and projects (e.g., program development and management; learning design; therapeutic rehabilitation; policy research, implementation, and evaluation). Taken concurrently with 385. Prerequisites: 372; consent of SESP's practicum director at least 2 quarters (3 for Summer Session practicums) before registering.

SESP 385-0 Practicum Analysis Seminar (2 units)

Development of analytical field studies of the practicum experience based on field notes, recorded observations, and class discussions; culminates in a final research paper. Taken concurrently with 383. Prerequisites: 372; consent of SESP's practicum director at least 2 quarters (3 for Summer Session practicums) before registering.

SESP 390-0 Research Apprenticeship Opportunity to participate in faculty research projects. Prerequisites: consent of the faculty member and the SESP assistant dean for student affairs; submission of completed Request for Independent Study/Special Courses Form at registration.

SESP 391-0 Advanced Research Methods Overview of research methods that may be used to design and implement the honors thesis. Prerequisites: 210 and 372 recommended.

SESP 398-0 Honors Thesis (3 units) Students develop, design, implement, and evaluate a research project under a faculty adviser's guidance. Prerequisites: senior status; 3.5 cumulative GPA by the end of winter quarter of the junior year; recommendation for the honors program from SESP 391 instructor(s); consent of program director.

SESP 399-0 Independent Study Faculty-supervised study of special topics of the student's own choosing and not covered in regular courses. Prerequisites: consent of the supervising faculty member(s) and the SESP assistant dean for student affairs; submission of completed Request for Independent Study/Special Courses Form at registration.

Human Development and Psychological Services

www.sesp.northwestern.edu/ugrad/academics/conc/hdps/curriculum

The human development and psychological services concentration explores how human development is influenced by family, schools, community, and the workplace. Students interested in such fields as child development, social work, clinical psychology, medicine, and counseling normally enter this concentration.

Courses focus on theories of individual development and on family, group, and organizational dynamics. The interdisciplinary concentration draws from current practice and research in counseling, personality psychology, and human development as well as on the disciplines of psychology, sociology, gender studies, communication studies, cognitive science, and anthropology to give students the opportunity to combine theory with practice and develop pragmatic skills grounded in a deep understanding of human psychology, growth, and adaptation throughout the life span. Examples of interdisciplinary specializations include child development, family development, pre-medical studies, and gender and human development.

Students are encouraged to include in their concentration the prerequisites in psychology and quantitative methods needed for graduate work in psychology and in the human services professions.

Total requirements — 45 units

Distribution requirements — 10 units (see page 182)

SESP core — 8 units (see page 182)

Concentration program — 18 units

- Required courses (5 units)
 - HDPS 201
 - HDPS 301
 - 3 courses chosen from HDPS 302, 311; SESP 303; SOC POL 304
- Concentration courses (13 units)

These must be selected from an approved list of courses in human development and psychological services, other SESP concentrations, and other areas such as anthropology, communication studies, linguistics, psychology, and sociology. At least 5 courses must be at the 300 level. Up to 3 units of SESP 390 or 399 and 3 units of SESP 398 may be counted toward this requirement.

Electives — 9 units (see page 182)

Students are encouraged to discuss their elective plans with their advisers; they may be able to pursue a second major or a minor using elective credits.

Courses

HDPS 201-0 Introduction to Psychological Services

Overview of professional degrees, sites, and various populations in psychological services. Introduction to the most common mental disorders and counseling fundamentals used in clinical mental health careers.

HDPS 222-0 Career Development: Theory and Counseling

The career-development process and its relation to the world of work. Discussion of career-development theories. Focus on self-assessment; decision-making and job-seeking skills; and educational, occupational, and community information.

HDPS 301-0 Introduction to Counseling Overview of counseling theories, techniques, client systems, and service settings.

HDPS 302-0 The Human Personality Classic and contemporary psychological approaches to personality; understanding the whole person in societal and historical contexts. Emphasis on both theory and research.

HDPS 311-0 Group Dynamics Theory and research in the social psychology of groups and social systems. Small- and large-group dynamics; intergroup relations. Participation in a group relations conference.

HDPS 341-0 Marriage 101 The intricacies and problems of close, committed, interpersonal relationships, especially marriage. Open to first-year students.

HDPS 351-0 Special Topics in Human Development and Psychological Services Advanced work on special topics.

Learning and Organizational Change

www.sesp.northwestern.edu/ugrad/academics/conc/loc/curriculum

Students who are interested in such fields as management, consulting, change management, training, design of knowledge systems, and human resources in for-profit and not-for-profit organizations normally enter the learning and organizational change concentration. They combine core course work in learning sciences, organization behavior, psychology, and human development with the necessary work in economics, quantitative methods, communications, and computer science to prepare for careers as organizational leaders and change agents and for graduate study in education, the social sciences, and management.

Total requirements — 45 units

Distribution requirements — 10 units (see page 182)

SESP core — 8 units (see page 182)

Concentration program — 18 units

- Required courses (7 units)
 - LOC 211
 - 1 course chosen from COG SCI 211, PSYCH 228
 - LOC 213
 - LOC 306
 - LOC 310
 - 1 course chosen from LOC 311, 391; HDPS 311; SESP 303, 318
 - 1 course chosen from LOC 313, 346, 351; PSYCH 335; COG SCI 207, 210
- Concentration courses (11 units)

These must be selected from an approved list of courses in learning and organizational change, other SESP concentrations, and other areas such as cognitive science, communication studies, computer science, economics,

psychology, and sociology. At least 5 courses must be at the 300 level. Students who are interested in applying their knowledge in the field of business are encouraged to take at least 3 units in economics (ECON 201, 202, 260), technology, and international studies or foreign language. Up to 3 units of SESP 390 or 399 and 3 units of SESP 398 may be counted toward this requirement.

Electives — 9 units (see page 182)

Students are encouraged to discuss their elective plans with their advisers; they may be able to pursue a second major or a minor using elective credits.

Courses

LOC 211-0 Introduction to Organization Theory and Practice Examines major organizational behavior theories and practices through organizational analysis.

LOC 213-0 Cognition in Context Explores how thinking and learning are organized in everyday settings.

LOC 306-0 Studies in Organizational Change Examines theories and methods of organizational change through analysis of organizational adaptations; applies theories from learning sciences and organizational behavior.

LOC 310-0 Learning Organizations for Complex Environments Major change factors, including technology, globalization, and demographics, and their impact on organizations; how organizations are creating and responding to these changes through organizational design, learning systems, and human resource changes.

LOC 311-0 Tools for Organizational Analysis Understanding cause-and-effect relationships pertaining to organizational behavior and performance.

LOC 313-0 Learning and Thinking in Organizations

Examines how human learning and thinking can facilitate organizational growth and change through methods such as instructional design, modeling, and evaluation of learning outcomes.

LOC 346-0 Psychology of Technology and Instructional Design Introduction to theory and practice in the development of technologies for formal and informal learning in the classroom, workplace, and everyday world.

LOC 351-0 Special Topics in Learning and Organizational Change Advanced work on special topics.

LOC 391-0 Organizational Planning and Analysis

Culminating experience involving application of knowledge and skills to analyze real-world problems and solutions in learning and organizational change.

Social Policy

www.sesp.northwestern.edu/ugrad/academics/conc/sp

The social policy concentration explores how policies function as the guiding principles on which social programs are based. Students interested in public service, public policy, public health, and law typically choose to follow the requirements of the social policy concentration.

Courses analyze how social policies and social institutions influence the course of human lives and how people can influence social policies. Students develop a strong interdisciplinary foundation in the social sciences and gain an understanding of current social policy issues, drawing on research in African American studies, anthropology, communication studies, economics, gender studies, history, philosophy, political science, public health, and sociology. Examples of interdisciplinary specializations include education policy and reform, urban issues and policy, health care issues and policy, legal issues, and environmental issues and policy.

Social policy students are encouraged to use electives to build specialties in such areas as juvenile justice, advocacy programs, and policy analysis and to develop the oral and written communication skills important to success in law school and public policy positions.

Total requirements — 45 units

Distribution requirements — 10 units (see page 182)

SESP core — 8 units (see page 182)

Concentration program — 18 units

- Required courses (7 units)
 - SESP 202
 - SOC POL 201
 - SOC POL 304
 - SOC POL 307
 - ECON 201
 - ECON 202
 - POLI SCI 220
- Concentration courses (11 units)

These must be selected from an approved list of courses in social policy, other SESP concentrations, and other areas such as African American studies, communication studies, economics, political science, and sociology. At least 7 courses must be at the 300 level. Up to 3 units of SESP 390 or 399 and 3 units of SESP 398 may be counted toward this requirement.

Electives — 9 units (see page 182)

Students are encouraged to discuss their elective plans with their advisers; they may be able to pursue a second major or a minor using elective credits.

Courses

SOC POL 201-0 Introduction to Social Policy Social policy formulation: the substance of major American social policies, the agenda-setting process, and how the political system shapes social policy in this country.

SOC POL 304-0 Social Policy and the Human Services

Development of social policy for human services in the United States. Human service policies for education, mental health, physical health, prisons, income, and aging.

SOC POL 305-0 Law and Social Policy Use and influence of the legal system in and on social institutions and policy.

SOC POL 306-0 Contemporary Issues in Education

Current policy issues and major debates in K-12 education.

Characteristics and skills of the critical consumer of policy. Topics vary by year.

SOC POL 307-0 Educational Policy Conflict between societal imperatives for selecting and preparing youth for future careers and offering youth opportunity; how society and schools address this conflict; various approaches to policy reform.

SOC POL 310-0 Legal Aspects of Education Structure of school governance; decision making; relevant state and federal legislation; role of the U.S. Supreme Court in affecting public schooling.

SOC POL 330-0 Economics of Social Policy How economists view social policy issues. Economic models of household decision making. How economists account for costs and benefits of public and private programs and decisions. Prerequisite: ECON 201, 202, or consent of instructor.

SOC POL 351-0 Special Topics in Social Policy Advanced work on special topics.

SECONDARY TEACHING

www.sesp.northwestern.edu/ugrad/academics/conc/st/curriculum

SESP's interdisciplinary secondary teaching concentration combines subject area courses in a chosen field from Weinberg College — such as art, biological and physical sciences, English, foreign languages, mathematics, or social science — with courses in child and adolescent development, educational philosophy, and urban education.

Secondary teaching students must complete a one-quarter student teaching internship and be enrolled in TEACH ED 388/389 Student Teaching Seminar.

SESP students who wish to pursue secondary teaching certification must complete the requirements of the secondary teaching concentration and apply for formal admission to the SESP Teacher Preparation Program (see page 187). Students completing degree requirements within SESP receive the bachelor of science degree in education and social policy; 45 units are required for the degree.

Weinberg College students who wish to pursue secondary teaching certification must complete the requirements of the secondary teaching concentration and apply for formal admission to the SESP Teacher Preparation Program (see page 187). They also must complete a major and fulfill the degree requirements of Weinberg College.

Students who wish to transfer into SESP's secondary teaching concentration must plan carefully throughout their undergraduate program in order to meet the requirements.

Distribution Requirements (14 units)

- 1 oral communication course
- 1 multicultural studies course reflecting a non-Western perspective
- 2 intensive writing courses
- 2 natural sciences courses

- 2 formal studies courses (mathematics, logic, etc.)
- 2 historical studies courses
- 2 ethics and values courses (religion, philosophy, etc.)
- 2 literature and fine arts courses

Selected courses from Weinberg College and professional schools throughout the University may be used to fulfill distribution requirements with the consent of the student's adviser and the SESP assistant dean for student affairs.

Professional Core (11 units)

- SESP 201
- TEACH ED 302
- TEACH ED 304
- TEACH ED 313
- TEACH ED 327
- 1 methods and techniques course: TEACH ED 354, 355, 356, 357, 358, or 359
- 1 practicum/seminar: TEACH ED 378 or 379
- 1 student teaching seminar (4 units): TEACH ED 388 or 389

Students seeking endorsement to teach art or foreign languages or in middle schools must also take TEACH ED 328 and 329.

Teaching Subject-Area Requirements (12–19 units)

Specific teaching subject-area courses prepare students to meet the requirements of the Illinois State Board of Education. Teaching subject-area requirements may differ from those of a departmental major, and departmental course offerings change frequently. Secondary teaching certification candidates are required to meet regularly with the advising staff in the SESP Office of Student Affairs to ensure that certification requirements are met. In the event that courses listed below are no longer offered by the departments, suitable replacements will be found. Students are also responsible for any prerequisites.

Art (12 units)

- 4 introductory courses chosen from ART 120, 125, 130, 140, 150
- 4 studio courses: ART 210 or 310; 222 or 225; 231 or 232; 240 or 250
- 1 additional studio course in painting and drawing, printmaking, sculpture, or photography
- 2 art history courses chosen from ART HIST 220, 230, 240, 250
- 1 theory/criticism course chosen from ART 270, 272, 372; ART HIST 360-1,2; 365-2; 366

Biological and Physical Sciences

Biological Sciences (16 units)

- 7 core science courses: ASTRON 101, 120, or 220; BIOL SCI 210-1; CHEM 101; EARTH 201; PHYSICS 135-1,2,3

- 4 additional biological sciences courses: BIOL SCI 210-2,3; 301 or 309; 315
- 1 course chosen from BIOL SCI 330, 331, 332, 347, 349; ENVR SCI 202
- *SESP students*: 4 additional biological sciences courses
- *Weinberg College students*: additional courses as needed for the major

Chemistry (17 units)

- 7 core science courses: ASTRON 101, 120, or 220; BIOL SCI 210-1; CHEM 101; EARTH 201; PHYSICS 135-1,2,3
- 6 additional chemistry courses: CHEM 102; 103; 210-1,2,3 or 212-1,2,3; 342-1
- 4 courses chosen from BIOL SCI 301; CHEM 220; 316; 329; 333; 342-2,3; 393

Physics (14 units)

- 7 core science courses: ASTRON 101, 120, or 220; BIOL SCI 164 or 210-1; CHEM 101; EARTH 201; PHYSICS 135-1,2,3
- 4 additional physics courses: PHYSICS 330-1; 332; 333-1; 335 or 339-1
- 3 additional physics or astronomy electives

English (14 units)

- 3 introductory courses: ENGLISH 210-1,2 or 270-1,2; 298
- TEACH ED 324
- TEACH ED 325
- 2 American literature courses
- 2 English literature courses
- 4 additional literature courses including 1 on non-Western literature
- 1 course chosen from LING 220, 221, 250, 260, 270, 311, 312, 321, 322, 323, 341, 342; ENGLISH 206; a poetry course

Foreign Languages

French (12 units)

- 6 language courses: FRENCH 202, 203, 301, 302, 303, 305
- FRENCH 210
- 2 300-level literature courses taught in French
- 2 culture and civilization courses: FRENCH 201 or 211; 355
- 1 additional culture and civilization course chosen from FRENCH 380; 390; 391; 396

German (12 units)

- 4 language courses chosen from GERMAN 201; 205-1,2; 207; 209; 303; 305
- 3 200-level literature and culture courses chosen from GERMAN 211; 221-1,2,3; 223; 245
- 5 300-level literature and culture courses chosen from GERMAN 321-1 or higher

Latin (12 units)

- 3 language courses: LATIN 101-1,2,3
- 4 literature courses: LATIN 201-1,2,3; 310

- 5 additional 200- or 300-level Latin, Greek, or classics courses

Spanish (13 units)

- 3 language and composition courses: SPANISH 201, 202, or an appropriate substitute for heritage speakers; 203 or 207; 204
- SPANISH 220
- 3 literature courses chosen from SPANISH 250, 251, 260, 261
- 1 culture and civilization course chosen from SPANISH 360, 361, 380
- 5 additional 300-level courses taught in Spanish, with at least 1 course in a period earlier than 1800

Mathematics (12 units)

- 6 calculus/analysis courses: MATH 220, 224, 230, 234, 240, 300
- 1 probability and statistics course chosen from MATH 310-1,2,3; SESP 210; STAT 210; 302
- 1 computer science course
- 5 additional 300-level mathematics courses

Students enrolled in Mathematical Experience for North-western Undergraduates courses should consult with the SESP adviser to determine course equivalencies.

Social Science

History (15 units)

- HISTORY 201-1,2
- HISTORY 210-1,2
- 2 non-Western civilization courses chosen from HISTORY 255-1,2,3; 270; 281; 284-1,2; 365; 366; 368-1,2; 381-1,2; 384-1,2; 385
- 6 additional history courses
- 3 related courses chosen from ANTHRO 214; ECON 201; 202; GEOG 341; POLI SCI 220; PSYCH 110; SOCIOL 110; SOCIOL 226, SESP 210, STAT 202, or STAT 210

Economics (19 units)

- 8 economics courses: ECON 201; 202; 281; 310-1,2; 311; 323-1,2
- 4 additional economics courses
- *SESP students:* complete a minor in history (7 units)
Weinberg College students: economics majors complete a minor in history (7 units) or take 7 history courses including 4 in U.S. history (HISTORY 201-1,2 and 210-1,2 recommended)

Political Science (19 units)

- POLI SCI 220
- POLI SCI 395
- 2 courses chosen from POLI SCI 201, 230, 240, 250
- 1 course chosen from POLI SCI 310, 311, 312
- *SESP students:* 7 additional political science courses including 4 at the 300 level
Weinberg College students: political science majors take additional courses to meet requirements for the major

- *SESP students:* complete a minor in history (7 units)
Weinberg College students: political science majors complete a minor in history (7 units) or take 7 history courses including 4 in U.S. history (HISTORY 201-1,2 and 210-1,2 recommended)

Sociology (19 units)

- SOCIOL 110
- SOCIOL 226
- SOCIOL 303
- SOCIOL 329
- *SESP students:* 8 additional sociology courses including 6 at the 300 level
Weinberg College students: sociology majors take additional courses to meet requirements for the major
- *SESP students:* complete a minor in history (7 units)
Weinberg College students: sociology majors complete a minor in history (7 units) or take 7 history courses including 4 in U.S. history (HISTORY 201-1,2 and 210-1,2 recommended)

Electives

Additional units of elective course work must be taken to complete the 45-unit degree requirement. Students are encouraged to discuss their elective plans with the teacher certification manager.

Teacher Preparation Program

Students who wish to be certified as teachers must apply to the SESP Teacher Preparation Program. This program is approved by the Illinois State Teacher Certification Board, and those completing the following requirements qualify for secondary or K-12 certification in Illinois.

The program's requirements parallel courses in the secondary teaching professional core, notably TEACH ED 304, 354–359, 378, 379, 388, and 389. Completion of the courses alone does not result in certification, nor is certification required for completion of the SESP degree.

Application and Admission

Students apply to the Teacher Preparation Program when enrolled in TEACH ED 304 Schooling in Communities or by the fall of the junior year. To be admitted, they must have received a passing score on the Illinois Certification Testing System (ICTS) Basic Skills Test and have GPAs of 2.5 overall and 3.0 in teaching subject-area courses. SESP students must be eligible for entrance to the program no later than the end of fall quarter of the junior year. Weinberg College students may start the program later than the fall of the junior year but then may finish later than June of the senior year. Students are required to attend meetings about the certification process.

Clinical Experience

Students in the Teacher Preparation Program complete three clinical experiences: a 30-hour nonschool experience (during winter of the sophomore or junior year as part of

TEACH ED 304); a 100-hour school practicum (typically during fall of the senior year); and student teaching (typically during winter of the senior year).

To be eligible for the 100-hour practicum, students must have met the GPA requirements for and been admitted to the Teacher Preparation Program and have taken a minimum of 9 courses in the teaching subject-area to be placed. Those meeting these requirements will be placed with a department or teacher mentor at a local school.

Students are encouraged to begin the practicum at the start of the school year at the assigned site. This is typically one to three weeks prior to the start of Northwestern's fall quarter. Clinical experiences gained at the site are central to the discussion of methods and theories in the practicum seminar (TEACH ED 378 or 379) and methodology courses (TEACH ED 354–359).

To be eligible for student teaching, students must have successfully completed the applicable TEACH ED 354–359 course(s) as well as TEACH ED 378 or 379, earned a passing score on the applicable ICTS Content-Area Test, fulfilled minimum GPA requirements for student teaching, and completed 9 teaching subject-area courses. Some school districts also require a criminal background check.

Student teaching involves full-time placement in a local school for the entire quarter; no other courses are taken concurrently. Teacher candidates attend an evening seminar (TEACH ED 388 or 389). The internship and seminar together earn 4 units. Teacher candidates are evaluated by their school mentor, a Northwestern supervisor, and the seminar instructor.

Other Requirements

In addition to successful completion of student teaching, teacher candidates must pass three ICTS professional teaching tests and complete the digital portfolio final assessment.

Foreign language teacher candidates other than those in Latin are required to complete the Oral Proficiency Interview of the American Council of Teachers of Foreign Languages with a rating of “intermediate high” or better.

Candidates must be U.S. citizens or possess evidence of permanent resident status. Those without this status must indicate their intention to obtain it within six years of applying for certification.

Recommendation for Certification

Students are recommended for certification when they successfully complete degree requirements and all courses in the Teacher Preparation Program, earn a rating of recommendation for certification for student teaching, pass all outside tests as noted above, and successfully complete the digital portfolio.

Although legal requirements for certification vary from state to state, the SESP Teacher Preparation Program is flexible enough to permit students who plan carefully to complete provisional requirements for most states. As it is

easier to obtain a teaching license in another state through reciprocity than through independent certification, all students who complete the program are encouraged to apply for an Illinois license before leaving the state.

Students should apply for the certificate immediately upon graduation. Teacher Preparation Program graduates who are recommended but do not apply for certification upon graduation may not be eligible for certification at a later date due to changes in state requirements.

The Illinois School Code has provided that school districts may not knowingly employ individuals who have been convicted of certain offenses (principally those related to sex or drugs). All Illinois school districts require applicants to submit to a criminal background check.

Courses

SESP 201-0 Human Development: Childhood and

Adolescence Personal, social, and cognitive development, birth through adolescence. Interplay of biological and experiential factors on linguistic and conceptual development, ego, and personality.

TEACH ED 302-0 Social Contexts of Education How social contexts such as families, schools, and the workplace shape individuals; how individuals' intellectual and interpersonal capacities, preferences, and goals are shaped by their social contexts. Societal structures that organize, supply, and channel individual learning experiences and how they provide the formal and informal settings in which social interaction takes place. How participation in these socializing settings molds the development of individuals' capacities and forms their goals.

TEACH ED 304-0 Seminar on Teaching: Introduction to

Schooling in Communities Action research methods — including observation/field notes, interviewing, and artifact analysis — as means to understanding how schools work and how theory and practice relate. Includes 30 hours of field experience. *Note:* Students seeking certification must take the ICTS Basic Skills Test before the end of the quarter of enrollment in 304.

TEACH ED 313-0 Problems in the Philosophy of Education

Classical and modern philosophies of education. Text interpretation, analysis of ideas, argument construction; relationship of philosophy to educational issues. Students develop their own philosophy of education.

TEACH ED 324-0 Foundations of Reading and Language

Acquisition Cognitive foundations of reading comprehension processes and their influences on methods of instruction and assessment. Interrelationships between reading processes and language learning and their implications for instruction and assessment.

TEACH ED 325-0 Foundations of Writing Processes

(Secondary) Cognitive and sociocultural foundations of writing processes and their implications for instruction and assessment.

TEACH ED 327-0 Educating Exceptional Children Students with disabilities, including learning disabilities resulting from human development and/or accidents; understanding and application of approved emergency, educational, and rehabilitative activities; interrelationships with medical, health, and educational personnel.

TEACH ED 328-0 Dynamics of Middle School Curriculum Identifying and understanding the effects of middle school dynamics (such as principles, structures, and practices) on classroom learning and instruction. Focuses on the development and social problems of children in grades five through eight. Required for middle school endorsement and enrollment in type-10 programs.

TEACH ED 329-0 Health and Physical Development Interaction and interdependence of physical well-being, mental and emotional health, and the surrounding social environment for 10- to 14-year-old children. Required for middle school endorsement and enrollment in type-10 programs.

TEACH ED 351-0 Special Topics in Teacher Education Advanced work on special topics.

TEACH ED 354-0 Methods and Techniques: Art Analysis of literature, research, and teaching methodologies related to the content area. Focuses on learning experiences, methods, and educational techniques appropriate for middle and high school students. Concurrent registration in 378 or 379 required.

TEACH ED 355-0 Methods and Techniques: Foreign Languages See description for 354.

TEACH ED 356-0 Methods and Techniques: English See description for 354.

TEACH ED 357-0 Methods and Techniques: Secondary Mathematics See description for 354.

TEACH ED 358-0 Methods and Techniques: Sciences See description for 354.

TEACH ED 359-0 Methods and Techniques: Social Sciences See description for 354.

TEACH ED 378-0 Practicum/Seminar: Humanities Students spend a minimum of 10 hours per week for an entire quarter observing and assisting in a school approved by the SESP director of undergraduate teacher education. Concurrent registration in the applicable methods and techniques course (354–359) required. Prerequisites: 304 and passing score on the ICTS Basic Skills Test.

TEACH ED 379-0 Practicum/Seminar: Mathematics and Science See description for 378.

TEACH ED 388-0 Student Teaching Seminar: Humanities (4 units) Seminar and accompanying internship involving intensive clinical experience and teaching under the supervision of master teachers in teacher-training schools. Students assume increasingly sophisticated teaching responsibilities and, finally, primary responsibility for teaching a group or a class. Prerequisites: 304; 378 or 379; applicable course(s) from 354–359; successful completion of the practicum experience; an approved contract for the internship experience; consent of the SESP director of

undergraduate teacher education; and passing score on the applicable ICTS Content-Area Test.

TEACH ED 389-0 Student Teaching Seminar: Mathematics and Science (4 units) See description for 388.

SESP PROGRAMS FOR ALL NORTHWESTERN STUDENTS

Civic Engagement Certificate Program

www.sesp.northwestern.edu/ugrad/academics/service

Open to freshmen, sophomores, and juniors in any school at Northwestern, the Civic Engagement Certificate Program increases students' understanding of community needs and fosters ongoing civic engagement by connecting community service experience with an academic component. Spanning five academic quarters, the two-year program requires a total of 5 units of course work and 100 hours of community service.

Course work includes SESP 202 Introduction to Community Development, taken in winter quarter of the first year of the program; SESP 195-1,2 Community Engagement, taken in winter and spring of the first year; SESP 351 Special Topics, taken in fall of the second year; and 2 independent study units — SESP 299-1,2 Civic Engagement Capstone Research — taken in winter and spring of the second year and leading to a capstone project completed in collaboration with a sponsoring organization.

During each of the two years, students perform 50 hours of community service at approved sites.

Summer Field Studies Program

www.sesp.northwestern.edu/ugrad/academics/practicums/field

The SESP Field Studies Program gives students the opportunity to make solid professional contributions to an organization while benefiting from experiential learning. The one-quarter program carries 4 units of credit. Students work at their sites for 30 hours a week and attend a Friday morning Practicum Analysis Seminar.

In the workplace students record and analyze events and processes, integrating concepts and theories from their social science courses. The field notes lead to a final paper analyzing some component of the practicum/field study experience.

During Summer Session any Northwestern undergraduate student is able to complete the program in San Francisco or Washington, D.C., in addition to the Chicago area. Program sites expose students to the breadth and depth of issues and activities within a field. They experience new skills and responsibilities through the projects they carry out from start to finish. Their supervising mentors meet with them individually for at least one hour per week.

The prerequisite course SESP 372 Methods of Observing Human Behavior teaches students how to take and analyze notes for a field study. Students complete a qualitative field study of their practicum experiences.

Robert R. McCormick School of Engineering and Applied Science

www.mccormick.northwestern.edu

The McCormick School of Engineering and Applied Science is committed to providing leadership for the technological foundation of our society, economy, environment, and culture. The school's mission is twofold: the personal and professional development of its students and faculty and the development and application of new technology, which is increasingly of an interdisciplinary nature.

McCormick is dedicated to a high standard of excellence in

- Teaching fundamentals of science and engineering disciplines and stimulating students to become innovative thinkers and leaders able to cope with complex issues in a changing environment
- Preparing undergraduate and graduate students capable of understanding, applying, and contributing to technology in whatever areas or careers they subsequently pursue

Undergraduate students in McCormick may follow a curriculum leading to a bachelor of science degree in any of the following fields:

applied mathematics
biomedical engineering
chemical engineering
civil engineering
computer engineering
computer science
electrical engineering
environmental engineering
industrial engineering
manufacturing and design engineering
materials science and engineering
mechanical engineering
medical engineering (Honors Program in Medical Education only)

The programs in biomedical engineering, chemical engineering, civil engineering, computer engineering, electrical engineering, environmental engineering, industrial engineering, manufacturing and design engineering, materials science and engineering, and mechanical engineering are accredited by the Engineering Accreditation Council of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, Maryland 21202.

With the proper use and combination of requirements, options, and electives, students may prepare themselves for graduate work in engineering and also for postbaccalaureate degrees in medicine, law, business, or other areas.

Bachelor of science degrees are awarded also in approved ad hoc combined studies programs.

Graduate programs of study are available in all of the above fields as well as in theoretical and applied mechanics, biotechnology, engineering design and innovation, computer information systems, manufacturing management, project management, information technology, product development, and engineering management. Programs leading to degrees at the master's and doctoral levels are described completely in the course catalog for the Graduate School and in publications on engineering graduate programs.

Excellence in research is a distinguishing characteristic of the engineering faculty. A faculty such as this, working at the frontiers of knowledge, is in the best position to maintain currency in courses and curricula and to develop an atmosphere inspiring scholarship, discovery, and originality among students.

McCormick has a student body of approximately 1,500 undergraduates and 1,350 graduate students. It is housed in the Technological Institute complex, which contains more than 1 million square feet of floor area and provides excellent educational and research facilities.

The Seeley G. Mudd Library for Science and Engineering, adjoining the Technological Institute, is an integrated and centralized collection serving engineering, applied mathematics, astronomy, biochemistry, biology, chemistry, and physics. Nearly all of its scholarly journals are available to Northwestern students over the Internet.

ACADEMIC POLICIES

Requirements for the Degree of Bachelor of Science

Students must successfully complete all 48 units of the curriculum or have equivalent academic credit. Students who interrupt their programs of study for an extended time during which degree requirements are changed will normally be held to the new requirements. Those who encounter curricular changes during their period of enrollment may choose to follow any curriculum during that period but must meet its requirements completely.

All curricula leading to a bachelor of science degree in engineering or applied science have the same basic components: mathematics, engineering analysis and computer proficiency, basic sciences, design and communications,

basic engineering, social sciences/humanities, unrestricted electives, and the major program. Courses qualifying for these components are listed in the departments appearing under Academic Offerings (beginning on page 196). General requirements are as follows:

Core Courses (32 units)

Mathematics (4 units)

Standard for all degree programs:

- MATH 220 Differential Calculus of One-Variable Functions
- MATH 224 Integral Calculus of One-Variable Function
- MATH 230 Differential Calculus of Multivariable Functions
- MATH 234 Multiple Integration and Vector Calculus

Note: ES APPM 252-1,2 satisfy requirements for MATH 230 and 234.

Engineering Analysis and Computer Proficiency (4 units)

Standard for all degree programs: GEN ENG 205-1,2,3,4 Engineering Analysis or 206-1,2,3,4 Honors Engineering Analysis

Basic Sciences (4 units)

Eligible courses vary by degree program; 4 courses from at least two of the areas below; no more than 2 from earth and planetary sciences/astronomy; no more than 3 in any other area

- *Physics*
 - PHYSICS 135-2,3 General Physics
 - PHYSICS 335 Modern Physics for Nonmajors
- *Biological sciences*
 - BIOL SCI 210-1 Genetics and Evolutionary Biology
 - BIOL SCI 210-2 Biochemistry and Molecular Biology
 - BIOL SCI 210-3 Physiology and Cell Biology
 - CHEM ENG 275 Molecular and Cell Biology for Engineers
- *Chemistry*
 - CHEM 101 General Chemistry
 - CHEM 102 General Inorganic Chemistry
 - CHEM 103 General Physical Chemistry
 - CHEM 171 Accelerated General Inorganic Chemistry
 - CHEM 172 Accelerated General Physical Chemistry
 - CHEM 210-1,2 Organic Chemistry
- *Earth and planetary sciences/astronomy*
 - EARTH 201 Surface Processes
 - EARTH 202 Earth's Interior
 - ASTRON 220 Introduction to Astrophysics

Design and Communications (3 units)

Standard for all degree programs except biomedical engineering, which requires BME 390-2

- *Writing and design*
 - ENGLISH 106-1,2 Writing in Special Contexts
 - DSGN 106-1,2 Engineering Design and Communication
- *Speaking*
 - GEN CMN 102 Public Speaking, GEN CMN 103 Analysis and Performance of Literature, or BME 390-2 Biomedical Engineering Design
- Higher-level courses may satisfy this requirement; they are approved on an individual basis.

Basic Engineering (5 units)

Eligible courses vary by degree program; 5 courses from at least four of the following areas:

- *Computer architecture and numerical methods*
 - EECS 203 Introduction to Computer Engineering
 - EECS 205 Fundamentals of Computer System Software
 - EECS 328 Numerical Methods for Engineers
 - ES APPM 346 Modeling and Computation in Science and Engineering
- *Computer programming*
 - EECS 211 Object-Oriented Programming in C++
 - EECS 317 Data Management and Information Processing
 - EECS 230 Programming for Computer Engineers or 231 Advanced Programming for Computer Engineers
- *Electrical science*
 - EECS 202 Introduction to Electrical Engineering
 - EECS 221 Fundamentals of Circuits
 - EECS 222 Fundamentals of Signals and Systems
 - EECS 223 Fundamentals of Solid-State Engineering
 - EECS 224 Fundamentals of Electromagnetics and Photonics
 - EECS 270 Applications of Electronic Devices
 - MECH ENG 233 Electronics Design
- *Fluids and solids*
 - BME 270 Fluid Mechanics
 - BME 271 Introduction to Biomechanics
 - CHEM ENG 321 Fluid Mechanics
 - CIV ENV 216 Mechanics of Materials I
 - MECH ENG 241 Fluid Mechanics I
- *Materials science and engineering*
 - MAT SCI 201 Introduction to Materials, 203 Microstructure and Engineering Properties of Materials, or 301 Materials Science Principles
- *Probability, statistics, and quality control*
 - BME 220 Introduction to Biomedical Statistics
 - CHEM ENG 312 Probability and Statistics for Chemical Engineering
 - CIV ENV 306 Uncertainty Analysis in Civil Engineering
 - EECS 302 Probabilistic Systems and Random Signals
 - IEMS 201 Introduction to Statistics
 - IEMS 303 Statistics
 - MECH ENG 359 Reliability Engineering

- *Systems engineering and analysis*
 - CHEM ENG 210 Analysis of Chemical Process Systems
 - CIV ENV 304 Civil and Environmental Engineering Systems Analysis
 - IEMS 310 Operations Research
 - IEMS 313 Deterministic Models and Optimization
 - IEMS 326 Economics and Finance for Engineers
- *Thermodynamics*
 - BME 250 Thermodynamics
 - CHEM 342-1 Thermodynamics
 - CHEM ENG 211 Thermodynamics
 - MAT SCI 314 Thermodynamics of Materials
 - MAT SCI 315 Phase Equilibria and Diffusion in Materials
 - MECH ENG 220 Thermodynamics I (may not be taken with CHEM 342-1 or CHEM ENG 211)
 - MECH ENG 370 Thermodynamics II

Social Sciences/Humanities (7 units)

Standard for all degree programs: 7 social sciences/humanities courses approved in advance by the McCormick Humanities Panel and chosen according to one of two options:

- *Option A:* 5 courses must be thematically related; no more than 5 may come from a single area
- *Option B:* At least 2 courses must be chosen from each of the following areas:
 - *Social and behavioral sciences*
 - *Historical studies and values*
 - *Fine arts, language, and literature*
 Only 3 may be 100-level courses; 3 must be thematically related

Unrestricted Electives (5 units)

Standard for all degree programs: students may take any credit course in the University to explore or extend technical or nontechnical interests.

Major Program (16 units)

Each degree program in the McCormick School finds its depth in the 16 units devoted to the major program. Each curriculum provides considerable elective opportunity within these courses. The intent is to provide opportunity for individualization, but coherence in the selection of elective courses is still necessary. In accredited programs, the understanding is that certain criteria will be met, and guidance to this end is essential. Accordingly, it is required that a plan of study listing intended selections be submitted for approval by the end of the eighth quarter of study (winter quarter of junior year). All 16 units in the major program must be at the 200 level or higher.

Most curricula offer suggested areas of specialization or options that provide excellent guidance in using electives. These course plans are available in the department or program offices or the McCormick Academic Services Office and can be the basis for course planning. Alternately, self-designed plans may be submitted, but they should be worked out in consultation with a faculty adviser.

Students must meet not only McCormick curriculum requirements but also the specific requirements for the program of study being pursued. The listings of these curricula present additional information or specifics to be used with the basic curriculum (see Academic Offerings, page 196).

Some curricula contain specializations or options. These are for advice and guidance for elective course choice. In addition, some courses may be regarded as duplicates (contact the Undergraduate Engineering Office or see the McCormick web site for this list), and taking them will increase the number of requirements needed to earn a McCormick degree. For further details about the options or specializations within a particular program, consult with the department coordinator sponsoring that curriculum, check with McCormick's Academic Services Office, or see the school's web page at www.mccormick.northwestern.edu.

Grade Requirements

A grade point average (GPA) of not less than 2.0 is required for all units presented for the degree. Students must have received a grade of C or higher in any course taken elsewhere and used to fulfill a McCormick degree requirement. The GPA of the 16 units in the major program must also be at least 2.0; no more than 2 of these units may carry grades of D.

Every candidate for a degree must file an application for the degree a year in advance of the date of graduation (see Academic Calendar on pages 4–5).

In addition to, and independent of, the requirements set by McCormick, all students must satisfy the Undergraduate Residence Requirement (see page 17).

Pass/No Credit Option

The following requirements apply to the pass/no credit (P/N) option:

- No more than 8 units taken P/N may be counted toward the 48 units required for the degree.
- Only 1 unit per quarter may be taken P/N during freshman and sophomore years.
- *Core courses:* Only 4 100- or 200-level courses may be taken P/N to satisfy the 7-unit requirement in the social sciences/humanities. No courses may be taken P/N in the required mathematics, engineering analysis and computer proficiency, basic sciences, design and communications, and basic engineering areas.

- *Major program:* Consult the responsible department office or McCormick's Academic Services Office regarding the regulations for use of P/N in each departmental program.
- Credits earned under a P/N grading scheme at another institution may be applied toward McCormick requirements only if the P/N option is permissible for that requirement.

Advanced Placement

Advanced placement and college credit may be granted on the basis of the College Entrance Examination Board (CEEB) Advanced Placement tests. Placement or exemption may be granted on the basis of the CEEB tests (or other appropriate international examinations), special examinations in subject areas, or analysis of high school background. Any placement (verified by a grade above C– in a subsequent course) in approved sequential work will reduce the requirements for the BS by the number of courses preceding the placement. These stipulations regarding placement, exemption, and degree requirements may differ from those of other schools of the University. Students receiving credit from Advanced Placement examinations and other such programs must still meet the Undergraduate Residence Requirement.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

ACADEMIC OPTIONS

Cooperative Engineering Education Program

The Walter P. Murphy Cooperative Engineering Education Program alternates periods of paid industrial experience and academic studies for full-time students in all departments of engineering and applied science. During 18 months of industrial employment, students can apply theory while gaining practical experience. This perspective enables them to develop an understanding of the responsibilities of their future professional careers.

Freshmen are invited to participate in workshops to prepare themselves for the co-op program. Sophomores in good academic standing begin applying for co-op positions as early as the fall quarter. The co-op coordinator makes every effort to secure interviews for the students so that cooperative work assignments are related to their professional objectives.

Generally, the first work experience for sophomore co-op students occurs the summer before their junior year. Co-op experience for juniors, transfer students, and others may begin as late as the spring of junior year. If necessary, with the help of the academic advisers, special schedules may be arranged to enable students to meet individual academic requirements as well as co-op requirements.

Students register for their work quarters, but no tuition or fee is charged. This registration keeps co-op students enrolled at Northwestern during work periods. While no academic credit is given for co-op, special BS/MS programs may use co-op experience as the basis for undergraduate projects and master's theses.

Although emphasis is on the experience gained from cooperative work rather than on the income, students in the co-op program can cover a portion of their educational expenses with their earnings.

The following table shows the college-industry schedule for the five years of undergraduate education:

College-Industry Schedule

	Summer	Fall	Winter	Spring
Freshman		1	2	3
Sophomore	vacation	4	5	6
Junior	work	7	8	work
Presenior	work	9	work	10
Senior	work	work	11	12

Students who complete the co-op plan receive tuition rebates during their final academic quarters to assure that they will not pay higher total tuition than other students in the same entering class.

In addition to the academic degree, McCormick awards co-op students a certificate in recognition of successful completion of the Walter P. Murphy Cooperative Engineering Education Program. Students must successfully complete the schedule of school and work — which meets standards set by the program and the co-op employer — in order to receive recognition as co-op students upon graduation from McCormick.

In some states, co-op experience may be credited for up to one year of the usual four years of engineering experience required for the Professional Engineer's License.

Employers of co-op students include government and service institutions as well as industry. Co-op coordinators visit participating employers periodically to discuss students' abilities, attitudes, and progress on the job. At the end of each work period, employers are asked to evaluate student performance and progress. It is important to note that neither students nor cooperative employers obligate themselves to permanent employment by virtue of the co-op status, although most students get impressive permanent job offers as a result of the co-op experience. Others are admitted to prestigious graduate and professional schools.

Undergraduate Honors Program

Students with good scholastic records may apply to the Undergraduate Honors Program any time during their junior or presenior years. (Students within three quarters of graduation are past this admission point.) At the time

of admission, they must have a cumulative GPA of 3.5 or better.

Honors students participating in the program must

- complete at least three units of approved advanced study (including courses normally accepted at the graduate level) with an average grade of B or better
- complete an extended independent study project (at least two quarters on the same topic) leading to an acceptable report

Successful completion of the honors program will be noted on the student's transcript. Recognition also will be given in the Commencement program. If a student's individually evaluated performance is not judged to meet the standards of success, the student will still receive course grades and credits as earned.

Undergraduate Research

Opportunities for undergraduate research are made available and encouraged. Each field of study offers independent study courses for research enrollment on an elective basis.

The Sara Boley Undergraduate Research Fund makes available money for individual research projects.

The Northwestern Student Advisory Board holds an annual competition for the best undergraduate research project, and the winner is recognized with the Harold Benedict Gotaas Award.

Students normally perform undergraduate research projects under the direction of faculty doing research in their department and in laboratories throughout the University, including McCormick research centers. For more on McCormick's research activities, see www.mccormick.northwestern.edu/research.

Combined Studies Program

For students whose particular interests and goals cannot be satisfied by one of the regular programs of study in engineering or applied science, the Combined Studies Program provides an alternative. If endorsed and guided by three faculty members and approved by McCormick's Curriculum Committee, an ad hoc curriculum leading to the bachelor of science degree may be pursued. Students applying to the program must submit their petitions to the McCormick Curriculum Committee 3½ quarters before the completion of their degrees.

Available courses may be combined in a variety of interdisciplinary plans as long as the all-school specification of eight basic components is met. Examples of combined studies programs from recent years include public health, engineering physics, biomedical engineering and molecular biology, and computers and mechanical design.

Students interested in the Combined Studies Program should consult with the associate dean for undergraduate engineering.

Second Field of Specialization

Elective opportunities in the McCormick curriculum may be used toward a departmental program in another school of the University. Satisfactory completion of the requirements for the second program, verified by the appropriate department, will be noted on the student's transcript. Carefully planned electives will normally enable students to obtain a second field of specialization within the 48-unit requirement for the BS degree.

Multiple BS Degrees

Students with wide-ranging interests may work toward two or more bachelor of science degrees in McCormick. The work in additional areas does not need to be completed at the same time, but the full requirements for each degree must be approved by each department or program no later than two academic quarters before the completion of work for the second degree but no earlier than the junior year. The full requirements for each degree must be satisfied. At least 6 additional units of credit, or their equivalent, must be presented before the awarding of each additional degree.

Accelerated Master's Program

Qualified undergraduate students at McCormick may work simultaneously toward the bachelor of science and master of science degrees in engineering. Integrated planning of course work allows the possibility of taking graduate-level courses during the third and fourth years. The requirements remain unchanged for the two degrees. The McCormick requirement for the BS is 48 units, and the requirement for the MS is specified by the individual department (9–12 units). No course used for the MS requirement may be counted toward the BS requirement.

Application for admission to concurrent BS/MS study must be approved by the appropriate department and the Graduate School. A department may require that students do additional work beforehand.

Dual Bachelor's Degree Programs

Dual Engineering and Liberal Arts Degrees

McCormick encourages breadth of interest and to this end supports dual bachelor's degree programs in engineering and liberal arts. A common approach to a dual bachelor's degree program is a parallel arrangement of studies requiring five years and resulting in a BA with a major in Weinberg College and a BS in a particular field of engineering. Students must complete the stated requirements of both schools and expected majors. For a description of the program, see page 28 in the Cross-School Options chapter. For information on applying to the program, see page 11.

Dual Engineering and Music Degrees

Highly capable students who have a strong interest in and commitment to both engineering and music may pursue a five-year program leading to bachelor's degrees in both fields. In engineering any field of study may be chosen, resulting in a bachelor of science in the chosen field. In music the bachelor of music or bachelor of arts in music is awarded. For a description of the program, see page 28 in the Cross-School Options chapter. For information on applying to the program, see page 11.

Business Enterprise Certificate

Students who aim to have business careers and want to improve their ability to make a contribution soon after they graduate may wish to consider pursuing this certificate program. This program involves a combination of required business courses and work experience. Students who complete the Walter P. Murphy Cooperative Engineering Education Program must take 2 units of credit in addition to those needed for their bachelor's degrees; other students must take 4 extra units. An acceptable report on the work experience and successful completion of a McCormick BS degree are required.

Certificate in Biotechnology and Biochemical Engineering

This certificate program provides specific training for students interested in industries that create and manufacture pharmaceuticals, biomaterials, and agents for gene and cell therapies or for those desiring in-depth preparation for future graduate study in biotech research. See page 201 for details.

Certificate in Engineering Design

This certificate program, administered by the Segal Design Institute, develops a set of design skills that prove valuable in careers across the entire spectrum available to McCormick graduates. See page 220 for details.

Honors Program in Medical Education

The Honors Program in Medical Education (HPME) is designed for unusually gifted high school students who seek a career in medicine or medical science. It provides a plan whereby students entering Northwestern are admitted simultaneously to McCormick, Weinberg College, or the School of Communication and to the Feinberg School of Medicine. HPME students then participate in a challenging program, with the first three or four years in undergraduate study and the last four years in the Feinberg School. Thus, the period of formal training may be reduced by one year.

Students who meet the entrance requirements of McCormick may pursue a program leading to the bachelor of science degree in medical engineering after five years

and the doctor of medicine degree after seven years. See page 29 for more information on HPME and page 11 for information on applying to the program.

STUDENT RESOURCES

Tutorial Program

McCormick conducts a program of guided study and tutorial help for freshmen and sophomores in all the required courses in mathematics, chemistry, physics, and engineering. This program encourages out-of-class work and good study habits and helps provide a full understanding of the early courses that are the foundation for much that is to follow. The aim is not to displace students in their learning efforts but to provide explanations to bridge the uncertain or unknown and lead to depth of understanding.

Faculty Advisers

During the first year students are assigned a freshman adviser. At the beginning of the sophomore year most students will have selected a program of study and will be re-assigned an adviser in that area. Advisers assist in planning the program of study, but students retain the responsibility of meeting overall graduation requirements. Curricular and other advice may be obtained by addressing an e-mail request to mccormick-school@northwestern.edu.

Organizations for Engineering Students

The McCormick Student Advisory Board is composed of representatives from each class in engineering and from approved McCormick organizations. It is the recognized representative body of undergraduate engineering students and as such serves as a link between the students and faculty and administration. It encourages and coordinates the activities of engineering students and student groups.

The following professional societies have established student branches on the campus:

- American Institute of Chemical Engineers
- American Society of Civil Engineers
- American Society of Mechanical Engineers
- ASM International
- Association for Computing Machinery
- Biomedical Engineering Society
- Engineers for a Sustainable World
- Institute of Electrical and Electronics Engineers and its computer and engineering in medicine and biology subchapters
- Institute of Industrial Engineers
- Materials Research Society
- National Society of Black Engineers
- Northwestern Organization of Design Engineers
- Society of Automotive Engineers
- Society of Hispanic Professional Engineers
- Society of Manufacturing Engineers
- Society of Women Engineers

The following honorary societies recognize high-achieving McCormick undergraduates:

- Eta Kappa Nu: open to upperclass students in electrical engineering who demonstrate superior scholarship and ability
- Kappa Theta Epsilon: cooperative engineering education honorary society
- Omega Chi Epsilon: for upperclass students in chemical engineering who demonstrate superior scholarship and leadership ability
- Phi Eta Sigma: for freshmen who earn a scholastic average equivalent to a grade of A
- Phi Lambda Upsilon: open to upperclass students in chemistry and chemical engineering who demonstrate superior scholarship and academic ability
- Pi Tau Sigma: for upperclass students in mechanical engineering who demonstrate superior scholarship and leadership ability
- Sigma Xi Society: associate membership open to seniors who excel in scholarship in at least two departments
- Tau Beta Pi: for upperclass students who have shown superiority in scholarship and ability in engineering work

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

ACADEMIC OFFERINGS

GENERAL ENGINEERING

Introductory and Related Courses

DSGN 106-1,2 Engineering Design and Communication

(.5 unit each) Integrated introduction to the engineering design process and technical communication. Approaches to unstructured and poorly defined problems; conceptual and detailed design; team structure and teamwork; project planning; written, oral, graphical, and interpersonal communications; use of software tools; discussion of societal and business issues. One lecture, two workshops, lab. Registration for both quarters required. Primarily intended for freshmen.

GEN ENG 190-0 Engineering Freshman Seminar Broad engineering or interdisciplinary subjects of current interest.

GEN ENG 191-0 MEOP Complete Seminar Issues unique to minority engineering students. Working in groups, achieving one's full potential, succeeding in class, increasing involvements with faculty and in their research. Primarily intended for freshmen.

GEN ENG 195-1,2,3,4 Engineering Dialog (.33 unit each) A weekly seminar addressing subjects of interest in engineering, design, engineering policy, and entrepreneurial activities. For participants in the invitation-only Murphy Institute Scholars Program. May be repeated.

GEN ENG 205-1,2,3,4 Engineering Analysis 1. Introduction to linear algebra from computational, mathematical, and applications viewpoints. Computational methods using a higher-level software package such as Matlab. Taken concurrently with 215-1. **2.** Linear algebra and introduction to vector methods in engineering analysis. Statics and dynamics of rigid bodies and matrix analysis of trusses and networks. Engineering design problems. Taken concurrently with 215-2. Prerequisites: C– or better in 205-1; MATH 220. **3.** Dynamic behavior of the elements. Modeling of mechanical (both translational and rotational), electrical, thermal, hydraulic, and chemical systems composed of those elements. Taken concurrently with 215-3. Prerequisite: C– or better in 205-2. **4.** Solution methods for ordinary differential equations, including exact, numerical, and qualitative methods. Applications and modeling principles; solution techniques. Taken concurrently with 215-4. Prerequisites: C– or better in 205-2; MATH 224.

GEN ENG 206-1,2,3,4 Honors Engineering Analysis Covers topics addressed in 205 at a deeper level. Intended for students with demonstrated strength in mathematics, computer programming, and/or physics. Prerequisite: consent of instructor.

GEN ENG 215-1,2,3,4 Advanced Conceptual Workshop Exercises related to work in 205. Taken concurrently with 205-1,2,3,4.

GEN ENG 220-1,2 Analytic and Computer Graphics (.5 unit each) **1.** Creating in autoCAD software. **2.** 3-D parametric modeling with AutoDesk Inventory.

GEN ENG 295-0 Introductory Topics in Engineering

Intermediate-level topics suggested by students or faculty members and approved by the curriculum committee.

CRDV 301-0 Introduction to Career Development (0 units)

This course prepares students for the Walter P. Murphy Cooperative Engineering Education Program, internships, and full-time employment. It includes units on job-search skills, self-assessment, transition to the workplace, workplace-management issues, and transition back to school.

CRDV 310-1,2,3,4,5,6 Cooperative Engineering Education

(0 units) This sequence of courses covers the work terms of students enrolled in the Walter P. Murphy Cooperative Engineering Education Program. Prerequisite: CRDV 301 or consent of program director.

CRDV 311-1,2,3 Professional Engineering Internship

(0 units) This series of courses is designated for students pursuing the Business Enterprise Certificate, seeking University recognition of their internship experience, or participating in an approved internship during the regular academic year. Prerequisite: consent of program director.

CRDV 312-1,2,3 Undergraduate Engineering Projects in

Service Learning Noncredit course requiring students to engage in an engineering-related, full-time community

service project under the guidance of an appropriate faculty member, agency supervisor, or mentor.

GEN ENG 355-0 Domestic Study — Affiliated Full-time registration in an academic program in the continental United States that is affiliated with Northwestern. Upon successful completion of the program, registration is replaced with credits transferred from the affiliated institution.

GEN ENG 395-0 Special Topics in Engineering Topics suggested by faculty members and approved by the curriculum committee.

GEN ENG 397-0 Selected Topics in Engineering (.5 unit) Topics of limited scope as suggested by faculty members and approved by the curriculum committee.

APPLIED MATHEMATICS

See Engineering Sciences and Applied Mathematics.

BIOMEDICAL ENGINEERING

www.bme.northwestern.edu

Biomedical engineers solve problems in the life sciences and clinical medicine by applying engineering and mathematical techniques. This approach has been fruitful where a descriptive approach is no longer adequate for studying complex systems involved in the body's transport, regulation, and information processing. Equally important has been the development of devices used inside or outside the body to replace or supplement physiological functions and to enhance the quality of diagnosis and care. Thus, biomedical engineering refers to the application of engineering techniques to problems in medicine and biology.

The interplay among the physical sciences, engineering, biology, and the medical sciences takes many forms. The traditional study of complex systems, whether for power transmission, communications, or the operation and control of industrial processes, has provided engineers with a number of concepts and techniques that proved valuable in analysis and design. These principles expressed in mathematical form are applicable to a wide range of phenomena, including those in biological processes. Information theory, statistics, and computer technology have opened new areas for exploration of sensory and central nervous activity as well as patient handling and diagnosis. Theories for feedback controls, transport processes, materials science, and mechanics provide new insight into homeostatic physiological processes. Analysis of heat transfer, fluid flow, and chemical-process control in living organisms requires competence in both engineering and the life sciences. Current studies help provide understanding of many physiological processes. This understanding, in turn, leads to improvements in clinical practice, diagnosis, and patient care.

Northwestern was among the first schools to recognize the value of a biomedical engineering background, and today the Department of Biomedical Engineering offers, at both the undergraduate and graduate levels, one

of the largest and broadest programs in the country. The primary path students follow is the biomedical engineering program administered by the biomedical engineering department, but alternative biomedical options are offered in other engineering departments.

The biomedical engineering program provides biomedical training that is quantitative, emphasizes problem solving, and treats phenomena from the molecular to the systems levels. This curriculum prepares students for careers in dentistry, medicine, and/or research or with corporations in the health care industry. Required courses in mathematics, engineering, and science establish a strong foundation on which to build a biomedical framework. In addition, each student selects one sequence of courses with which to develop an area of specialization.

Students earning a biomedical engineering degree must obtain a minimum of 18 total course credits in engineering design and engineering science and have obtained substantial training in design.

Those seeking admission to dental or medical school should be familiar with the entrance requirements of those schools to which they intend to apply. In addition to the specifically required courses of the biomedical engineering program, many professional schools also require additional courses in physics, organic and/or physical chemistry, and laboratory biology. These requirements may be satisfied by judicious use of electives.

Areas of Specialization

All areas are suitable for students planning to enter medical school, continue their biomedical engineering education in graduate school, or pursue careers in the biomedical industry or hospitals.

Biological Materials and Molecular Engineering

Principles from biochemical and materials science engineering, molecular biology, and biosensors are applied to the creation and adaptation of materials for medical applications (e.g., implants, medical-device coatings, drug delivery). Students in this area learn about various aspects of biology and chemistry from the engineer's perspective.

Biomechanics and Rehabilitation

Solid (e.g., musculoskeletal) and fluid (e.g., cardiovascular, pulmonary) mechanics are applied to human physiology in the design and manufacture of limb prostheses or artificial organs. Students in this area learn the fundamental engineering principles needed for this work.

Biomedical Signals and Images

The application of imaging, signal processing, and signal analysis to biomedical problems has become an important part of medicine. MRI, CT-imaging, PET, EKG, and EEG are all examples of physiological signals. Students in this area learn the physiology that underlies these signals

and the engineering that underlies their recording and analysis.

Electronic Instrumentation

Electronic instruments are used widely in the diagnosis and treatment of disease and in the study of normal physiological function. Students in this area learn the fundamentals of electronic and computer (hardware and software) instrumentation.

Transport Processes and Tissue Engineering

The study of transport processes in living tissue is important in understanding blood flow, lung ventilation, and oxygen transport to and from red blood cells to various tissue beds. Students in this area learn the fundamental chemical engineering principles that relate to these processes.

Degree in Biomedical Engineering

Requirements (48 units)

Core courses (32 units)

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses
- 4 basic science courses: PHYSICS 135-2,3; CHEM 101 and 102 *or* 171 and 172
- 3 design and communications courses
- 5 basic engineering courses
 - *Fluids and solids*: BME 270 and 271
 - *Materials science and engineering*: MAT SCI 201 or 301
 - *Probability, statistics, and quality control*: 1 course from BME 220; IEMS 201, 303; MECH ENG 359
 - *Thermodynamics*: 1 course from BME 250; CHEM 342-1; MECH ENG 220
 - MECH ENG 220 may not be taken with CHEM 342-1 or 211
- 7 social sciences/humanities courses
- 5 unrestricted electives

Major program (16 units)

- BME 101 (noncredit)
- 9 core courses: BIOL SCI 210-2; CHEM 210-1; BME 301, 302, 303, 305, 306, 307, 390-1
- 7 courses in an area of specialization
 - 5 courses selected from one of the following tracks or an alternate set of courses developed with their advisers and approved by the Biomedical Engineering Undergraduate Committee:
 - *Biological materials and molecular engineering*
 - *Biomechanics and rehabilitation*
 - *Biomedical signals and images*
 - *Computer engineering*
 - *Electrical engineering*
 - *Transport processes and tissue engineering*

- 2 technical electives

- May include BIOL SCI 210-1,3; CHEM 101, 210-3; EECS 230; and any courses in engineering, science, or mathematics at the 300 level or higher.

- Students are urged to choose technical electives that emphasize engineering design.

- Courses in the major program must be at the 200 level or higher; none may be taken P/N.

Courses

BME 101-0 Introduction to Biomedical Engineering (0 units)

Faculty, students, and guests present various topics introducing the field of biomedical engineering: different tracks within the program of study, possible career and research opportunities, and ethics.

BME 220-0 Introduction to Biomedical Statistics Basic statistical concepts presented with emphasis on their relevance to biological and medical investigations.

BME 250-0 Thermodynamics Physical and chemical principles as applied to biological systems and medical devices. Topics include material balances, thermodynamics, solution chemistry, electrochemistry, surface chemistry, transport, and kinetics. Prerequisites: MATH 230; CHEM 103 or 172.

BME 270-0 Fluid Mechanics Fundamentals of fluid mechanics and their applications to biological systems. Prerequisites: GEN ENG 205-4; MATH 234.

BME 271-0 Introduction to Biomechanics Analysis of stresses and deformations in solids. Problems in biomechanics, with particular emphasis on assumptions appropriate to modeling biological materials including bone, skin, muscle, and cell membranes. Prerequisite: GEN ENG 205-2.

BME 301-0 Systems Physiology Functional/structural aspects of mammalian nervous system. Neural biophysics. Laboratory exercises. Prerequisites: PHYSICS 135-2; junior standing.

BME 302-0 Systems Physiology Cardiovascular and respiratory physiology. Human physiology from a quantitative viewpoint. Anatomy and pathology, where appropriate. Prerequisite: MATH 230.

BME 303-0 Systems Physiology Cellular mechanisms of and quantitative systems approach to human renal, digestive, endocrine, and metabolic physiology. Prerequisite: BIOL SCI 210-2; junior standing recommended.

BME 305-0 Biomedical Signal Analysis Introduction to biomedical signals and systems. Time and frequency domain analysis: convolution representation, Fourier series, Fourier transforms, frequency response, filtering, sampling. Prerequisite: PHYSICS 135-2 or consent of instructor.

BME 306-0 Biomedical Systems Analysis Introduction to linear systems analysis. Time and frequency domain techniques for analyzing linear systems, emphasizing their applications to biomedical systems. Matlab-based problem

sets and lab illustrate topics covered in class. Prerequisites: GEN ENG 205-4; BME 305.

BME 307-0 Quantitative Experimentation and Design

Laboratory and associated lecture concerning quantitative physiology, physiological measurement techniques, instrument design, and statistical design of experiments. Prerequisites: 305, 306, and one of the following: 220; IEMS 201, 303; MECH ENG 359.

BME 310-0 Molecular and Cellular Aspects of Bioengineering

Molecular/cellular structure and function, mechanical influences on biological systems, molecular/cellular experiments. Prerequisites: BIOL SCI 210-2; GEN ENG 205-3.

BME 314-0 Models of Biochemistry and Molecular Biology

Mathematical modeling of biochemical and molecular biological problems, such as allosteric enzymes, bacterial transduction, X-ray diffraction, study of DNA. Prerequisite: junior standing recommended.

BME 315-0 Application of Genetic Engineering to Immunoch

chemistry Recent developments in genetic engineering as applied to the rapidly developing field of immunochemistry for antibodies and related proteins. Prerequisite: junior standing recommended.

BME 317-0 Biochemical Sensors Theory, design, and applications of chemical sensors used in medical diagnosis and patient monitoring. Electrochemical and optical sensors. Prerequisites: BIOL SCI 210-2; CHEM 210-1; PHYSICS 135-2,3.

BME 323-0 Visual Science Mammalian visual system.

Optics of the eye. Visual image representation and interpretation. Visual adaptation. Motion. Color vision. Prerequisite: PHYSICS 135-2.

BME 325-0 Introduction to Medical Imaging Diagnostic

X rays; X-ray film and radiographic image; computed tomography; ultrasound. Prerequisites: PHYSICS 135-3 or equivalent.

BME 327-0 Magnetic Resonance Imaging Nuclear magnetic resonance; two-dimensional Fourier transform, spin-echo and gradient-echo imaging; gradient and RF hardware. Prerequisites: PHYSICS 135-3.

BME 333-0 Modern Optical Microscopy and Imaging

Rigorous introduction to principles, current trends, emerging technologies, and biomedical applications of modern optical microscopy.

BME 343-0 Biomaterials and Medical Devices Structure-property relationships for biomaterials. Metal, ceramic, and polymeric implant materials and their implant applications. Interactions of materials with the body. Prerequisites: MAT SCI 201 or 301; senior standing.

BME 344-0 Biological Performance of Materials Structure-property relationships of materials, physical chemistry of surfaces and interfaces, materials-tissue interactions, applications to the selection and design of materials for medical implants and devices. Prerequisite: MAT SCI 201.

BME 346-0 Tissue Engineering In vivo molecular, cellular, and organ engineering, with an emphasis on the

foundations, techniques, experiments, and clinical applications of tissue engineering. Prerequisites: BIOL SCI 210-2 or CHEM ENG 375; GEN ENG 205-3.

BME 349-0 Bioregenerative Engineering Fundamentals, mechanisms, and clinical significance of biological regeneration and application of engineering principles to regenerative medicine. Prerequisite: BIOL SCI 210-2.

BME 350-0 Mass and Heat Transport Fundamental and biomedical applications of diffusive and convective heat and mass transfer. Prerequisites: 270; MATH 230; BME 377 recommended.

BME 365-0 Control of Human Limbs and Their Artificial Replacements Human movement, biomechanics, skeletal and muscular anatomy, comparative anatomy, muscle physiology, and locomotion. Engineering design of artificial limbs. Prerequisite: senior standing with engineering or physical science background.

BME 366-0 Biomechanics of Movement Engineering mechanics applied to analyze human movement, including models of muscle and tendon, kinematics of joints, and dynamics of multijoint movement. Applications in sports, rehabilitation, and orthopedics. Prerequisite: MECH ENG 202, BME 271, or consent of instructor.

BME 371-0 Mechanics of Biological Tissues Stress and strain for small and large deformations. Nonlinear elastic, viscoelastic, pseudoelastic, and biphasic models. Prerequisites: GEN ENG 205-1,2; BME 271.

CHEM ENG 371-0 Transport Phenomena in Living Systems See Chemical Engineering.

BME 377-0 Intermediate Fluid Mechanics Fundamental concepts of fluid dynamics. Kinematics, mass and momentum balances, constitutive relations. Navier-Stokes equations and methods of solution. Sealing techniques. Prerequisite: 270 or consent of instructor.

BME 383-0 Cardiovascular Instrumentation Theory, design, and application of instrumentation used for diagnosis, monitoring, treatment, and research investigation of cardiac and cardiovascular diseases. Examples from the current literature. Prerequisite: EECS 202, 270, equivalent, or consent of instructor.

BME 390-1,2 Biomedical Engineering Design 1. Open-ended team-designed projects in the medical devices arena. Systems approach requiring design strategy and concepts, including reliability, safety, ethics, economic analysis, marketing, FDA regulations, and patents. Written and oral reports. Prerequisite: 307.
2. Development of a design project initiated during the previous quarter. Prerequisite: 390-1.

BME 395-0 Special Topics in Biomedical Engineering

BME 399-0 Projects

BIOTECHNOLOGY AND BIOCHEMICAL ENGINEERING

See Chemical Engineering for the certificate in biotechnology and biochemical engineering.

CHEMICAL ENGINEERING

www.chem-biol-eng.northwestern.edu

Chemical engineering is concerned primarily with the principles and processes involved in the conversion of raw materials into products vital to modern civilization. The products of the chemical and process industries range from antibiotics to zirconium, from petroleum to pharmaceuticals, from agricultural chemicals to plastics and synthetic rubber. The rapid introduction of new products by the chemical and bioprocess industries gives chemical engineering its characteristic concern with the management and development of innovation. Preparation for careers in chemical engineering requires a comprehension of physical, chemical, biological, and engineering principles. The program aims at developing people who can plan, design, and operate new processes and who may have potential for managerial responsibility in highly technical industrial enterprises.

The chemical engineering curriculum provides this broad fundamental training and prepares graduates for the chemical and process industries or advanced study. The first two years are devoted largely to mathematics, physics, chemistry, and basic engineering. After this, the fundamentals of chemical engineering fall into two sequences: the chemical process principles, emphasizing thermodynamics and kinetics of chemical change, and the transport processes, emphasizing the transfer of mass, momentum, and thermal energy in the physical handling of substances and in their heating, cooling, separation, and purification. Theoretical principles and practical applications are then integrated in courses in systems design and control. Supporting courses in allied fields of engineering and the sciences broaden the technical proficiency of chemical engineers, while courses in the social sciences, humanities, and arts deepens their background in the common hopes and problems of humanity.

Areas of Specialization

The curriculum permits students to select an area of specialization and to develop background for further study at the graduate level or for application to specific industries. Students are encouraged to select one of the six areas listed below or to plan an alternate program with an adviser. There are numerous electives in the basic program, and students are urged to give early consideration to planning for effective use of these opportunities.

Biomedical Engineering

Increasing numbers of chemical engineers enter medical school and work in related areas such as pharmaceutical production, biomedical materials, and artificial organs. The biomedical engineering option satisfies the needs of these students by adding courses in biology, biochemistry, and biomedical engineering to the foundation in chemical engineering. Students therefore can prepare for careers

in medicine or biomedical engineering as they obtain a degree in chemical engineering.

Biotechnology

Biotechnology is the industrial exploitation of biological systems or processes. Microorganisms are employed for production of food, beverages, antibiotics, and solvents as well as for waste treatment. Advances in genetic engineering have led to the production (in animal cells, yeast, and bacteria) of a wide range of enzymes, growth factors, hormones, immunoregulators, and monoclonal antibodies for use in disease diagnosis and therapy. Animal cells and microorganisms produce chemicals via a complex network of tightly regulated chemical reactions, making biotechnology a natural extension of chemical engineering. The biotechnology option provides the background necessary to apply chemical engineering skills in biological systems, especially for process optimization, control, scale-up, and product recovery.

Chemical Process Engineering

The chemical process engineering option is designed to prepare students for many areas, including design, operations, research, and management. Recommended for students who want a broad background in chemical engineering, it provides preparation for employment in many fields, including the chemical process and petroleum industries. It is also good preparation for graduate work in chemical engineering or other areas, both technical and nontechnical.

Environmental Engineering

Means for improving the quality of our environment, disposing of wastes, and devising waste-free processes often involve chemical processing. The development, construction, and operation of these processes increasingly involves chemical engineers in a leading role. The next decade will see the replacement of many present industrial processes by new ones designed to eliminate or minimize waste products, requiring imaginative engineering. The environmental engineering specialization offers students a way to add special competence in environmental and civil engineering concerns to a chemical engineering degree and to prepare for attacking environmental problems.

Polymer Science and Engineering

Synthetic polymers are large molecular substances that now provide the basis for the plastics, fiber, and rubber industries. Synthetic polymers are used in fields as diverse as the automotive industry, pollution abatement, low-cost housing, and biomedical engineering and indeed wherever needs exist for new materials with unique properties. The polymer field requires a knowledge of chemistry and some background in materials science in combination with expertise in chemical engineering, especially in transport

processes. The option in polymer science and engineering provides training to undergraduates considering working in the field or going to graduate school.

General Chemical Engineering

This option provides flexibility for students who desire exposure to a wide range of topics or who wish to specialize in fields of science or engineering not listed above.

Laboratories

The Undergraduate Chemical Engineering Laboratory provides facilities for exploring firsthand the quantitative experimental implications of fundamental laws in their application to practical problems of heat transfer, distillation, reaction engineering, and other basic operations. Process dynamics and automatic control principles are studied in the Process Dynamics and Control Laboratory. A computing laboratory is used in a variety of courses. Chemical laboratory experience is also a part of the polymer course.

Degree in Chemical Engineering

Requirements (48 units)

Core courses (32 units)

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses:
- 4 basic science courses: PHYSICS 135-2,3; CHEM 102 and 103 *or* 171 and 172
- 3 design and communications courses
- 5 basic engineering courses
 - *Fluids and solids*: CHEM ENG 321
 - *Materials science and engineering*: MAT SCI 301
 - *Probability, statistics, and quality control*: CHEM ENG 312 *or* IEMS 303
 - *Systems engineering and analysis*: CHEM ENG 210
 - *Thermodynamics*: CHEM ENG 211
- 7 social sciences/humanities courses
- 5 unrestricted electives

Major program (16 units)

- 11 required courses: CHEM 210-1; CHEM ENG 212, 275, 307, 322, 323, 341, 342, 351, 352 (BIOL SCI 210-2 may substitute for CHEM ENG 275)
- 5 technical electives
 - 2 advanced chemical engineering courses from an approved list available from the department
 - 3 engineering or advanced science or mathematics courses from approved lists available from the department

Certificate in Biotechnology and Biochemical Engineering

This certificate program provides specific training for students interested in industries that create and manufacture

pharmaceuticals, biomaterials, and agents for gene and cell therapies or for those desiring in-depth preparation for future graduate study in biotech research.

Requirements (10 units)

- 5 courses in biological science and biochemical engineering: BIOL SCI 210-1, 210-3; BIOL SCI 210-2 *or* CHEM ENG 275; CHEM ENG 375, 377 (CHEM ENG 377 can be taken before 375 and with junior standing; 377 is only offered in alternate years)
- 4 electives providing opportunity for greater depth in both fundamental biology and engineering applications:
 - 1 course from CHEM ENG 371, 372, 379, 475, 478, 479
 - 1 course from BIOL SCI 301, 309, 315, 319, 323, 333, 355, 390
 - 2 additional courses from the lists above or from BME 315, 317, CHEM 210-3, CIV ENG 441 *or* 2 *or* more units of CHEM ENG 399
- 1 quarter of independent study (399 Projects) to provide hands-on practical experience with a biotech-related project
- a minimum GPA of 2.0 in the courses in the certificate program
- successful completion of a McCormick BS degree

Courses

CHEM ENG 190-0 Engineering of Chemical and Biological Processes

Survey of engineering principles as they are applied to processes involving chemical and biological transformations. Examples from the chemical, pharmaceutical, biotechnology, food processing, electronics, and other industries. Impact of economics, ethics, and other nontechnical constraints.

CHEM ENG 210-0 Analysis of Chemical Process Systems

Introduction to process systems. Material balances and stoichiometry. Analysis of process system flow sheets. Introduction to departmental computing facilities. Basic numerical analysis. Prerequisites: CHEM 103; GEN ENG 205-4 (may be taken concurrently).

CHEM ENG 211-0 Thermodynamics The first and second laws of thermodynamics. Entropy and equilibrium. Material and energy balances. Equations of state and properties of fluids. Solutions, phase equilibria, and chemical reactions. Prerequisite: 210.

CHEM ENG 212-0 Phase Equilibrium and Staged Separations

Thermodynamic models of mixtures and phase equilibrium. Analysis and design of staged separation processes such as distillation, absorption, stripping, and extraction. Prerequisite: 211.

CHEM ENG 275-0 Molecular and Cell Biology for Engineers

Introduction to cell and molecular biology concepts that provide the foundation for modern biotechnology and bioengineering. Prerequisite: CHEM 103.

CHEM ENG 307-0 Kinetics and Reactor Engineering

Chemical reaction kinetics with application to the design of chemical reactors. Prerequisites: 210, 211, 321, 322.

CHEM ENG 312-0 Probability and Statistics for Chemical Engineering Introduction to probability theory and statistical methods necessary for analyzing the behavior of processes and experiments. Statistical tests for detecting significant changes in process parameters.

CHEM ENG 321-0 Fluid Mechanics Derivation and applications of continuity and Navier-Stokes equations. Macroscopic mass, momentum, and energy balance. Dimensional analysis: friction factors in pipes and packed beds; drag coefficients. Prerequisites: completion of mathematics requirements with no grades of D; GEN ENG 205-4 (C– or better).

CHEM ENG 322-0 Heat Transfer The differential equations of energy transport. Solutions for various applications. Prerequisite: completion of mathematics requirements with no grades of D; GEN ENG 205-4 (C– or better); CHEM ENG 321 recommended.

CHEM ENG 323-0 Mass Transfer Diffusion and rate concepts; application to distillation, extraction, absorption, humidification, drying. Prerequisites: 321, 322.

CHEM ENG 341-0 Process Dynamics and Control Dynamic behavior of chemical process components. Feedback control principles. Prerequisite: senior standing; 307.

CHEM ENG 342-0 Chemical Engineering Laboratory Operation and control of process equipment for the determination of operating data. Analysis and written presentation of results. Prerequisites: 212, 307, 321, 322, 323.

CHEM ENG 345-0 Process Optimization Modern techniques and application to the design and operation of chemical process systems. Steady-state and dynamic methods. Experimental search for the optimum. Prerequisite: senior standing.

CHEM ENG 351-0 Process Economics, Design, and Evaluation Preliminary design of industrial processes for the production of chemical and allied products by the application of the engineering sciences and economics. Prerequisites: 212, 307, 321, 322.

CHEM ENG 352-0 Chemical Engineering Design Projects Design of chemical and process plants applying the principles of unit operations, thermodynamics, reaction kinetics, and economics. Mechanical design and selection of chemical process equipment. Prerequisite: 351.

CHEM ENG 361-0 Introduction to Polymers Polymerization mechanisms and their relation to molecular structure, polymerization processes, and the mechanical properties of polymers, especially flow behavior. Prerequisites: 211 or other thermodynamics course; CHEM 210-1.

CHEM ENG 364-0 Chemical Processing and the Environment Application of chemical engineering fundamentals to environmental problems. Chemistry and mechanisms, chemical reaction and rate, and transport emphasized.

Risk assessment and analysis revealed through case studies. Prerequisites: 212, 307.

CHEM ENG 365-0 Sustainability, Technology, and Society

Technical discussion of sustainability, sustainable development, global warming, natural and renewal resources and utilization, industrial ecology, ecoefficiency, technology related to sustainability, and risk assessment. Prerequisite: junior standing in science or engineering.

CHEM ENG 371-0 Transport Phenomena in Living Systems

Application of transport theory, principally diffusion, to movement of molecules in biological systems, including blood, cornea, microcirculation, and lung. Prerequisites: 275 or BIOL SCI 210-2; 321, 323, or BMD ENG 270; or consent of instructor.

CHEM ENG 372-0 Interfacial Phenomena and Bionanotechnology The physical chemistry of systems of large interfacial area, with specific examples of their unusual behavior and useful properties for applications in bionanotechnology. Prerequisite: senior standing or consent of instructor.

CHEM ENG 375-0 Biochemical Engineering Modern biochemical engineering. Life sciences: microbiology, biochemistry, and molecular genetics. Metabolic stoichiometry, energetics, growth kinetics, transport phenomena in bioreactors, and product recovery. Prerequisite: 307, 323, or consent of instructor.

CHEM ENG 377-0 Bioseparations Downstream process in biotechnology. Separation and lysis of cells. Recovery of organelles and proteins. Protein separation and purification. Prerequisite: 323 (may be taken concurrently), 375, or BIOL SCI 210-2.

CHEM ENG 379-0 Computational Biology: Principles and Applications

Introduction to the development and application of data-analytical and theoretical methods, mathematical modeling, and computational simulation techniques to the study of biological systems.

CHEM ENG 390-0 Personal and Organizational Effectiveness

Introduction to nontechnical skills required in a business environment, with the goal of increasing personal effectiveness and marketability of seniors and graduate students. Prerequisite: senior standing.

CHEM ENG 395-0 Special Topics in Chemical Engineering

Topics suggested by students or faculty and approved by the department.

CHEM ENG 396-0 Focused Topics in Chemical Engineering

(.5 unit) Emerging topics suggested by students or faculty and approved by the department.

CHEM ENG 399-0 Projects Supervised investigation of a chemical engineering problem with submission of a final report.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

CIVIL AND ENVIRONMENTAL ENGINEERING

www.civil.northwestern.edu

The Department of Civil and Environmental Engineering offers two degree programs for undergraduate students, one in civil engineering and another in environmental engineering. Civil and environmental engineers play central roles in defining sustainable development approaches to the interactions of humans with earth systems. These programs place strong emphasis on design, communication, teamwork, and the development of a systems perspective on the complex problems of today and tomorrow.

Civil Engineering

Civil engineers plan systems such as transportation networks or procedures for water control and supply, and they design structures such as buildings, bridges, dams, and sewage disposal plants. They work together with ecologists, sociologists, economists, lawyers, and others to plan how to wisely use the human and natural resources of large areas such as river basins and how to redevelop cities. With few exceptions, each planning or design job is one of a kind, as contrasted with more routine solutions to other engineering problems.

Planning, of course, requires abundant data of all sorts — topography, geology, soils, vegetation, weather and climate, stream-flow and lake currents, traffic routes and patterns, pollution, population, cultural background and preferences, skills and ambitions. Many civil engineers collect, analyze, and present the data, developing and improving measuring instruments as part of their job. Others apply probability and statistical methods to the data to forecast such things as population growth, demand for water and transportation, maximum winds and precipitation, height of floods, and air and water quality.

Designing systems and structures requires the planning forecasts plus accurate data on the mechanical properties of materials such as steel, concrete, soils, rocks, and plastics and on the behavior of structural components made from them. Some civil engineers test materials and physical models to obtain such data. Many more use known physical properties and the laws of mechanics — energy, momentum, and conservation of mass — to design structures, foundations, pavements, pipe networks, and treatment plants that will do the job safely and economically.

Civil engineers who design water and waste treatment facilities or set up programs to reduce air and water pollution need to understand certain chemical reactions and biological processes as well as the usual fluid and solid mechanics. Engineers who help to plan and design a system understand how and why it works and what may

go wrong with it. Hence, civil engineers may operate treatment facilities or systems of flood control reservoirs or set up and administer traffic control plans. Civil engineers may become city engineers.

Engineers who design structures and know soil mechanics learn the practical difficulties of providing a foundation and erecting the structure. Thus, they become partly qualified to operate construction companies, with some entering the construction business. Administrative and business activities require them also to learn something about accounting, personnel management, and contracts.

Since civil engineering students have such a wide range of career options, the Department of Civil and Environmental Engineering prescribes a minimum of required courses and required subjects. Students elect the remainder freely or from specified broad categories. For details see the civil engineering curriculum.

Areas of Specialization

Civil engineering students may select a program that fits their needs by choosing courses judiciously. Students are encouraged to discuss with faculty any proposed program that meets a well-defined goal. Examples of courses selected in the areas of specialization most often pursued by students are listed in the civil engineering curriculum.

Degree in Civil Engineering

Requirements (48 units)

Core courses (32 units)

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses:
- 4 basic science courses: PHYSICS 135-2,3; CHEM 101, 102; CHEM 103 or PHYSICS 135-3
- 3 design and communications courses
- 5 basic engineering courses
 - *Electrical science*: MECH ENG 233; EECS 202 or 270
 - *Fluids and solids*: CIV ENV 216; MECH ENG 241
 - *Thermodynamics*: MECH ENG 220 or CHEM 342-1
 - 1 course from materials science and engineering, systems engineering and analysis, computer architecture and numerical methods, or computer programming
- 7 social sciences/humanities courses
- 5 unrestricted electives

Major program (16 units)

- 7 basic civil engineering courses: CIV ENV 221, 222, 250, 260, 330, 340; 371 or 376
- 2 mathematical techniques and science courses from an approved list, 1 of which must be a calculus-based probability and statistics course

- 7 technical electives at the 200 level or higher in mathematics, science, engineering, or another area supporting their area of specialization
 - 2 courses must be from an approved list of design and synthesis courses; 1 must be the currently designated “capstone design course” and may not be taken P/N
 - Listed below are samples of some traditional areas of specialization, but students are encouraged to design with their advisers a program that meets their own particular interests.
 - *Applied mechanics*
 - *Construction*
 - *Environmental engineering*
 - *Geotechnical engineering*
 - *Structural engineering*
 - *Transportation systems*
- 10 of the 16 courses in the major program must be civil engineering

Environmental Engineering

Environmental engineering is concerned with the interactions of people and environment, the applications of scientific knowledge to the understanding and analyses of these interactions, and the improvement of the quality of our environment.

Traditionally, environmental engineers have provided safe drinking water, treated and properly disposed of wastes, maintained air quality, controlled water pollution, and remediated sites contaminated by hazardous substances. They continue to do so, but with the realization that anthropogenic activities at the earth surface are modifying the natural environment at an accelerating pace.

Environmental engineers have become more concerned with the state of the environment. They also understand how complex environmental systems work. For example, they are developing molecular tools and new technologies to track and remove contaminants present at very low levels, and they are using genomic approaches to characterize microbial communities.

Environmental engineers have become a vital link between scientific discovery, technological development, and the societal need for protecting the health of humans and ecological systems. The emphasis is shifting from managing wastes to designing sustainable practices that foster recovery, recycling, and reuse of resources.

The environmental engineering curriculum provides a broad, fundamental training and prepares graduates for highly interdisciplinary work. The first two years are devoted largely to mathematics, physics, chemistry, basic engineering, and gateway courses that provide an overall view of earth systems. Subsequently, the fundamentals of environmental engineering and their application to the atmosphere, land, and the hydrosphere are emphasized.

This program provides an engineering and scientific basis for understanding contemporary environmental problems and approaches to their solutions, understanding the natural systems with which human activities must be compatible, and developing the engineering analysis and design tools necessary to plan and design environmental control systems. Completion of the undergraduate degree program in environmental engineering prepares students to practice engineering at the entry level or to continue their education at the graduate level. It serves as preparation for the Fundamentals of Engineering (FE) examination and, with adequate experience, the Professional Engineer (PE) examination.

Degree in Environmental Engineering

Requirements (48 units)

Core courses (32 units)

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses:
- 4 basic science courses: PHYSICS 135-2; CHEM 101, 102, 103
- 3 design and communications courses
- 5 basic engineering courses:
 - *Systems engineering and analysis*: CIV ENV 304 or IEMS 326
 - *Thermodynamics*: CHEM 342-1
 - *Fluids and solids*: MECH ENG 241
 - *probability, statistics, and quality control*: 1 course from BME 220; CHEM ENG 312; CIV ENV 306 (recommended); EECS 302; IEMS 201, 303; MECH ENG 359
 - 1 course from EECS 328; ES APPM 346; MAT SCI 201, 203, 301
- 7 social sciences/humanities courses
- 5 unrestricted electives

Major program (16 units)

- 12 core courses: CHEM 210-1; CIV ENV 260, 340, 361, 363, 364, 365, 367, 382; ENVR SCI 201, 202, 203
- 4 technical electives
 - 2 courses from an approved list
 - 2 courses, 200 level or higher, in engineering or mathematics or science in Weinberg College

Courses

CIV ENV 206-0 Environmental Literacy Simple concepts from the sciences and engineering applied to specific environmental problems, including the concepts of risk. Understanding of and quantitative facility in multidisciplinary aspects of environmental decisions.

CIV ENV 212-0 Mechanics Force systems, equivalence of force systems, and resultants. Equilibrium of a rigid body and systems. Kinematics and dynamics of a rigid body

in plane motion. Work and energy relations for a rigid body in plane motion. Prerequisites: PHYSICS 135-1; registration in MATH 234.

CIV ENV 216-0 Mechanics of Materials I Analytical and experimental study of stresses and deformations and their application to the design of machine and structural elements subjected to static, dynamic, and repeated loads. Prerequisite: 212 or GEN ENG 205-2.

GEN ENG 220-1,2 Analytical and Computer Graphics

(.5 unit each) See General Engineering Courses.

CIV ENV 221-0 Theory of Structures I Deflections of structures, energy concepts, idealization of structures, truss analysis, column stability, and influence lines. Introduction to indeterminate truss and frame analyses, slope-deflection analysis, and moment distribution. Portal method. Prerequisite: 216.

CIV ENV 222-0 Structural Steel Design Rational basis of structural design. Design approach for structural steel components of a building system. Prerequisite: 221.

MECH ENG 241-0 Fluid Mechanics I See Mechanical Engineering.

CIV ENV 250-0 Introductory Soil Mechanics Fundamental properties and behavior of soils as engineering materials. Origin of soils through the properties of soil components to the strength, permeability, and deformation of soil masses. Prerequisite: 216.

CIV ENV 260-0 Fundamentals of Environmental Engineering Mass and energy concepts applied to major issues facing environmental engineers: safe drinking water, surface water quality, ambient air quality, global atmosphere, managing solid and hazardous wastes. Prerequisites: CHEM 101; MATH 224 (may be taken concurrently).

CIV ENV 267-0 Chemistry of the Natural Environment Fundamental principles of organic and inorganic chemistry applied to air, water, soil, and sediments. Focus on problem solving. Laboratory/field projects. Prerequisite: CHEM 103.

CIV ENV 302-0 Engineering Law The American legal system from an engineer's perspective. Socratic-method analysis of statutory and case law. Contract, patent, corporation, antitrust, property, and environmental law. Torts, product liability, and arbitration. Prerequisite: junior standing.

CIV ENV 303-0 Environmental Law and Policy An introduction to important aspects of environmental law and policy. A wide range of environmental topics are covered, with a focus on national environmental policy as implemented through major federal environmental statutes. Prerequisite: junior or senior standing.

CIV ENV 304-0 Civil and Environmental Engineering Systems Analysis Quantitative techniques to develop descriptive and prescriptive models that support efficient planning and management of civil and environmental engineering systems. Prerequisite: MATH 224 or equivalent.

CIV ENV 306-0 Uncertainty Analysis in Civil Engineering Probability, statistics, and decision theory. Discrete and

continuous random variables, marginal and conditional distributions, moments, statistical model selection and significance tests, hypothesis testing, and elementary Bayesian decision theory. Application to problems in soil mechanics, water resources, transportation, and structures.

CIV ENV 307-0 Microstructure of Cement-Based Materials Chemistry of the principal silicate and aluminate cements used in building and civil and environmental engineering. Emphasis on underlying science rather than on practical application. Experimental and theoretical aspects of cement chemistry; relationships between processing, microstructure, and properties.

CIV ENV 319-0 Theory of Structures II Shear center, non-prismatic members, nonlinear materials, influence lines, Mueller-Breslau principle, approximate methods of analysis, energy methods, stiffness matrix, and computer methods of analysis. Prerequisite: 221.

CIV ENV 320-0 Structural Analysis — Dynamics Single and multiple degree-of-freedom systems subjected to periodic, seismic, and general loadings. Time-history analysis of linear and nonlinear systems. Design methods for earthquakes. Prerequisite: 221.

CIV ENV 321-0 Properties of Concrete Concrete as a composite material; relationship between constitutive laws and microstructure; failure theories; fracture; fatigue; strain rate effects; destructive and nondestructive testing; creep and shrinkage; chemistry of cement hydration; admixtures; aggregates; proportioning; new materials.

CIV ENV 322-0 Structural Design Design criteria; planning and design aspects of structural systems for gravity and lateral loads. A total design project involving the analysis and design of a structure. Prerequisite: 222 or equivalent.

CIV ENV 325-0 Reinforced Concrete Fundamentals of reinforced concrete theory and design. Analysis and design of beams, slabs, and columns. Concurrent familiarization with current building codes, specifications, and practices. Prerequisite: 221.

CIV ENV 327-0 Finite Element Methods in Mechanics Development of finite elements from variational principles and application to static stress analysis. Introduction to techniques for transient and generalized field problems. Computer implementation of finite element techniques.

CIV ENV 330-0 Construction Management Techniques for coordinating decisions and actions of various parties in the design and construction of civil and environmental engineering projects. Delivery systems; preconstruction services; project planning; cost control and value engineering; bidding. Prerequisite: consent of instructor.

CIV ENV 332-0 Building Construction Estimating Estimation of cost at different stages of design; conceptual estimating, quantity takeoff of various elements, such as materials, labor, equipment. Prerequisite: 330 and consent of instructor.

CIV ENV 336-0 Project Scheduling Project planning, scheduling, and control using CPM arrow and precedence networks; basic resource allocation and leveling; earned-value

analysis; linear scheduling; PERT charts; hands-on experience in using computer tools. Prerequisite: 330 or consent of instructor.

CIV ENV 338-0 Public Infrastructure Management Explores the complexity of managing public infrastructure facilities by means of a five-part interactive model. Aims to impart a realistic appreciation of contemporary policies and practices. Prerequisite: senior standing.

CIV ENV 340-0 Fluid Mechanics II Civil engineering applications of fluid mechanics. Turbulent flow in pipes, pipe networks, and open channels. Prerequisite: CHEM ENG 321; MECH ENG 241; or consent of instructor.

CIV ENV 346-0 Meteorology and Hydrology Mechanics of the atmosphere. Precipitation, runoff, groundwater flow. Methods of analyzing rainfall and stream-flow records for power generation, flood control, and water supply. Prerequisite: MECH ENG 241.

CIV ENV 349-0 Environmental Management The roles and responsibilities of project managers who deal with environmental issues. How managers deal with previously created environmental problems, respond to current requirements, and anticipate future needs. Prerequisites: a technical background and senior standing.

CIV ENV 352-0 Foundation Engineering Application of soil mechanics to analysis and design of foundations and embankments. Settlement of structures, bearing capacities of shallow and deep foundations, earth pressures on retaining structures, and slope stability. Prerequisite: 250.

CIV ENV 355-0 Engineering Aspects of Groundwater Flow Applied aspects of groundwater flow and seepage, including Darcy's law, parameter determination, aquifer test analysis, flow-net construction and application, modeling techniques, slope stability analysis, drainage, and filter design. Prerequisite: fluid mechanics.

CIV ENV 358-0 Airphoto Interpretation Principles and practice of using aerial photographs to obtain information about natural features of the earth's surface, with emphasis on earth materials. Landforms, geological processes, rocks, and soils. Stereoscopic photographs, elements of photogrammetry. Prerequisite: junior standing or consent of instructor.

CIV ENV 359-0 Hazardous Waste Management Definition and regulation of wastes. Pollutant transport, fate, and toxicology. Management via audits and prevention. Treatment and control. Risk and site assessment and site remediation. Prerequisite: junior or senior standing in engineering or science or consent of instructor.

CIV ENV 360-0 Environmental Impact Evaluation Environmental legislation and quality indices. Methods for evaluating impact of engineering projects on environmental quality. Impact statements, projects, and summary impact reports. Prerequisite: junior standing.

CIV ENV 361-1 Environmental Microbiology Basic principles and practical applications of microbiology to

environmental issues, such as microbial contamination, degradation of organic contaminants, production of alternative fuels, and global climate change.

CIV ENV 361-2 Public and Environmental Health Current problems in public and environmental health, such as the worldwide burden of major infectious diseases, emergence of new pathogens, and environmental reservoirs of infectious organisms. Prerequisite: 361-1 or consent of instructor.

CIV ENV 363-0 Environmental Engineering Applications I: Air and Land Nature and control of community air pollution. Sources, physical and chemical properties, and effects of major air pollutants; analytical measurements and monitoring of air pollutants; engineering and legislative control. Prerequisite: junior standing.

CIV ENV 364-0 Environmental Engineering Applications II: Water Engineering elements of water supply and water pollution abatement. Water quality standards, water and wastewater treatment processes, and the management of receiving waters to control pollution. Prerequisite: MECH ENG 241; CIV ENV 340 recommended.

CIV ENV 365-0 Environmental Laboratory Chemical and microbiological aspects of environmental engineering and science are explored through an integrated laboratory course.

CIV ENV 366-0 Ecosystems and Ecotoxicology Terrestrial, freshwater, marine, and estuarine ecosystems. Fundamentals of toxicology and their application to natural environments and biotic components; tolerance limits and adaptation of organisms to environmental change brought on naturally or by human technology and activity. Prerequisite: junior standing in engineering or science.

CIV ENV 367-0 Aquatic Chemistry Terrestrial, freshwater, marine, and estuarine chemical equilibria in natural waters. Development of theoretical basis for the investigation of chemical behavior of aquatic systems emphasizing a problem-solving approach. Prerequisite: CHEM 342-1.

CIV ENV 368-0 Sustainability: Issues and Action, Near and Far Exploration of the issues that motivate the design and engineering of sustainable resource use and development.

CIV ENV 369-0 The Industrial Ecology of Materials and Products A course to increase students' knowledge of ecodesign, green products, environmentally friendly manufacturing, reuse of various materials, and recycling.

CIV ENV 371-0 Introduction to Transportation Planning and Analysis Analysis and design of solutions to transportation problems; introduction to selected operations research and statistical analysis techniques; use of case studies in urban transportation, intercity passenger transport, and freight movements. Prerequisite: junior standing or consent of instructor.

CIV ENV 376-0 Transportation System Operations Traffic-flow theory; vehicle and human factors, capacity analysis, intersection performance and control; management and

control of arterial streets and networks; neighborhood traffic restraint, urban transit operations. Operations concepts and theories applied to actual problems through laboratory practice. Prerequisite: basic understanding of calculus and statistics; knowledge of MATLAB is desirable but not required.

CIV ENV 382-0 Capstone Design Culminating team-based design experience in civil and environmental engineering, with an overview of the function, design, and operation of modern infrastructure systems. Prerequisite: senior standing in civil or environmental engineering or consent of instructor.

CIV ENV 395-0 Special Topics in Civil Engineering Topics suggested by students or faculty and approved by the department.

CIV ENV 398-1,2 Community-Based Design Yearlong participation in two- or three-person team projects involving research, analysis, and/or design in the solution of environmental problems affecting primarily lower-income communities. Grade assigned only on completion of both units. Prerequisite: consent of instructor.

CIV ENV 399-0 Projects Special studies under faculty direction. Credit to be arranged.

COMPUTER ENGINEERING

See Electrical Engineering and Computer Science.

COMPUTER SCIENCE

See Electrical Engineering and Computer Science.

DESIGN ENGINEERING

See Manufacturing and Design Engineering for the certificate in design engineering.

ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

www.eecs.northwestern.edu

The Department of Electrical Engineering and Computer Science offers three programs for undergraduate students leading to the bachelor of science degree: electrical engineering, computer engineering, and computer science. It also offers graduate programs leading to the MS and PhD degrees in those three areas. The department boasts an internationally renowned faculty, state-of-the-art research equipment, and the considerable resources offered by a great university. It combine these advantages with an uncommon commitment to students.

The department offers several interdisciplinary options, including premedical/biomedical studies and cognitive science. It collaborates with Weinberg College to offer that school's major in computer science (see page 75).

Detailed information on degree requirements and elective courses is available from the department office or at www.eecs.northwestern.edu.

Electrical Engineering

Electrical engineering involves the development and application of electronic and optical technologies for generating, communicating, and processing information. The electrical engineering curriculum includes courses in electronic circuits, solid-state electronics, electromagnetics, optics, lasers, controls, digital signal processing, communications and networks. Students may specialize in any of the following areas.

Circuits and Electronics

This area of study is concerned with the analysis and design of circuits that employ electronic devices, such as integrated circuits, transistors, diodes, light-emitting diodes, data storage elements, and image-forming devices. Important applications include AM and FM radio, television, digital computers, and electronic control instrumentation systems.

Communications Systems

A communication system involves the generation of an electrical signal representing information to be transmitted, its encoding in some form for efficient transmission, its actual transmission, its decoding at the receiving end of the system, and its reconversion into something intelligible to the user. The thorough study of communications systems theory requires knowledge of a broad range of mathematical methods and of the capabilities and limitations of electronic circuits. This subject also covers the design and analysis of communication networks for the transmission of audio, video, and data among many users.

Control Systems

The study of control systems deals with the analysis and design of automatic regulators, guidance systems, numerical control of machines, robotics, and computer control of industrial processes. Students are concerned with identifying these systems and with such topics as system stability, system performance criteria, and optimization. These concepts find application in other fields of engineering and in the development of better understanding of biological, energy, economic, and social systems.

Digital Signal Processing

Study in this area focuses on the digital representation and algorithmic manipulation of speech, audio, image, and video signals. Specific topics within this general area include image and video processing, recovery and compression, multimedia signal processing, filter design and rank-order operators, image and video transmission, medical and biomedical signal processing, medical imaging, and algorithms for medical instrumentation.

Electromagnetics and Photonics

Study in the area of photonic systems and technology focuses on microcavity lasers, nanostructures, quantum and nonlinear optics, integrated optics, fiber-optic and infrared waveguide devices, fiber-optic communications, computational electromagnetics, and imaging through turbulence. Special emphases include applications of novel quantum amplifiers in optical communications, imaging, and cryptography; devices for tera-bit second WDM and TDM optical networks; and applications of computational techniques in integrated and nonlinear optics.

Solid-State Engineering

This area is concerned with the design, physical principles, and applications of solid-state devices both as discrete units and integrated circuit systems. In addition to the various diode, transistor, and FET devices fabricated from silicon technology, other devices developed from compound semiconductor materials are reviewed. Both analog and digital circuit applications are stressed. Another important topic is the behavior of conductors in the superconducting state, with a stress on applications.

Degree in Electrical Engineering*Requirements (48 units)***Core courses (32 units)**

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses:
- 4 basic science courses
 - PHYSICS 135-2,3
 - 2 courses from
 - *Physics*: PHYSICS 335
 - *Biological sciences*: BIOL SCI 210-1, -2,-3; CHEM ENG 275
 - *Chemistry*: CHEM 101, 102, 103, 171, 172, 210-1,2
 - *Earth and planetary sciences/astronomy*: EARTH 201, 202; ASTRON 220
- 3 design and communications courses
- 5 basic engineering courses
 - EECS 202, 203, 302 (grade of C- or better in 202 and 203 required for graduation)
 - EECS 211 or 230
 - 1 course from BME 250, 270, 271; CHEM 342-1; CHEM ENG 210, 211, 321; CIV ENV 216, 219, 304; IEMS 310, 313, 326; MECH ENG 220, 241, 370; MAT SCI 201, 203, 301, 314, 315
- 7 social sciences/humanities courses
- 5 unrestricted electives

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

Major program (16 units)

- 5 required courses: EECS 221, 222, 223,224, 225
- 10 technical electives
 - at least 6 courses from the following six tracks:
 - *Biomedical engineering track*: BME 317, 325, 327, 333, 383
 - *Circuits and electronics track*: EECS 303, 346, 353, 355, 391, 393
 - *Communications systems track*: EECS 307, 333, 378, 380
 - *Control systems track*: EECS 360 or MECH ENG 391; EECS 374, 390; MECH ENG 333
 - *Digital signal processing track*: EECS 332, 359, 363
 - *Electromagnetics and optics track*: EECS 308, 379, 382, 383, 386
 - *Solid-state engineering track*: MECH ENG 381; EECS 250, 381, 384, 385, 388
 - 2 courses from 300-level EECS technical electives (which may include the courses above)
 - 2 courses may be chosen from BIOL 210-1,2,3; CHEM 210-1,2,3; or 300-level technical courses in science, mathematics, computer science, or engineering and may include the courses below.
 - No more than 2 units of 399 will be counted as technical electives. Additional units of 399 may be taken but will be counted as unrestricted electives.
- 1 required design course: 1 course from EECS 347-1, 392, 398, 399 (when 399 is a design project)

Computer Engineering

Computer engineering deals with digital design, computer hardware and architecture, robotics, microprocessors, software and programming, and the interrelationships between hardware and software. The computer engineering curriculum involves courses in digital logic, electronic circuits, computer architecture, robotics, VLSI design, VLSI CAD, software programming, operating systems, microprocessor systems, and parallel computing. The computer engineering curriculum allows students to develop a particular specialization in the following areas.

Embedded Systems

This area focuses on the use of digital hardware to monitor and control physical systems. Topics include discrete dynamics systems, digital controllers, analog-to-digital converters, microprocessor-based design, and the economic trade-offs of different software and hardware systems.

High-Performance Computing

This area introduces students to the field of state-of-the-art high-performance computing. In particular, it deals with aspects of computing involving multiple processors working together on a common problem, including issues of computer architecture, parallel programming and algorithms, numerical computing, and computer networking.

Software

This area exposes students to the field of writing software that runs on compilers. Students are taught the techniques of designing and analyzing efficient algorithms, how to develop operating systems and compilers, and how to write programs using efficient data structures and software engineering practices.

VLSI and Computer-Aided Design

This area focuses on systematic approaches to designing high-performance integrated circuits consisting of millions of transistors. This specialization includes topics such as low-power, high-speed, and reliable circuit design, hardware-software codesign, design verification, design of multi-FPGA systems, and CAD techniques.

Degree in Computer Engineering

Requirements (48 units)

Core courses (32 units)

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses
- 4 basic science courses
 - PHYSICS 135-2,3
 - 2 courses from ASTRON 220; BIOL SCI 210-1, -2, -3; CHEM 101, 102, 103, 171, 172, 210-1,2; CHEM ENG 275; EARTH 201, 202; PHYSICS 335
- 3 design and communications courses
- 5 basic engineering courses
 - *Computer architecture and numerical methods*: EECS 203 (grade of C– or better required for graduation)
 - *Computer programming*: EECS 231
 - *Electrical science*: EECS 202 (grade of C– or better required for graduation)
 - *Probability, statistics, and quality control*: EECS 302
 - 1 course from BME 250, 270, 271; CHEM 342-1; CHEM ENG 210, 211, 321; CIV ENV 216, 219, 304; IEMS 310, 313, 326; MAT SCI 201, 203, 301, 314, 315; MECH ENG 220, 241, 370
- 7 social sciences/humanities courses
- 5 unrestricted electives

Major program (16 units)

- 5 required courses: EECS 205, 221, 303, 311, 361
- 10 technical electives
 - at least 2 courses from EECS 213, 222, 223, 224, 225
 - 5 courses from the following four tracks:
 - *Embedded systems track*: EECS 332, 346, 347-1, -2, 390; BME 384
 - *High-performance computing track*: EECS 328, 333, 358, 362
 - *Software track*: EECS 310, 322, 336, 339, 394
 - *VLSI and CAD track*: EECS 353,357, 391, 392

- 3 electives from BIOL 210-1,2,3; CHEM 210-1,2,3; or 300-level technical courses in science, mathematics, computer science, or engineering
- No more than 2 units of 399 will be counted as technical electives. Additional units of 399 may be taken but will be counted as unrestricted electives.
- 1 required design course from EECS 347-1, 362, 392

Computer Science

Computer science involves the understanding, use, and extension of computational ideas and their implementation. A Northwestern computer science graduate will

- comprehend the breadth of computer science, its key intellectual divisions and questions, and its past and likely future influence on engineering, science, medicine, business, and law
- approach problems from the algorithmic perspective, understanding the nature and broad reach of computation and how to apply it abstractly
- approach problems from the systems perspective, understanding the evolving layers of the software/hardware stack and how to create, use, and extend them
- approach problems from the perspective of artificial intelligence, understanding how to make progress solving seemingly intractable problems
- design and implement complex software systems, individually and as a team member
- design and implement effective human-machine interfaces

Courses and undergraduate research opportunities focus on software, ranging from theoretical models to practical applications, and establish a common breadth of knowledge in computer science, allowing students flexibility in areas in which they choose to specialize, such as

- *artificial intelligence*, including mobile robots with perceptual systems, models of memory and reasoning, knowledge representation, natural-language comprehension, planning, and problem solving
- *computer systems*, including parallel, distributed, and real-time systems, performance evaluation, prediction, and scheduling
- *networked systems*, including peer-to-peer computing, large-scale data storage, network security, and pervasive computing environments
- *programming languages and compilers*, including semantics, optimization, and software
- *human-computer interaction*, including interface design, task modeling, intelligent interfaces, and authoring tools
- *distributed interactive systems*, including client-server and web-based applications, such as heterogeneous databases and multimedia learning environments
- *theoretical computer science*, focusing on algorithm design and analysis of algorithms' worst- and average-case behavior

- *intelligent information systems*, including “frictionless” proactive systems and context- and task-sensitive retrieval systems
- *computer graphics and human-computer interfaces* for spatial applications, visualization, and computer entertainment

Degree in Computer Science

Requirements (48 units)

Core courses (32 units)

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses
- 4 basic science courses from at least two of the areas below; no more than 2 from earth and planetary sciences/astronomy; no more than 3 in any other area
 - *Physics*: PHYSICS 135-2,3, 335
 - *Biological sciences*: BIOL SCI 210-1,2,3; CHEM ENG 275
 - *Chemistry*: CHEM 101, 102, 103, 171, 172, 210-1,2
 - *Earth and planetary sciences/astronomy*: EARTH 201, 202; ASTRON 220
- 3 design and communications courses
- 5 basic engineering courses
 - *Computer programming*: EECS 211
 - *Probability, statistics, and quality control*: IEMS 201, 303, or EECS 302
 - 3 courses from BME 220, 250, 270, 271; CHEM 342-1; CHEM ENG 210, 211, 312, 321; CIV ENV 216, 219, 304, 306; EECS 202, 203, 205, 221, 222, 223, 224, 230, 231, 328, 270, 317; ES APPM 346; IEMS 310, 313, 326; MAT SCI 201, 203, 301, 314, 315; MECH ENG 220, 233, 241, 359, 370 (MECH ENG 220 may not be taken with CHEM 342-1 or CHEM ENG 211)
- 7 social sciences/humanities courses
- 5 unrestricted electives

Major program (16 units)

- 3 required courses: EECS 101, 213, 311
- 13 technical electives
 - 5 courses from the list of breadth courses (available from the department)
 - 6 courses from the list of depth courses (available from the department)
 - 2 project courses, each resulting in the construction and demonstration of a proposed solution to some organization's problem. Projects must be approved by a faculty adviser beforehand. Project work will typically occur in independent study projects (EECS 399) or in project-oriented courses (e.g., EECS 394). No more than 4 units of EECS 338 may be used for the degree requirements.

- Courses at the 400 level are primarily for graduate students but may be open to advanced undergraduate students with the consent of the instructor. EECS 110 may be used as an unrestricted technical elective if taken before EECS 111.

Minor in Computer Science

The department offers a minor in computer science for students who wish to develop stronger competence in computer science while pursuing a degree in another field.

Requirements (16 units)

General courses (7 units)

- MATH 220, 224, 230
- EECS 310
- 3 units of engineering analysis: GEN ENG 205-1,2,3 or 206-1,2,3

Core courses (6 units)

- 6 units of computer science: EECS 101, 111, 211, 213, 310, 311; students without prior programming experience may wish to take 110 before 111

Breadth courses (3 units)

- 3 courses from the list of breadth courses (available from the department); each course must be in a different breadth area

Facilities

Students have access to state-of-the-art research and teaching facilities, ranging from laboratories for electronic devices to parallel computers and worldwide distributed testbeds.

Electrical engineering facilities include laboratories for electronic circuits, digital circuits, solid-state electronics, the fabrication of solid-state lasers and other quantum electronic/ photonic devices, thin-film device development, biomedical electronics, microwave techniques, holography and coherent light optics, biological and other control systems, and signal, image, and speech processing.

Computer engineering facilities include laboratories in digital systems design, microprocessor systems, micro-programming, robotics, computer-aided design, and computer networking. The department has major research facilities for work in parallel and distributed computing systems, database systems, computer vision, VLSI design, CAD, robotics, solid-state devices, fiber optics, lasers, computational electromagnetics, electronic materials, and biomedical engineering.

Computer science students benefit from access to computing laboratories that provide Linux, Windows, Solaris, and PocketPC machines, a private network, sensor networks, and the worldwide PlanetLab distributed systems testbed. Students taking courses in experimental

computer systems also have access to a special cluster on which they can instantiate their own collections of virtual machines. The department is part of the Microsoft Developer Network Academic Alliance, which provides free or inexpensive access to Microsoft products that are used widely in desktop computing.

Courses

EECS 101-0 An Introduction to Computer Science for Everyone

General introduction to historical and current intellectual questions in computer science. Theory, systems, artificial intelligence, interfaces, software development, and interactions with business, politics, law, medicine, engineering, and other sciences.

EECS 110-0 Introduction to Computer Programming

Introduction to programming practice using a modern programming language. Analysis and formulation of problems for computer solution. Systematic design, construction, and testing of programs. Substantial programming assignments. Not to be taken for credit with or after EECS 111.

EECS 111-0 Fundamentals of Computer Programming

Introduction to principles of programming and procedural thinking. Procedural abstraction, data abstraction, modularity, object-oriented programming. Uses the Scheme programming language and computer facilities. Substantial programming assignments, including numerical and symbolic programs. Required for the computer science degree.

EECS 130-0 Tools and Technology of the World Wide Web

Introduction to the theory and practice of developing sites on and technology for the web. Basics of HTML, JavaScript, ASP, and CGI programming.

EECS 202-0 Introduction to Electrical Engineering Concepts and applications of electrical engineering. Quantization, binary representation, performance. Power spectral density, digital filtering, fundamental limitations. Control systems, feedback systems. Properties of lasers, amplifiers, passive circuit elements, active circuit elements. Electronic devices and materials. Prerequisite: GEN ENG 205-3.

EECS 203-0 Introduction to Computer Engineering Overview of computer engineering design. Number systems and Boolean algebra. Logic gates. Design of combinational circuits and simplification. Decoders, multiplexers, adders. Sequential logic and flip flops. Introduction to assembly language. Application of concepts to a computer engineering design project.

EECS 205-0 Fundamentals of Computer System Software

Basics of assembly language programming. Macros. System stack and procedure calls. Techniques for writing assembly language programs. Features of INTEL 8086/88-based PC. Interfaces between C and assembly codes. Prerequisite: GEN ENG 205-1,2,3,4 or EECS 110; EECS 203 recommended.

EECS 211-0 Object-Oriented Programming in C++

Continuation of 111. Key concepts in software design and systems programming. Object-oriented programming in C++, design of interpreters and compilers, and register machines. Required for the computer science degree.

Prerequisite: 110 or 111 or knowledge of any programming language. Not to be taken for credit with or after 230 or 231.

EECS 213-0 Introduction to Computer Systems The hierarchy of abstractions and implementations that make up a modern computer system; demystifying the machine and the tools used to program it; systems programming in C in the UNIX environment. Preparation for upper-level systems courses. Prerequisite: 211 or 230.

EECS 221-0 Fundamentals of Circuits Circuit analysis and network theorems; linearity and superposition; series/parallel combinations of R, L, and C circuits; sinusoidal forcing; complex frequency and Bode plots; mutual inductance and transformers; two-port networks; Fourier analysis; response of circuits to periodic nonsinusoidal sources. Prerequisite: 202.

EECS 222-0 Fundamentals of Signals and Systems

Comprehensive introduction to analysis of continuous and discrete-time signals and systems. Linear time-invariant systems, convolution. Fourier series representations of periodic signals. Continuous time and discrete time Fourier transforms. Laplace transform; z-transform. Prerequisite: 202.

EECS 223-0 Fundamentals of Solid-State Engineering

Crystalline state of matter; quantum phenomena and quantum mechanics; electrons in atoms, atoms in crystals, electrons in crystals; semiconductors; thermal properties of crystals, electrical properties of crystals and semiconductors; p-n junction. Prerequisites: 202; PHYSICS 135-3; MATH 234.

EECS 224-0 Fundamentals of Electromagnetics and Photonics

Concepts of flux, potential, gradient, divergence, curl, and field intensity. Boundary conditions and solutions to Laplace and Poisson equations. Capacitance and inductance calculations. Conductors, insulators, and magnetic materials. Prerequisites: 202; PHYSICS 135-2; MATH 234; or consent of instructor.

EECS 225-0 Fundamentals of Electronics Diode, BJT, and FET circuits; design using ideal operational amplifiers; feedback; frequency response; biasing; current sources and mirrors; small-signal analysis; design of operational amplifiers. Prerequisites: 221, 223.

EECS 230-0 Programming for Computer Engineers Introduction to computer programming in an object-oriented language. Emphasis on applications to computer systems, computer simulation, and discrete optimization. Basic principles of software engineering. Not to be taken for credit with or after 211 or 231. Prerequisites: GEN ENG 205-1,2.

EECS 231-0 Advanced Programming for Computer Engineers

Object-oriented programming, classes and data hiding, dynamic object construction and destruction, derived classes and inheritance, virtual functions; file processing; introduction to UNIX; testing and test generation. Not to be taken for credit with or after 211 or 230. Prerequisite: 110 or knowledge of a programming language.

EECS 250-0 Physical Electronics and Devices The physical basis of electronic and optoelectronic devices and their application in analog and digital systems. Diodes, transistors, LEDs, photodetectors, and lasers are described, and their properties are explored. Prerequisites: 221; PHYSICS 135-2.

EECS 270-0 Applications of Electronic Devices DC and AC networks, rectifiers, transistor amplifiers, feedback and operational amplifiers, digital electronics, and microprocessors. Not open to electrical engineering degree candidates. Prerequisites: MATH 224; PHYSICS 135-2; or equivalent.

EECS 302-0 Probabilistic Systems and Random Signals

Basic concepts of probability theory and statistics, random variables, moments; multiple random variables, conditional distributions, correlation; random signals; applications to engineering systems. Prerequisite: MATH 234.

EECS 303-0 Advanced Digital Logic Design Overview of digital logic design. Technology review. Delays, timing in combinational and sequential circuits, CAD tools, arithmetic units such as ALUs and multipliers. Introduction to VHDL. Prerequisite: 203.

EECS 307-0 Communications Systems Analysis of analog and digital communications systems, including modulation, transmission, and demodulation of AM, FM, and TV systems. Design issues, channel distortion and loss, bandwidth limitations, additive noise. Prerequisites: 222, 302.

EECS 308-0 Advanced Electromagnetics and Photonics

Electromagnetic waves, transmission lines; impedance transformation; transients on lines; electrostatics, conductors, and capacitors; magnetostatics and inductors; wave reflection and transmission; electromagnetic motor; Maxwell's equations; metallic waveguides and wave transmission; antenna and diffraction, antenna arrays, communication, and radar. Prerequisite: 224.

EECS 310-0 Mathematical Foundations of Computer Science

Basic concepts of finite and structural mathematics. Sets, axiomatic systems, the propositional and predicate calculi, and graph theory. Application to computer science: sequential machines, formal grammars, and software design. Prerequisites: 110 or 111; MATH 230.

EECS 311-0 Data Structures and Data Management The design, implementation, and analysis of abstract data types; data structures and their algorithms. Topics include data and procedural abstraction, linked lists, stacks, queues, binary trees, searching, and sorting. Required for the computer science degree. Prerequisite: 211 or 230.

EECS 313-0 Telecommunication Networks for Multimedia

Signals and bandwidth concepts, spectra, basics of

electronics, information and coding, modulation, multiplexing, transmission systems, transmission media, analog versus digital communications, computer networks, and switching techniques. Not for electrical engineering or computer engineering degree candidates.

EECS 317-0 Data Management and Information Processing

Data representation, file and record organization, linear and linked lists, and scatter storage techniques. Sorting and searching algorithms. Solving problems involving large databases. Not for students in computer science. Prerequisite: 110, 111, or programming experience.

EECS 322-0 Compiler Construction

Overview of compilers and context-free languages, top-down parsing, LL(1) parser construction, translation grammars, implementation of lexical analyzer, parser and translator, compiler optimization, error handling, and recovery. Prerequisite: 311.

EECS 325-1,2 Artificial Intelligence Programming

Introduction to LISP and programming knowledge-based systems and interfaces. Strong emphasis on writing maintainable, extensible systems. Topics include semantic networks, frames, pattern matching, deductive inference rules, case-based reasoning, and discrimination trees. Project driven. Substantial programming assignments. Prerequisite: 110, 111, or programming experience.

EECS 328-0 Numerical Methods for Engineers

Introduction to numerical methods; numerical differentiation, numerical integration, solution of ordinary and partial differential equations. Students write programs in FORTRAN, C, or Pascal using methods presented in class. Prerequisites: GEN ENG 205-1,2,3; MATH 220, 224, 230.

EECS 330-0 Human-Computer Interaction

Introduction to human-computer interaction and the design of systems that work for people and their organizations. Understanding the manner in which humans interact with and use their computers for productive work. Prerequisite: programming experience.

EECS 332-0 Digital Image Analysis

Introduction to computer and biological vision systems, image formation, edge detection, image segmentation, texture, representation and analysis of two-dimensional geometric structures, and representation and analysis of three-dimensional structures. Prerequisites: 311; IEMS 202; MATH 240.

EECS 333-0 Introduction to Communication Networks

Data communication basics. Telephone, cellular, cable, and computer networks. Layered network architectures, models, and protocols. Switching, routing, flow control, and congestion control. Medium access control, ARQ, and local area networks. Queuing models and network performance analysis. Prerequisite: 302; IEMS 202; MATH 320-1,2,3; or equivalent basic probability theory.

EECS 334-0 Introduction to Computer Vision

Introduction to computer and biological vision systems, image formation, edge detection, image segmentation, texture, and representation and analysis of two- and three-dimensional structures. Prerequisites: 311; IEMS 201.

EECS 335-0 Introduction to the Theory of Computation

Mathematical foundations of computation, including computability, relationships of time and space, and the P vs. NP problem. Prerequisite: 310 or consent of instructor.

EECS 336-0 Design and Analysis of Algorithms

Analysis techniques: solving recurrence equations. Algorithm design techniques: divide and conquer, the greedy method, backtracking, branch-and-bound, and dynamic programming. Sorting and selection algorithms, order statistics, heaps, and priority queues. Prerequisite: 310, 311, or consent of instructor.

EECS 337-0 Natural Language Processing

Semantics-oriented introduction to natural language processing, broadly construed. Representation of meaning and knowledge inference in story understanding, script/frame theory, plans and plan recognition, counterplanning, and thematic structures. Prerequisite: 348 or consent of instructor.

EECS 338-0 Practicum in Intelligent Information Systems

A practical excursion into building intelligent information systems. Students develop a working program in information access, management, capture, or retrieval. Project definition, data collection, technology selection, implementation, and project management.

EECS 339-0 Introduction to Database Systems

Data models and database design. Modeling the real world: structures, constraints, and operations. The entity relationship to data modeling (including network hierarchical and object-oriented), emphasis on the relational model. Use of existing database systems for the implementation of information systems. Prerequisite: 311.

EECS 340-0 Introduction to Networking A top-down exploration of networking using the five-layer model and the TCP/IP stack, covering each layer in depth. Students build web clients, servers, and a TCP implementation and implement routing algorithms. Prerequisite: 311.

EECS 343-1,2 Operating Systems Fundamental overview of operating systems. **1.** Operating system structures, processes, process synchronization, deadlocks, CPU scheduling, and memory management. **2.** File systems, secondary storage management, issues in distributed systems, case studies, and special topics. Requires substantial programming projects. Prerequisites: 311 and either 213 or 205 and 231.

EECS 344-0 Design of Computer Problem Solvers Principles and practice of organizing and building artificial intelligence reasoning systems. Pattern-directed rule systems, truth-maintenance systems, and constraint languages. Prerequisite: 348 and 325-1 or equivalent LISP experience.

EECS 345-0 Distributed Systems Basic principles behind distributed systems (collections of independent components that appear to users as a single coherent system) and main paradigms used to organize them. Prerequisites: 340, 343.

EECS 346-0 Microprocessor System Design Structure and timing of typical microprocessors. Sample

microprocessor families. Memories, UARTS, timer/counters, serial devices, and related devices. MUX and related control structures for building systems. Sample single-board computers. Standard bus structures. Interrupt programming. Hardware/software design tradeoffs. Prerequisites: 203, 205.

EECS 347-1 Microprocessor System Projects I Programmable logic devices such as PAL and FPGA. Design, prototype, and test individual projects involving microprocessors and programmable logic devices. Prerequisites: 303, 346.

EECS 347-2 Microprocessor System Projects II Students design, prototype, and test individual projects involving microprocessors and related devices, such as PAL/FPGA and special-purpose ICs. Embedded-system tools such as special-purpose compilers and ICE (in-circuit emulation). Manufacturing issues such as PCB layout. Survey of microprocessor platforms. Prerequisite: 347-1.

EECS 348-0 Introduction to Artificial Intelligence Core techniques and applications of AI. Representing, retrieving, and applying knowledge for problem solving. Hypothesis exploration. Theorem proving. Vision and neural networks. Prerequisite: 325-1 or LISP programming experience.

EECS 349-0 Machine Learning Machine learning is the study of algorithms that improve through experience. Topics covered typically include Bayesian learning, decision trees, genetic algorithms, neural networks, Markov models, and reinforcement learning. Assignments include programming projects and written work. Prerequisite: 348.

EECS 350-0 Introduction to Computer Security Basic principles and practices of computer and information security. Software, operating system, and network security techniques, with detailed analysis of real-world examples. Topics include cryptography, authentication, software and operating system security (e.g., buffer overflow), Internet vulnerability (DoS attacks, viruses/worms, etc.), intrusion detection systems, firewalls, VPN, and web and wireless security. Prerequisite: 213 or equivalent or consent of instructor; 340 highly recommended.

EECS 351-0 Introduction to Computer Graphics

Mathematical software and hardware requirements for computer graphics systems. Data structures and programming languages. Random displays. Graphic applications. Prerequisite: 311.

EECS 352-0 Machine Perception of Music and Audio

Machine extraction of musical structure in audio and MIDI and score files, covering areas such as source separation and perceptual mapping of audio to machine-quantifiable measures. Prerequisite: GEN ENG 205-2, EECS 211, EECS 231, or prior programming experience in MATLAB.

EECS 353-0 Digital Microelectronics Logic families, comparators, A/D and D/A converters, combinational systems, sequential systems, solid-state memory, large-

scale integrated circuits, and design of electronic systems. Prerequisites: 203, 225.

EECS 354-0 Network Penetration and Security Practical tools for vulnerability assessment and defense of computer and communication systems. Prerequisite: 213 or 205 and 231.

EECS 355-0 ASIC and FPGA Design Overview of computer-aided design tool flow for ASIC and FPGA design. Synthesis from hardware description languages and creation of finite-state machines. Differences between FPGA and ASIC design flows. Exploration of concepts in several projects. Prerequisite: 303.

EECS 356-0 Introduction to Formal Specification and Verification Introduction to formal techniques used for system specifications and verifications: temporal logic, set theory, proofs, and model checking. TLA* (Temporal Logic of Actions) specifications. Safety and liveness properties. Real-time specs and verifications.

EECS 357-0 Introduction to VLSI CAD VLSI physical design, including logic design, architectural design, and packaging. Development of CAD tools for VLSI physical design. Prerequisites: 303; EECS 311.

EECS 358-0 Introduction to Parallel Computing Introduction to parallel computing for scientists and engineers. Shared-memory parallel architectures and programming, distributed memory, message-passing data-parallel architectures, and programming. Prerequisites: 361; 211 or 230.

EECS 359-0 Digital Signal Processing Discrete-time signals and systems. Discrete-time Fourier transform, z-transform, discrete Fourier transform, digital filters. Prerequisite: 222.

EECS 360-0 Introduction to Feedback Systems Linear feedback control systems, their physical behavior, dynamical analysis, and stability. Laplace transform, frequency spectrum, and root locus methods. System design and compensation using PID and lead-lag controllers. Digital implementations of analog controllers. Not to be taken for credit with or after MECH ENG 391. Prerequisite: 222.

EECS 361-0 Computer Architecture Design and understanding of the computer system as a whole unit. Performance evaluation and its role in computer system design; instruction set architecture design, datapath design and optimizations (e.g., ALU); control design; single cycle, multiple cycle, and pipeline implementations of processor. Hazard detection and forwarding; memory hierarchy design; cache memories, virtual memory, peripheral devices, and I/O. Prerequisites: 205, 303.

EECS 362-0 Computer Architecture Project Quarter-long team project designing a processor for a complete instruction set. Involves ISA design, design of components, datapath, and control for a pipelined processor to implement the ISA. Students use industrial-strength design tools and VHDL as the design specification language. Designs are evaluated using benchmark programs for correctness and performance. Prerequisite: 361.

EECS 363-0 Digital Filtering Recursive and nonrecursive digital filters, decimation and interpolation, A/D and D/A conversion as digital filtering problems. Implementation of nonrecursive filters via FFT, quantization problems, e.g., companding and limit cycles. Prerequisite: 359.

EECS 366-0 Designing and Constructing Models with Multiagent Languages How to translate a situation into a multiagent model, construct multiagent models and networked situations, and analyze their behavior and performance. Prerequisite: 311.

EECS 370-0 Computer Game Design Plot, narrative, and character simulation for creating game worlds; artificial intelligence for synthetic characters; tuning gameplay. Substantial programming and project work. Prerequisites: 311; 1 unit of 322, 343, 348, or 351.

EECS 372-0 Designing and Constructing Models with Multiagent Languages Exploration and analysis of multiagent models, which simulate “emergent” scientific phenomena in a wide variety of content domains.

EECS 374-0 Introduction to Digital Control Discrete dynamics systems; discrete models of continuous systems feedback and digital controllers; analog-digital conversion; digital control design including PID, lead/lag, deadbeat, and model-matching controllers. Prerequisite: 360.

EECS 378-0 Digital Communications Sampling and time-division multiplexing, baseband digital signals and systems. Coded pulse modulation, error control coding, digital modulation systems, information measure and source encoding, and introduction to spread spectrum communications. Prerequisites: 302, 307.

EECS 379-0 Lasers and Coherent Optics Optical resonators; fundamental operation of lasers; mode-locking and Q-switching; optical propagation and diffraction; Gaussian beams; thin-lens imaging; optical signal processing. Prerequisites: 222, 224.

EECS 380-0 Wireless Communications Overview of existing and emerging wireless communications systems; interference, blocking, and spectral efficiency; radio propagation and fading models; performance of digital modulation in the presence of fading; diversity techniques; code-division multiple access. Prerequisite: 378.

EECS 381-0 Electronic Properties of Materials Fundamental properties of electrons in materials. Classical and quantum mechanical descriptions of free and bound electrons. Optical, electrical, thermal, and magnetic properties of materials. Microelectronic, optoelectronic, magnetic recording, superconductivity. Prerequisites: 223 and 224 or consent of instructor.

EECS 382-0 Photonic Information Processing Introduction to photonic information processing; coherent and incoherent light; electro-optic and acousto-optic modulation; optical signal processing; holography; optical storage. Prerequisites: 222 and 224 or consent of instructor.

EECS 383-0 Fiber-Optic Communications Semiconductor diode lasers, internal modulation, electro-optic modulation, coherent and incoherent detection, optical fibers and their properties, optical amplifiers, communication systems, optical networks. Prerequisites: 223, 224.

EECS 384-0 Solid-State Electronic Devices Energy-band model for semiconductors; carrier statistics and transport; diodes, bipolar and field-effect transistors; integrated circuits, optoelectronic and heterojunction devices.

Prerequisite: 381 or consent of instructor.

EECS 385-0 Optoelectronics Introduction to solid-state optoelectronic devices; display devices, laser diodes, photodetectors, and light modulators; optical waveguides and fibers; system application of optoelectronic devices.

Prerequisite: 381 or consent of instructor.

EECS 386-0 Computational Electromagnetics and Photonics Introduction to the finite-difference time-domain (FDTD) method in numerical modeling of electromagnetic and optical wave interactions with engineering structures.

Finite differences; Maxwell's equations; numerical dispersion and stability; free-space and waveguide field sources; absorbing boundary conditions; material dispersions and nonlinearities; modeling examples in modern electromagnetic and optical engineering. Prerequisite: 308.

EECS 388-0 Nanotechnology Physics and fabrication of photonic and electronic devices. Physics of semiconductors: crystal structures, reciprocal lattice, elements of quantum mechanics, heterojunctions, quantum wells, and superlattices. Bulk crystal, thin-film, and epitaxial growth technologies. Device processing technologies: diffusion oxidation, ion implantation, annealing, etching, and photolithography. Prerequisite: 223 or consent of instructor.

EECS 389-0 Superconductivity and Its Applications Properties of materials in the superconducting state; charge flow dynamics of type II superconductors; high-T_c superconductors; applications for computers and high-frequency devices. Prerequisite: 381 or consent of instructor.

EECS 390-0 Introduction to Robotics Homogeneous vectors and planes; homogeneous transformation, position and orientation transformations, kinematics and inverse kinematic solutions of robot manipulators; Jacobian and inverse Jacobian relation; robot trajectory and task planning; dynamic formulation and computation of robot manipulators; robot programming and control systems. Prerequisite: 230.

EECS 391-0 VLSI Systems Design Design of CMOS digital integrated circuits, concentrating on architectural and topological issues. Tradeoffs in custom design, standard cells, gate arrays. Use of VLSI design tools on a small project. Prerequisite: 303.

EECS 392-0 VLSI Systems Design Projects Design of a cutting-edge VLSI chip. Teams of 5 to 10 students undertake a large circuit design problem, going from specification to VLSI implementation while optimizing for speed,

area, and/or power. Group collaboration and engineering design. Prerequisite: 391.

EECS 393-0 VLSI Design and Analysis of High-Speed Integrated Circuits Issues that arise in the design and analysis of VLSI circuits at high speeds, such as buffer sizing, repeater insertion, noise, electromigration, Elmore decay, scaling trends, and power consumption. Prerequisite: 391.

EECS 394-0 Software Project Management and Development Software development methodologies. Object-oriented analysis and design, CASE tools, software life cycle. Project management tools, programming teams. Executable specifications, automatic test generation. Prerequisite: 343 or equivalent programming experience.

EECS 395-0 Special Topics in Electrical Engineering and Computer Science Topics suggested by students or faculty and approved by the department.

EECS 398-0 Electrical Engineering Design Design of electrical and electronic devices, circuits, and systems by the application of the engineering sciences, economics, and Institute of Electrical and Electronics Engineers or other national standards. Prerequisite: senior standing.

EECS 399-0 Projects Seminar and projects for advanced undergraduates on subjects of current interest in electrical and computer engineering.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

ENGINEERING DESIGN

See Manufacturing and Design Engineering for the certificate in engineering design.

ENGINEERING SCIENCES AND APPLIED MATHEMATICS

www.esam.northwestern.edu

The Department of Engineering Sciences and Applied Mathematics offers course work in applied mathematics and administers an undergraduate program leading to a BS in applied mathematics and a graduate program in applied mathematics.

The applied mathematics program is intended to provide the knowledge necessary for applying mathematical ideas and techniques to the problems that arise in engineering or science. It is expected that a student receiving a BS in applied mathematics would have the background for suitable employment in industry or for graduate study in either mathematics (pure or applied) or an engineering field, including computer science and operations research. To achieve these goals, the applied mathematics program is designed to be flexible and allow the student to concentrate a substantial part of the course work either in mathematics or one or more areas of application.

Degree in Applied Mathematics

Requirements (48 units)

Core courses (32 units)

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses
- 4 basic science courses
 - PHYSICS 135-2,3
 - 2 courses from the following list:
 - *Biological sciences*: BIOL SCI 210-1,2,3; CHEM ENG 275
 - *Chemistry*: CHEM 101, 102, 103, 171, 172, 210-1,2
 - *Earth and planetary sciences/astronomy*: EARTH 201, 202; ASTRON 220
- 3 design and communications courses
- 5 basic engineering courses
 - EECS 230 or 231
 - 4 courses from at least three of the following areas:
 - *Computer architecture and numerical methods*: EECS 203, 205, 328; ES APPM 346
 - *Computer programming*: EECS 211, 317
 - *Electrical science*: EECS 202, 221, 222, 223, 224, 270; MECH ENG 233
 - *Fluids and solids*: BME 270, 271; CHEM ENG 321; CIV ENV 216, 219; MECH ENG 241
 - *Materials science and engineering*: MAT SCI 201, 203, or 301
 - *Probability, statistics, and quality control*: BME 220; CHEM ENG 312; CIV ENV 306; EECS 302; IEMS 201, 303; MECH ENG 359
 - *Systems engineering and analysis*: CHEM ENG 210; CIV ENV 304; IEMS 310, 313, 326; IEMS 313, 326
 - *Thermodynamics*: BME 250; CHEM 342-1; CHEM ENG 211; MAT SCI 314, 315; MECH ENG 220, 370 (MECH ENG 220 may not be taken with CHEM 342-1 or CHEM ENG 211)
- 7 social sciences/humanities courses
- 5 unrestricted electives

Major program (16 units)

- ES APPM 311-1,2,3, 322, 346, 421-1
- 1 modeling course from an approved list
- MATH 334
- 2 courses from EECS 302; IEMS 202, 303, 310, 313; MATH 330-1,2,3
- 4 courses in engineering or the sciences at the 300-level or higher leading to an approved concentration in one of the following areas:
 - *Engineering*
 - *Mathematical social sciences (e.g., economics)*
 - *Mathematics (e.g., discrete mathematics or analysis)*
 - *Numerics*
 - *The sciences*
- 2 technical electives at the 300 level or higher in engineering, science, or mathematics

Courses

ES APPM 252-1,2 Honors Calculus for Engineers Alternative to standard calculus sequence. Covers more material at a deeper level with more applications. Satisfies same requirements as MATH 230 and 234. Prerequisite: invitation or consent of instructor.

ES APPM 311-1,2 Methods of Applied Mathematics Ordinary differential equations; Sturm-Liouville theory, properties of special functions, solution methods including Laplace transforms. Fourier series: eigenvalue problems and expansions in orthogonal functions. Partial differential equations: classification, separation of variables, solution by series and transform methods. Prerequisite: GEN ENG 205-4, 206-4, or MATH 250.

ES APPM 311-3 Methods of Applied Mathematics: Complex Variables Imaginary numbers and complex variables, analytic functions, calculus of complex functions, contour integration with application to transform inversion, conformal mapping. May be taken independently of 311-1,2. Prerequisite: GEN ENG 205-4, 206-4, or MATH 250.

ES APPM 321-0 Modeling Soft Matter: Networks, Membranes, Fluctuations Fundamental mathematical tools (e.g., differential geometry, variational calculus) are applied to modern concepts of soft-matter structure and mechanics in various fields (e.g., biological membranes, polymers). Prerequisites: 311-1,2 or consent of instructor.

ES APPM 322-0 Applied Dynamical Systems Example-oriented survey of nonlinear dynamical systems, including chaos. Combines numerical exploration of differential equations describing physical problems with analytic methods and geometric concepts. Applications to mechanical, fluid dynamical, electrical, chemical, and biological systems. Prerequisites: 311-1,2 or equivalent or consent of instructor.

ES APPM 346-0 Modeling and Computation in Science and Engineering Advanced techniques for initial value problems, differential algebraic systems, bifurcations, chaos, and partial differential equations. Applications drawn from different physical areas. Prerequisites: MATH 234, 240; MATH 250 or GEN ENG 205-4; PHYSICS 135-1,2 or equivalent; familiarity with a programming language; or consent of instructor.

ES APPM 399-0 Projects Special studies to be carried out under faculty direction. Credit to be arranged.

ENVIRONMENTAL ENGINEERING

See Civil and Environmental Engineering.

INDUSTRIAL ENGINEERING AND MANAGEMENT SCIENCES

www.iems.northwestern.edu

Northwestern's industrial engineering students graduate with the skills needed to create, design, analyze, and improve the operation of complex organizational systems, e.g., financial systems, information systems, production

systems, logistics, and transportation. All students acquire an understanding of statistics, economics, optimization, computing, and simulation techniques. Elective opportunities include courses in business management, advanced economics and mathematics, quality control and reliability, communications and information systems, and production and supply-chain management. Realistic (i.e., open-ended and ill-defined) problems are used to help students refine the application of these principles as well as their ability to work in teams and to communicate their results effectively. These are the experiences that employers find most valuable in our graduates regardless of the field they enter.

Students may pursue an optional concentration using technical electives and other courses from one or more of the following areas: economics and finance, general business management, industrial behavioral sciences, mathematical sciences/graduate research, production and logistics, and statistics and quality control.

Many industrial engineering graduates eventually assume management positions. In preparation for such careers, students take full advantage of the additional academic, business, and leadership programs available at Northwestern: a major or minor in economics, the business enterprise certificate for engineers, the Undergraduate Leadership Program, the Business Institutions Program, study abroad, and the co-op program. The two-quarter senior design project allows students to integrate all of these experiences.

Degree in Industrial Engineering

Requirements (48 units)

Core courses (32 units)

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses
- 4 basic science courses
 - 4 courses from at least two of the following areas:
 - *Physics*: PHYSICS 135-2,3, 335
 - *Biological sciences*: BIOL SCI 210-1,2,3; CHEM ENG 275
 - *Chemistry*: CHEM 101, 102, 103, 171, 172, 210-1,2
 - *Earth and planetary sciences/astronomy*: EARTH 201, 202; ASTRON 220
 - no more than 2 courses from earth and planetary sciences/astronomy
 - no more than 3 courses in any other area
 - PHYSICS 135-2 and 1 unit of chemistry recommended
- 3 design and communications courses
- 5 engineering courses:
 - EECS 230
 - EECS 317 or 328
 - IEMS 326
 - 2 courses from BME 220, 250, 270, 271; CHEM 342-1; CHEM ENG 210, 211, 312, 321;

CIV ENV 216, 219, 304, 306; EECS 202, 203, 205, 211, 221, 222, 223, 224, 231, 270, 302; ES APPM 346; IEMS 201, 303, 310, 326; MAT SCI 201, 203, 301, 314, 315; MECH ENG 220, 233, 241, 359, 370 (MECH ENG 220 may not be taken with CHEM 342-1 or CHEM ENG 211)

- 7 social sciences/humanities courses
- 5 unrestricted electives

Major program (16 units)

- 2 probability and statistics courses: IEMS 202, 303
- 3 operations research courses: IEMS 313, 315, 317
- 1 applied behavioral science course: IEMS 340 or 342
- 1 production and logistics course: 1 course from IEMS 381, 382, 383
- 2 senior design project courses
 - IEMS 390, 391, or 392
 - IEMS 393
- 7 electives
 - 3 industrial engineering/operations courses from IEMS 304, 305, 306, 307, 373, 381, 382, 383, 391
 - 1 management science course from IEMS 325, 340, 342, 342, 390, 392
 - 3 engineering courses at the 200 level or higher or any course from the general technical elective group (available from the department); no more than 2 units of 399 are allowed
 - No more than 2 courses, and only those in the last group, may be taken P/N
- Concentration (optional)

Students choose at least 4 courses from an approved list. Students may pursue more than one concentration. Concentrations may be created from courses that satisfy other requirements or concentrations. A list of available concentration areas may be found on the department web site.

Courses

IEMS 201-0 Introduction to Statistics Collecting data; summarizing and displaying data; drawing conclusions from data; probability background, confidence intervals, hypotheses tests, regression, correlation. Not open to industrial engineering degree candidates. Not to be taken for credit with or after STAT 210.

IEMS 202-0 Probability Introduction to probability theory and its applications. Random variables and distributions including binomial, Poisson, exponential, and normal. Monte Carlo simulation. Examples in reliability, inventory, finance, and statistics. Homework, labs, and exams. Not to be taken for credit with or after MATH 310-1. Prerequisite: concurrent enrollment in MATH 234.

IEMS 210-0 Methods, Standards, and Work Design Introduction to traditional topics in industrial engineering, including time study, work measurement, standards, and design.

This course enables industrial engineering students to understand and assume traditional industrial engineering roles upon graduation. Prerequisite: sophomore standing and knowledge of probability and statistics.

IEMS 225-0 Principles of Entrepreneurship Introduction to essential elements of building one's own business, from brainstorming ideas and assessing opportunities to pitching a business idea. History of entrepreneurship and the entrepreneurial psyche. Business plan fundamentals, including strategy, finance, accounting, marketing, operations, and choosing the ideal management team. May not be taken after 325.

IEMS 295-0 Introductory Topics in Industrial Engineering Topics suggested by students or faculty members and approved by the department; taught at an intermediate level.

IEMS 303-0 Statistics Statistical methods for data analysis. Descriptive plots and statistics; observational studies and experiments; confidence interval estimation; hypothesis testing; regression and correlation. Homework, labs, and project. Not to be taken for credit with or after STAT 320-1. Prerequisite: 202 or equivalent.

IEMS 304-0 Statistical Methods for Data Mining Advanced statistical methods. Multiple regression; analysis of variance; design and analysis of single-factor and multifactor experiments; categorical data; nonparametric methods. Homework and project. Not to be taken for credit with or after STAT 320-2. Prerequisite: 303 or equivalent.

IEMS 305-0 Statistical Methods for Quality Improvement Methods for controlling and improving industrial processes. Control charts; process capability; gage repeatability and reproducibility. Multifactor experiments; screening experiments; robust design. Homework, labs, and project. Prerequisite: 303 or equivalent.

IEMS 306-0 Decision Analysis Theory and practice of analyzing decisions in the public and private sectors. Multiple objectives; influence diagrams; decision trees; sensitivity analysis; probability assessment; utility; human biases. Problems, cases, and projects. Prerequisite: 202 or equivalent.

IEMS 307-0 Quality Improvement by Experimental Design Methods for designing and analyzing industrial experiments. Blocking; randomization; multiple regression; factorial and fractional factorial experiments; response surface methodology; Taguchi's robust design; split plot experimentation. Homework, labs, and project. Prerequisite: 303 or equivalent.

IEMS 310-0 Operations Research Survey of operations research techniques. Linear programming, decision theory, stochastic processes, game theory. Not open to industrial engineering degree candidates. May not be taken with 313 or 315.

IEMS 313-0 Deterministic Models and Optimization Formulation and solution of applicable optimization models, including linear, integer, nonlinear, and network problems. Efficient algorithmic methods and use of

computer modeling languages and systems. Homework, exams, and project. Prerequisites: GEN ENG 205-1; MATH 230; sophomore standing.

IEMS 315-0 Stochastic Models and Simulation Modeling and analysis of dynamic systems subject to uncertainty. Integrated approach to stochastic analysis and simulation. Rough-cut analysis of queuing systems. Homework, exams, computer labs, and project. Prerequisites: 202, 303; GEN ENG 205-1.

IEMS 317-0 Discrete-Event Systems Simulation Computer simulation of discrete-change systems subject to uncertainty. Choice of input distributions; development of models; design and analysis of simulation experiments. Miniprojects, exams, and computer labs. Prerequisites: 303; 310 or 315.

IEMS 325-0 Engineering Entrepreneurship Overview of the entrepreneurial process from an engineering perspective. Idea generation, planning, financing, marketing, protecting, staffing, leading, growing, and harvesting. Students write startup business plans. Lectures, guest speakers, and case studies. Prerequisite: 1 course in accounting or finance such as 326 or ECON 260.

IEMS 326-0 Economics and Finance for Engineers Principles of corporate finance; financial decisions of firms; value; risk and return; investment and capital budgeting decisions under certainty and uncertainty; performance evaluation. Homework and exams. Prerequisites: MATH 220; basic understanding of probability and economics recommended; students will not receive credit for 326 after taking KELLG FE 310.

IEMS 340-0 Field Project Methods Use of field research methods to solve management problems. Assignments focus on individual student projects. Students define projects, design field studies and pilot tests of data collection instruments, and present results. Prerequisite for students who are not degree candidates: consent of instructor.

IEMS 341-0 Social Network Analysis The use of social network analysis to understand the growing connectivity and complexity in the world around us on different scales, ranging from small groups to the World Wide Web. How we create social, economic, and technological networks, and how they enable and constrain attitudes and behaviors.

IEMS 342-0 Organizational Behavior Manager's view of tools available to recruit, develop, appraise, compensate, organize, and lead a team going through change. Application of psychological principles relating to human dynamics, motivation, teams, power, and organizational culture. Lectures, guest speakers, and exams. Work experience recommended.

IEMS 343-0 Project Management for Engineers A case study-based exploration of the body of project management knowledge. Key topics include project scheduling, risk management, project leadership, small-group dynamics, project methodologies, lifecycle concepts, and project

controls. A Socratic approach is taken to exploring various case studies in the context of established and leading-edge project-management concepts. Prerequisites: 303 and 342 recommended.

IEMS 345-0 Negotiations and Conflict Resolution for Engineers

Highly interactive case-study-based exploration of the field of negotiation and dispute resolution. Students interact in simulated negotiations and disputes ranging in complexity from single-party/single-issue to multiparty/multi-issue cases that illustrate integrative negotiation techniques. Also, dispute resolution techniques in the context of typical industrial situations. Prerequisites: 303 and 342 recommended.

IEMS 373-0 Introduction to Financial Engineering Financial markets, derivative securities, risk management, mathematical models in finance. Foreign exchange, debt, equity, commodity markets. Investing, trading, hedging, arbitrage. Forwards, futures, options, swaps, exotic derivatives. Models of price dynamics, binomial model, introduction to Black-Scholes theory and Monte Carlo simulation. Homework, projects, and guest speakers. Prerequisites: 315, 326, MATH 234, EECS 230, or equivalent or consent of instructor.

IEMS 381-0 Supply-Chain Modeling and Analysis Application and development of mathematical modeling tools for the analysis of strategic, tactical, and operational supply-chain problems including facility location, customer assignment, vehicle routing, and inventory management. Related topics including the role of information and decision support systems in supply chains. Homework, exams, and project. Prerequisite: 313.

IEMS 382-0 Production Planning and Scheduling Applications of operations research methods to practical problems of production planning and inventory control. Forecasting; aggregate planning; deterministic and stochastic inventory models; MRP; JIT; variability; scheduling in production and service systems. Case studies, homework, and exams. Prerequisites: 202; 310 or 313.

IEMS 383-0 Service Operations Management Exploration of service industries: cost-reduction and service-enhancement models, location planning, workforce scheduling, yield management, queuing analysis, and call-center management. Prerequisites: 313, 315.

IEMS 390-0 Systems Management Introduction to systems problems and methods. Small-group development of potential classwide projects to be carried out the following quarter. Identifying projects, team skills, presenting plans and proposals. Prerequisite: 340.

IEMS 391-0 Industrial Engineering Design Case studies and small-scale projects involving application of operations research techniques to complex-decisions problems. Mathematical modeling, optimization, and policy analysis in public and private sector systems. Written and oral presentations of analyses. Prerequisite: senior standing; 313 and 315 for industrial engineering degree candidates; 310 for manufacturing engineering degree candidates.

IEMS 392-0 Systems Project Management Project management methods applied to analysis and design of a complex real-world system. Students choose and carry out a single classwide project. Planning, organizing, staffing, directing, and controlling; working with clients and stakeholders. Prerequisite: senior standing.

IEMS 393-0 Industrial Engineering Design Project Large-scale, open-ended team projects from selected fields of industrial engineering. Systems approach requiring establishment of objectives and criteria, analysis and synthesis of alternatives, feasibility, trade-offs, testing, and evaluation. Written and oral reports. Prerequisite: 390, 391, or 392.

IEMS 395-0 Special Topics in Industrial Engineering Topics suggested by students or faculty members and approved by the department.

IEMS 399-0 Independent Study Independent study on an industrial engineering topic supervised by a faculty member.

MANUFACTURING AND DESIGN ENGINEERING

www.segal.northwestern.edu

The Segal Design Institute is the unit of the McCormick School that promotes the importance of design throughout the undergraduate curriculum and is dedicated to fostering innovation among engineering students and faculty.

Through the institute students gain design experience using state-of-the-art tools by participating in projects on topics that range from blast-resistant structures to HIV monitoring in the developing world. They also develop portfolios to showcase their design work.

Degree in Manufacturing and Design Engineering Requirements (48 units)

Core courses (32 units)

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses
- 4 basic science courses: PHYSICS 135-2,3; 2 courses from CHEM 101, 102, 103, 171, 172, 210-1,2
- 3 design and communications courses
- 5 basic engineering courses
 - *Computer architecture and numerical methods or electrical science*: EECS 202 or 203
 - *Fluids and solids*: CIV ENV 216
 - *Materials science and engineering*: MAT SCI 201
 - *Systems engineering and analysis*: IEMS 326
 - 1 additional course from BME 220, 250, 270, 271; CHEM 342-1; CHEM ENG 210, 211, 312, 321; CIV ENV 219, 304, 306; EECS 205, 211, 221, 222, 223, 224, 230, 231, 270, 302 317, 328; ES APPM 346; IEMS 303, 310, 313; MAT SCI 203, 301, 314, 315; MECH ENG 220, 233, 241, 359, 370
- 7 social sciences/humanities courses
- 5 unrestricted electives

Major program (16 units)

- 10 core courses: DSGN 308 *or* MECH ENG 315; DSGN 344; IEMS 201 *or* 303, 305 *or* 307, 310, 382; MAT SCI 318; MECH ENG 240, 340-1, -2, *or* -3
- 2 senior design project courses:
 - DSGN 398
 - 1 course from DSGN 298; IEMS 391; MECH ENG 398
- 4 technical electives
 - 2 courses from an approved list
 - 2 300-level engineering courses

Certificate in Engineering Design

This certificate program, administered by the Segal Design Institute, develops a set of design skills that prove valuable in careers across the entire spectrum available to McCormick graduates. The program focuses on innovative engineering design in team-based, cross-disciplinary settings that address real-world problems.

Certificate Requirements (6 units)

- 3 required courses: DSGN 298, 370, 398
- 3 elective courses from an approved list
- An engineering design portfolio demonstrating accomplishments in prototyping and implementation, modern software tools, design analysis, writing, project management, and effective graphical communication
- Successful completion of a Northwestern baccalaureate degree

Courses**DSGN 106-1,2 Engineering Design and Communication**

(.5 unit each) See General Engineering Courses.

DSGN 245-1,2 Computer-Aided Design I, II (.5 unit each)

1. Introduction to CAD software. Students develop solid models, detail drawings, and product assemblies.
2. Building more complex shapes such as splines and other developed curves, building sheets through one or more sets of curves, and applying specially shaped transitions between faces. This sequence may not be repeated for credit.

DSGN 295-0 Introductory Topics in Design Topics suggested by students or faculty members and approved by the institute; taught at an intermediate level.

DSGN 297-0 Intermediate Topics in Engineering Design

(.5 unit) Topics suggested by students and faculty and approved by the institute.

DSGN 298-0 Interdisciplinary Design Projects I Product or system design projects carried out by small student groups. Conceptual and detailed design, implementation and evaluation, reporting and archiving. Prerequisite: 106-1,2.

DSGN 307-0 Introduction to Industrial Design Methods

The process of product development from an industrial design perspective.

DSGN 308-0 Human-Centered Product Design Project-based course focusing on user needs: observational methods, brainstorming, prototyping, business models, and the social and engineering concerns for product design. Prerequisite: sophomore standing or 106-1,2.

DSGN 344-0 Manufacturing Engineering Design Production-system design with emphasis on manual assembly, machining processes, material handling and storage, and product design for manufacture and assembly. Prerequisite: MECH ENG 340-1 or consent of instructor.

DSGN 350-0 Innovation and Invention This course aims to help engineering students understand their critical role in the invention/creative process and to yield insight on the technologist's role in wealth creation. Prerequisite: senior standing or consent of instructor.

DSGN 360-0 Design Competition Undergraduate teams compete in McCormick's annual autonomous robot contest. Work begins winter quarter; teams must pass a qualifying milestone to register for credit in spring quarter. Students may register for this course no more than two times.

DSGN 370-0 Engineering Design Portfolio and Presentation Students create portfolios that showcase engineering work and further career goals. The portfolio is a design project aimed at presenting a story about its creator in a physical presentation that embodies its goals.

DSGN 371-0 Communicating Complex Data (.5 unit) Best practices in creating graphs, tables, and diagrams to communicate complex technical data clearly and powerfully. The course emphasizes the display of complex data as evidence in support of effective arguments.

DSGN 395-0 Special Topics in Design Engineering Topics relevant to design engineering and approved by the institute. Prerequisite: consent of instructor.

DSGN 397-0 Topics in Engineering Design (.5 unit) Topics suggested by students and faculty and approved by the institute.

DSGN 398-0 Interdisciplinary Design Project II Large-scale, open-ended team projects in real-world settings. Integrated, multidisciplinary approach addressing product, process, and systems considerations. Written and oral reports. Prerequisite: senior status or consent of instructor.

DSGN 399-0 Independent Study Independent study on a manufacturing engineering topic supervised by a faculty member. Prerequisite: consent of instructor.

MATERIALS SCIENCE AND ENGINEERING

www.matsci.northwestern.edu

Materials science and engineering is a discipline that has expanded rapidly in response to growing demand for materials that make improved use of existing resources or are needed for new technologies. The program at Northwestern is broad based, offering educational and research opportunities in polymer science, ceramics, metallurgy,

surface science, biomaterials, nanomaterials, and electronic materials. Engineers, scientists, and technologists who work on these different materials all apply basically the same scientific principles governing the interrelation of processing, structure, properties, and material performance. A key theme of the Northwestern program is the integration of these principles in the systematic design of new materials.

The department offers an undergraduate program leading to the BS degree. The department also participates in the co-op and BS/MS programs. The curriculum centers on basic engineering and materials course work but also provides the flexibility to focus on different areas of concentration as described below. A student's educational experience is broadened by courses in the humanities, arts, sciences, and other areas of engineering. The undergraduate program culminates in the senior project, in which each student carries out a research/development project with a faculty member and his or her research group.

Students who complete the BS program will be well prepared for professional work or graduate study in the application, production, processing, or research and development of materials. Graduates find opportunities in materials science and engineering in many other areas, since materials expertise is important in various engineering fields as well as in medicine, physics, and chemistry.

Areas of Concentration

The undergraduate program at Northwestern offers a close relationship between students and faculty. Every effort is made to tailor specific programs to needs and interests. Several broad areas of concentration are described below. Students are encouraged to create other areas that fit particular interests.

Biomaterials

The growth of biotechnology has stimulated interest in the interface of the life sciences and materials science. The field of biomaterials spans three broad areas: biomedical implant materials to replace natural structures; biomimetic materials applying biological concepts to the design of new engineering materials; and application of materials science principles to the understanding of structure and function in biological systems.

Design and Manufacturing

Engineers in industry typically work in teams on projects requiring experience with design and manufacturing. This concentration is meant for students desiring additional strength in these areas and is especially appropriate for those planning a career in industry. It builds on the design content in the materials science curriculum and provides

additional interdisciplinary design experience. The concentration also provides industrially relevant strengths in the areas of materials selection, computational tools, materials processing, and failure analysis.

Electronic Materials

As microelectronics enters the era of ultralarge-scale integration, materials scientists face new challenges in developing materials and processes for integrated circuits with components of nanometer dimensions. New scientific principles, materials fabrication techniques, and improved instrumentation will be needed to exploit electronic-level structure/property relations in these devices and their components. New electronic materials must be developed to meet requirements in a growing range of application areas such as spintronics, optical computing, and fuel cells.

Metals and Ceramics

The ability to design increasingly higher-strength alloys allows for lighter structures, and higher-temperature materials provide energy efficiency. Heat-treatable and toughened ceramics exploit advanced knowledge of solid-state phase transformations and reactions. Exciting developments are taking place in high-performance composite combinations of these and other materials for structural and electronic applications.

Nanomaterials

The area of nanomaterials, focusing on materials with feature sizes in the range of 1 to 100 nanometers, is an important research topic that will become increasingly emphasized as nanotechnology industries develop. Examples of nanomaterials include new ultrahigh-strength materials with nanometer-range structural features and new structures designed and self-assembled atom by atom or molecule by molecule. Machines smaller than the tip of a pin can be built using either semiconductor materials processing or biologically inspired processing technology. This specialization is designed to give students the knowledge needed to work at the nanoscale, including design and synthesis, characterization, and theory/modeling/simulation of nanomaterials.

Polymeric Materials

Synthetic polymers offer the engineering community an ever-expanding array of materials having properties that are tailored by chemical and physical processing. New developments are opening up applications for polymers as high-strength, low-weight materials; optoelectronic components; and key materials in other revolutionary areas. The basic understanding of engineering properties in terms of multilevel microstructure is essential for the full utilization of polymers.

Surface Science

A solid communicates with the outside world through its surface. Wear, corrosion, and passivation are well-known surface processes. Chemical, electronic, and mechanical properties of materials depend critically on composition at surfaces and grain boundaries (internal surfaces), surface treatments, and the environment. The surface scientist must be able to not only determine the properties of surfaces or interfaces but also to control them.

Laboratories and Facilities

Materials science and engineering demands sophisticated experimental techniques for the preparation and characterization of advanced materials. The undergraduate program makes heavy use of state-of-the-art laboratory facilities in core courses, technical electives, and senior projects.

Materials preparation and processing equipment is available for all classes of materials, including an advanced crystal growth facility in a clean room environment for preparing single crystals of metals, oxides, alkali halides, and semiconductors. Investigation of complex microstructures employs a wide array of microscopy, diffraction, and microanalysis techniques. This features a unique combination of instruments (cold field-emission transmission electron microscope, atom-probe field-ion microscopes, scanning tunneling microscopes), providing atomic resolution imaging and chemical analysis, complemented by an extensive surface analytical laboratory. Characterization of material properties employs an advanced mechanical testing facility featuring static and dynamic loading under controlled temperature and environment. Specialized facilities measure electrical, spectroscopic, magnetic, and photonic properties. Computer laboratories and a design studio address thermodynamic modeling and simulation of microstructural evolution, with application in materials design.

Degree in Materials Science and Engineering

Requirements (48 units)

Core courses (32 units)

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses
- 4 basic science courses
 - PHYSICS 135-2,3
 - CHEM 101 and 103 *or* CHEM 171 and 172
- 3 design and communications courses
- 5 basic engineering courses:
 - *Fluids and solids*: CIV ENV 216 *or* 219
 - *Materials science and engineering*: MAT SCI 301
 - *Thermodynamics*: MAT SCI 314, 315
 - 1 course from BME 220; CHEM ENG 210, 312; CIV ENV 304, 306; EECS 202, 203, 205, 211, 221, 222, 223, 224, 230, 231, 270, 302, 328, 317; ES APPM 346; IEMS 201, 303, 310, 313, 326; MECH ENG 233, 359

- 7 social sciences/humanities courses
- 5 unrestricted electives

Major program (16 units)

- 11 required courses: MAT SCI 316-1,2, 331, 332, 351-1,2, 361, 390, 391, 396-1,2
- 5 technical electives
 - 5 courses in engineering, natural sciences (usually chemistry or physics), and mathematics chosen to fulfill an area of concentration
 - No more than 2 of the 5 units may be 200-level courses
 - At least 2 of the 5 must be 300-level materials science and engineering courses
 - Examples of programs for concentrations in biomaterials, design and manufacturing, electronic materials, metals and ceramics, nanomaterials, polymeric materials, and surface science are described in a departmental manual for degree candidates.

Courses

MAT SCI 101-0 Modern Materials and Society Introduction to materials — how they function, how they are made, the devices they enable, and their impact on society. Role of materials developments in technological innovation and global competitiveness. Prerequisites: high school mathematics and science background. Fulfills Weinberg College distribution requirements; not intended for engineering students.

MAT SCI 190-0 Materials Science and Engineering Freshman Projects Laboratory-oriented, with research projects emphasizing use of the scanning electron microscope and other modern apparatus; correlation of structure with other properties of materials. Lectures, laboratory.

MAT SCI 201-0 Introduction to Materials Introduction to atomic and molecular organization in solids, with emphasis on structure-property relations in ceramics, electronic materials, metals, and polymers. Not to be taken for credit with or after 203 or 301. Prerequisite: CHEM 102.

MAT SCI 301-0 Materials Science Principles Equilibrium and nonequilibrium development of microstructures. Mechanical behavior of metals, ceramics, and polymers. Corrosion and stability of engineering materials. Materials processing. Not to be taken for credit with or after 201 or 203. Prerequisite: CHEM 102.

MAT SCI 314-0 Thermodynamics of Materials Classical and statistical thermodynamics; entropy and energy functions in liquid and solid solutions, and their applications to phase equilibria. Lectures, problem solving. Materials science and engineering degree candidates cannot take this course for credit with or after CHEM 342-1.

MAT SCI 315-0 Phase Equilibria and Diffusion in Materials Application of thermodynamics to ternary phase equilibria. Defects and diffusion in solids. Interdiffusion. Short-

circuit diffusion. Defects and transport in ionic solids. Lectures, problem solving. Prerequisite: 314 or equivalent.

MAT SCI 316-1,2 Microstructural Dynamics Principles underlying development of microstructures. Defects, diffusion, phase transformations, nucleation and growth, thermal and mechanical treatment of materials. Lectures, laboratory. Prerequisite: 315 or equivalent.

MAT SCI 318-0 Materials Selection Methods of specifying materials and the processes for making them in the context of a given application. Service performance of materials based on their physical and chemical properties. Case studies and use of high-level databases. Prerequisite: 201.

MAT SCI 331-0 Soft Materials Different kinds of polymeric materials. Relationships between structure and physical properties; rubber elasticity, the glassy state, crystallinity in polymers. Lectures, laboratory. Prerequisites: 301 or equivalent; 314 or CHEM 342-1.

MAT SCI 332-0 Mechanical Behavior of Solids Plastic deformation and fracture of metals, ceramics, and polymeric materials; structure/property relations. Role of imperfections, state of stress, temperatures, strain rate. Lectures, laboratory. Prerequisites: 316-1,2; 316-2 may be taken concurrently.

MAT SCI 333-0 Composite Materials Introduction to ceramic-, metal-, polymer-matrix composites for structural applications. Emphasis on structure (reinforcements, architecture), properties (elasticity, strength, toughness, creep), processing, role of interface. Prerequisites: 316-1,2, 332.

MAT SCI 336-0 Chemical Synthesis of Materials The design of materials targeting important properties through processes that break and form primary chemical bonds. Fundamental principles and main methodologies, including polymerization, biosynthesis, self-assembly, sol-gel reactions, synthesis of nanomaterials, vapor phase synthesis, and composite synthesis. Prerequisite: junior standing in materials science and engineering or consent of instructor.

MAT SCI 340-0 Ceramic Processing Steps in production of fired ceramic articles. Powder preparation and characterization, compact formation, slip casting, extrusion and injection molding; firing, liquid-phase and solid-state sintering. Lectures, laboratory. Prerequisite: 316-1 or equivalent.

MAT SCI 341-0 Introduction to Modern Ceramics Applications of ceramic materials, with emphasis on structure (bond, crystal, glass, defect, micro-); properties (thermal, electrical, optical, magnetic, mechanical); and processing (powders, forming, densification). Prerequisites: 316-1,2 or consent of instructor.

MAT SCI 351-1,2 Introductory Physics of Materials Quantum mechanics; applications to materials and engineering. Band structures and cohesive energy; thermal behavior; electrical conduction; semiconductors; amorphous semiconductors; magnetic behavior of materials; liquid crystals. Lectures, laboratory, problem solving. Prerequisites: GEN ENG 205-4 or equivalent; PHYSICS 135-2,3.

MAT SCI 355-0 Electronic Materials Principles, models, and characterization of semiconductor materials. Crystal growth and doping. Diffusion, epitaxy, and monolithic processes. Current transport, nonequilibrium processes, thin films, low-mobility materials, and interfaces. Prerequisite: 316-1 or consent of instructor.

MAT SCI 360-0 Introduction to Electron Microscopy Theories and practice involved in application of scanning electron microscopy and transmission electron microscopy. Lectures, laboratory. Primarily for undergraduates and for graduate students in other departments. Prerequisites: 301; PHYSICS 135-2,3 or equivalent.

MAT SCI 361-0 Crystallography and Diffraction Elementary crystallography. Basic diffraction theory; reciprocal space. Applications to structure analysis, preferred orientation. Film and counter techniques. Lectures, laboratory. Prerequisites: GEN ENG 205-4; PHYSICS 135-2,3.

MAT SCI 362-0 Point, Line, and Planar Imperfections Introduction to point defects, dislocations, and internal interfaces in crystalline solids. Interactions among point, line, and planar imperfections. Metals, ionic solids, semiconductors. Prerequisite: 315.

MAT SCI 370-0 Biomaterials Introduction to biomaterials from a materials science perspective, focusing on synthesis, structure, and properties. Materials used for human repair (permanent implants, devices, materials for drug delivery, tissue-engineering scaffolds); naturally occurring and engineered materials synthesized through biotechnology; biomimetic materials that copy microstructures from nature.

MAT SCI 376-0 Nanomaterials Introduction to structure-property relationships of materials processed at the nanometer scale. This highly interdisciplinary course is appropriate for undergraduate and graduate students in other departments. Prerequisite: 351-1 or consent of instructor.

MAT SCI 380-0 Introduction to Surface Science and Spectroscopy Surface spectroscopy, including Auger spectroscopy, photoemission, and LEED. Surface dynamics and thermodynamics. Electronic properties of surfaces and interfaces. Gas-surface interactions. Prerequisite: 351-1 or equivalent.

MAT SCI 390-0 Materials Design Analysis and control of microstructures. Quantitative process/structure/property/performance relations with case studies. Computer lab for modeling multicomponent thermodynamics and transformation kinetics. Prerequisites: 315, 316-1,2, or consent of instructor.

MAT SCI 391-0 Process Design Processing of materials. Design and analysis of experiments to identify and optimize key parameters to control properties and performance. Resolving conflicting requirements. Statistical process control.

MAT SCI 394-0 Honors Project in Materials Science Independent study and/or research linked to 396. Comprehensive report on a specific area of modern

materials science and engineering. Prerequisite: registration in department honors program.

MAT SCI 395-0 Special Topics in Materials Science and Engineering Topics suggested by students or faculty and approved by the department.

MAT SCI 396-1,2 Senior Project in Materials Science and Engineering To be taken in two consecutive quarters. Independent basic or applied research project, conceived and performed under the direction of a department faculty member. Prerequisite: senior standing in materials science program.

MAT SCI 398-0 Introduction to Plasma Science and Processing Technology Plasma production, plasma properties (microscopic and macroscopic); plasma characterization, transport phenomena, plasma processing of powders and advanced materials.

MAT SCI 399-0 Special Problems in Materials Science Individual problems, including library and design work; comprehensive report on a specific phase of modern materials science. Credit to be arranged.

MECHANICAL ENGINEERING

www.mech.northwestern.edu

The Department of Mechanical Engineering offers a broad range of programs leading to the bachelor of science degree in mechanical engineering.

Mechanical engineering has always meant engines and machinery, but the character of modern engines and machinery has changed enormously because of the ever-increasing demands of performance, compactness, reliability, and productivity. The early devices were built by ingenious mechanics, individuals who possessed the know-how to reduce these ideas to practice. Today, traditional know-how and creative ability are as necessary as ever but no longer sufficient in an increasingly competitive world. It has become necessary to also know why things occur and thus to be able to exert the proper guidance at the earliest stages of planning. Furthermore, in a world of finite resources and in a society increasingly aware of its environment, mechanical engineers must cope with not only the traditional concerns of efficiency and safety but also the undesirable effects of pollution. Clearly, the tools that future mechanical engineers need to possess must be more sophisticated to allow the important but ever-subtle effects to be recognized and controlled.

Mechanical engineering plays a dominant role in a wide spectrum of industries, among them the transportation industry (automotive, rail, air, and marine), heavy machinery (machines producing other machines), the power industry, the environmental industry (heating, ventilation, and air-conditioning), robotics, the light precision-machine enterprises (optical, prosthetic devices, mechanical instruments, and the like), and numerous commercial product industries. Preparation for a career in mechanical engineering requires a basic understanding of the mathematical, physical, and engineering principles

essential to planning, designing, and manufacturing new equipment.

The curriculum in mechanical engineering provides a broad fundamental education preparing students for direct entry into industry as well as further professional study. The first part of the curriculum is devoted to mathematics, physics, and chemistry. With this background, fundamental mechanical engineering subjects are studied. These include dynamics, solid mechanics, fluid mechanics, and thermodynamics followed by specialized subjects such as manufacturing, heat transfer, and automatic control. During the final two years, design courses, laboratory courses, and project courses allow students to acquire a taste for the complex task of designing, analyzing, and building a piece of "hardware." In particular, students become aware of the relationships among conceptual design, subsequent analysis (mathematical modeling), manufacturing, systematic experimentation, and final testing. Supporting courses in allied fields of science and engineering broaden the technical proficiency of mechanical engineering, while the elective courses in social sciences, fine arts, history, and philosophy enlarge their background in the problems of humanity.

Elective Concentrations

The program in mechanical engineering is designed to appeal to students with a wide variety of interests and professional goals. By choosing the 5 required elective courses wisely, students can develop a highly personalized curriculum. Some areas of concentration are computer-aided design/computer-aided manufacturing, fluid mechanics, robotics, systems and control, and tribology. In addition, there are special concentrations: biomedical engineering, design, energy, intelligent mechanical systems, manufacturing, nanotechnology/MEMS, and solid mechanics.

The biomedical engineering concentration is open to students interested in the biological and medical applications of mechanical engineering procedures. Students in this concentration can also satisfy the entrance requirements of medical schools.

The design concentration focuses on product design with related conceptual and manufacturing processes.

The energy concentration emphasizes the mechanical aspects of energy conversion and management.

The intelligent mechanical systems concentration focuses on the design of devices featuring mechanical hardware interfaces to electronic hardware and software.

The manufacturing concentration is directed toward planning and selecting manufacturing methods, design for manufacture, computer-aided flexible automation and robotics, and increased efficiency and productivity of current and emerging manufacturing technologies.

The nanotechnology/MEMS concentration focuses on engineering at nanometer- and micrometer-length scales,

including properties of materials and design and fabrication of devices.

The solid mechanics concentration focuses on the study of stress and strain in solid bodies, along with the application of computational methods for stress analysis.

A listing of courses that satisfy the elective requirements may be found in the department office.

Facilities

A detailed description of facilities in the reconstructed mechanical engineering laboratories is available in the department office.

Degree in Mechanical Engineering

Requirements (48 units)

Core courses (32 units)

See general requirements on page 191 for details.

- 4 mathematics courses
- 4 engineering analysis and computer proficiency courses
- 4 basic science courses:
 - PHYSICS 135-2,3
 - 2 courses from CHEM 101, 102, 103, 171, 172, 210-1,2
- 3 design and communications courses
- 5 basic engineering courses
 - *Electrical science*: MECH ENG 233 (students planning to take advanced EECS courses may substitute EECS 221)
 - *Fluids and solids*: CIV ENV 216; MECH ENG 241
 - *Materials science and engineering*: MAT SCI 201
 - *Thermodynamics*: MECH ENG 220 (may not be taken with CHEM 342-1 or CHEM ENG 211)
- 7 social sciences/humanities courses
- 5 unrestricted electives

Major program (16 units)

- 7 required courses: MECH ENG 202, 224, 240, 315, 340-1, 377, 390
- 4 advanced study courses, at least 1 course from each group:
 - *Design*: MECH ENG 340-2, 366, 398
 - *Dynamics/controls*: MECH ENG 314, 363, 391
 - *Mechanics*: MECH ENG 362, 365; CIV ENV 327
 - *Thermofluid science*: MECH ENG 370, 373
- 5 electives
 - 2 300-level mechanical engineering courses
 - 1 200- or 300-level technical elective
 - 2 300-level technical electives
 - At least 1 unit must be in mathematics or basic sciences; it may be chosen from IEMS 201 or 202; 200- or 300-level courses in biological sciences, chemistry, earth and planetary sciences, or physics and astronomy; or 300-level courses in mathematics, applied mathematics, or statistics (*Exceptions*: BIOL SCI 307, CHEM 393, PHYSICS 301).

- No more than 2 units of 399 are allowed.
- Students are encouraged to concentrate electives in areas of interest. A list of seven areas of concentration, including appropriate courses and descriptions, is available from the department office.

Courses

MECH ENG 201-0 Mechanics I Equivalent force systems. Equilibrium of rigid bodies. Distributed forces and centers of gravity. Kinematics of rigid bodies in planar motion. Prerequisites: PHYSICS 135-1; concurrent registration in MATH 234.

MECH ENG 202-0 Mechanics II Dry friction. Kinetics of rigid bodies in planar motion. Kinetics of particles. Moments of inertia of rigid bodies. Prerequisite: GEN ENG 205-4.

MECH ENG 220-0 Thermodynamics I Basic definitions; Zeroth Law and the meaning of temperature; the First Law applied to flow and nonflow processes; the Second Law and its applications; properties of pure substances; equations of state, the Third Law of Thermodynamics, and introduction to cycles. Prerequisites: GEN ENG 205-3; concurrent registration in MATH 234.

MECH ENG 224-0 Experimental Engineering I Modern electronics; analog and digital circuit construction and conversion. Modern data acquisition involving temperature measurements, control of stepper motors, transient heat transfer, fluid mechanics, deformation of beams. Prerequisites: 220 and 241; 233 or EECS 270; 262 or CIV ENV 216.

MECH ENG 233-0 Electronics Design Design and prototyping of analog and digital electronic circuits using semiconductor devices: diodes, transistors, op amps, logic chips, etc. Optical and other sensors, power electronics, filters, and feedback control. Intended for engineers in all disciplines. Extensive hands-on construction and debugging.

MECH ENG 240-0 Introduction to Mechanical Design and Manufacturing Introduction to strategy and methods of designing, manufacturing, and testing of mechanical products. Material properties and selection methodology, engineering drawing and CAD, and simple manufacturing processes. Prerequisite: MAT SCI 201; CIV ENV 216.

MECH ENG 241-0 Fluid Mechanics I Fundamentals of fluid mechanics. Properties and statics of fluids. Kinematics and dynamics of fluid motion — continuity, momentum, and energy equations. Dimensional analysis, flow in closed conduits. Prerequisites: GEN ENG 205-4.

MECH ENG 260-0 Mechanics of Sports Applications of mechanics and mathematical modeling to sports: baseball, basketball, golf, soccer, swimming, running, and others. Introduction to the biomechanics of sports. Prerequisites: GEN ENG 205-2; MATH 230; or high school physics and consent of instructor.

MECH ENG 262-0 Stress Analysis and Finite Elements I Analytical and numerical methods for study of strains,

stresses, and deformations in solids, with applications to design of mechanical components subjected to static and repeated loads. Prerequisite: GEN ENG 205-3.

MECH ENG 314-0 Theory of Machines — Dynamics Three-dimensional kinematics: rotation axes and mechanism analysis, rotation matrices and Euler's angles for rigid bodies. Three-dimensional kinetics: dynamics of particles, central force problems, dynamics of rigid bodies, rotational inertia matrices and principal axes, dynamics of mechanisms, the gyroscope and other torque-free problems. Prerequisite: 202.

MECH ENG 315-0 Theory of Machines — Design of Elements Factors influencing the proportioning of machine elements — stresses, deformations, and failure criteria as applied to shafts, springs, belts, bearings, gears. Lectures, laboratory. Prerequisite: MAT SCI 201; CIV ENV 216.

MECH ENG 316-0 Mechanical Systems Design Design of mechanical systems such as cams, multibar linkages, and precision machines. Design principles and best practices. Case studies and team-based projects. Prerequisite: 315.

MECH ENG 317-0 Molecular Modeling and the Interface to Micromechanics Introduction to modern computational methods for calculating thermodynamic, transport, and structural properties of materials. Computational chemistry, molecular simulation, and mesoscopic methods, with emphasis on tribology applications.

MECH ENG 318-0 Multiscale Simulations Introduction to multiscale modeling and simulation methods for studying material interactions in micro- and nanomechanical systems, as well as in electronic packaging. Hands-on exercises using equipment to characterize nanoscale properties and parallel computer codes.

MECH ENG 319-0 Applications of Surface Science to Nanomechanics and Nanotribology Overview of the composition, structure, chemical, and mechanical properties of surfaces and how they affect surfaces mechanically and tribologically.

MECH ENG 320-0 Micro- and Nanomechanical Properties of Surfaces Micro- and nanomechanical interactions between surfaces, fractal nature of surfaces, interfacial forces, principles of micromechanics, characterization of surfaces using atomic-force microscopy, optical interferometry, and nanoindentation.

CIV ENV 327-0 Finite Element Methods in Mechanics See Civil Engineering.

MECH ENG 333-0 Introduction to Mechatronics Introduction to microprocessor-controlled electromechanical systems. Interfacing sensors and actuators to computers, electrical and mechanical prototyping, dissection of a commercial product. Final team project. Prerequisite: 233, EECS 221, or consent of instructor.

MECH ENG 340-1,2,3 Computer-Integrated Manufacturing Use of computers to improve productivity and reduce costs in the manufacture of discrete parts and assemblies.

1. Manufacturing processes: Analysis and evaluation of process usage in the contemporary manufacturing environment. Prerequisite: 240 or consent of instructor.

2. CAD/CAM: Geometric modeling, dimensioning systems, tolerances, design for manufacture, programming of machine tools. Prerequisites: 340-1; 262 or CIV ENV 216; or consent of instructor. **3. Manufacturing automation:** sensors, actuators, and computers for automation; principles of computer control; programmable logic controllers; robotic devices; assembly automation. Prerequisite: 340-2 or consent of instructor.

MECH ENG 341-0 Computational Methods for Engineering Design Introduction to a wide range of computational techniques for engineering design. Modeling, simulation, optimization, design software, examples, and projects with emphasis on computational techniques for design and manufacturing related applications. Prerequisite: senior standing or consent of instructor.

MECH ENG 342-0 Mechanics of Cutting and Forming Introduction to plasticity theory applications to simple cutting and forming processes. Process analysis and design: force estimation, friction and redundant work effects, temperature-generated defects, and process and equipment limitations. Prerequisites: 262 or CIV ENV 216; senior standing.

MECH ENG 346-0 Introduction to Tribology Fundamentals of surface contact: surface topography, asperity contact, interfacial phenomena. Friction theories and wear mechanisms. Temperatures in sliding contacts. Hydrodynamic, hydrostatic, elastohydrodynamic, and boundary lubrication.

MECH ENG 358-0 Experimental Engineering II Optical metrology. Stress analysis, fluid flows, combustion, dynamics, and control. Use of optical interferometry, anemometers and pitot tubes, accelerometers, and other advanced measurement devices.

MECH ENG 359-0 Reliability Engineering Probability concepts and random variables. Failure rates and reliability testing. Wear-in, wear-out, random failures. Probabilistic treatment of loads, capacity, safety factors. Reliability of redundant and maintained systems. Fault tree analysis. Prerequisite: GEN ENG 205-4.

MECH ENG 362-0 Stress Analysis Theory of elasticity: elastic stability, principle of minimum potential energy, Rayleigh-Ritz methods. Introduction to finite element methods of stress analysis: computer implementation and use of commercial codes. Structural analysis of rods, beams, columns, and plates. Prerequisite: 262 or CIV ENV 216.

MECH ENG 363-0 Mechanical Vibrations Analysis of vibrations in single- and multidegree-of-freedom systems. Free and forced vibrations with various types of damping. Response to steady-state and transient excitations. Prerequisites: 202; GEN ENG 205-4.

MECH ENG 365-0 Finite Elements for Stress Analysis

Introduction to the finite-element method for stress analysis, with emphasis on linear elasticity. Computer implementation of finite-element techniques: finite-element code development and modification; use of commercial codes. Prerequisite: 262, MATH 234, or CIV ENV 216.

MECH ENG 366-0 Finite Elements for Design and

Optimization Numerical methods for interaction and optimal CAD. Fully stressed design; design sensitivity analysis and descent methods; optimality criteria to automated design. Prerequisites: senior standing; 365 or consent of instructor.

MECH ENG 370-0 Thermodynamics II Elementary classical thermodynamics, application of first and second laws of thermodynamics to power and refrigeration cycles, mixtures and solution, thermodynamic relations, chemical reactions, phase and chemical equilibrium. Prerequisite: 220.

MECH ENG 373-0 Engineering Fluid Mechanics Laminar and turbulent duct flows. Boundary layers and potential flows. Lift and drag forces. Thermodynamics and mechanics of compressible flow. Nozzle flows and choking. Wave motion and shock waves. Applications to fluid machinery. Prerequisite: 220, 241, or equivalent.

MECH ENG 377-0 Heat Transfer Fundamentals of heat transfer by conduction, convection, and radiation. Steady and transient heat conduction in solids. Forced and free convection in fluids. Properties of thermal radiation. Radiation heat transfer between solids. Solar radiation. Prerequisite: 241.

MECH ENG 379-0 Elements of Combustion Engineering Introduction to combustion processes, providing an understanding of flame processes as they relate to efficiency and pollution due to propulsion and power-generating systems. Diffusion and premixed flames, problems of ignition, quenching, flammability limits, and detonation. Prerequisite: senior standing in mechanical engineering or consent of instructor.

MECH ENG 381-0 Introduction to Microelectromechanical Systems (MEMS) Introduction to microelectromechanical devices, with an emphasis on their manufacturing and mechanical behavior. Materials properties, microfabrication technology, mechanical behavior of microstructures, design, and packaging. Case studies on sensors, wireless communications, fluidic systems, microengines, and biological devices. Prerequisites: CIV ENV 216 or consent of instructor.

MECH ENG 382-0 Experiments in Micro- and Nanoscience and Engineering Interdisciplinary topics spanning the physical and biological sciences and engineering. Seven integrated labs in which students acquire hands-on experience in various aspects of micro- and nanoscience and engineering: clean-room microfabrication, flow visualization in microchannels, nanomechanics, AFM and dip-pen nanolithography, multiphysics computational tools, and

experimental techniques to evaluate micro- and nanoscale devices. Prerequisites: 381 or consent of instructor.

MECH ENG 385-0 Nanotechnology Manipulation of matter at the nanometer-length scale to produce useful devices and materials. Scientific and engineering properties of nanoscale systems. Emphasis on development of new techniques.

MECH ENG 389-0 Molecular Machines in Biology

Introduction to engineering principles that govern cellular activities at the molecular level. Particular emphasis on the dynamics and kinematics of proteins, especially those that are locomotory or force generating. Lectures, team projects, and presentations. Prerequisite: MATH 230 or consent of instructor.

MECH ENG 390-0 Introduction to Dynamic Systems

Modeling the dynamic behavior of physical systems. Concepts of causality, dependent and independent storages, and state. Introduction to bond graphs. Generation of state equations; analytical and computer simulation of system behavior. Application to problems of engineering interest. Prerequisite: GEN ENG 205-4.

MECH ENG 391-0 Fundamentals of Control Systems

Mathematical modeling of automatic control systems. Open-loop and closed-loop control. Laplace transform techniques and transfer functions. Stability. Root locus technique, Bode plots, Nyquist criterion. Approaches to control system design, including PID and lead-lag compensation. Not to be taken for credit with or after EECS 360. Prerequisite: 390 or consent of instructor.

MECH ENG 395-0 Special Topics in Mechanical Engineering

Topics suggested by students or faculty members and approved by the department.

MECH ENG 398-0 Engineering Design Product or system design projects carried out by small student groups. Project definition, conceptual and detailed design, evaluation, and documentation. Prerequisite: senior standing.

MECH ENG 399-0 Projects Special studies to be done under faculty direction. Credit to be arranged.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

Medill School of Journalism

www.medill.northwestern.edu

The Medill School has pioneered advances in journalism and marketing communications education for almost nine decades. Now, as the media face unprecedented change, Medill's undergraduate program is leading the way in preparing multimedia journalists who can help shape and navigate a dynamic media landscape. A Medill education ensures that students become skilled not only in writing, reporting, editing, production, and critical thinking but also in using multiple platforms (print, online, broadcast, and wireless) so that they can create compelling, high-impact journalism for increasingly interactive audiences.

Producing such versatile graduates requires broad faculty expertise. Medill is the only school in the country with a faculty ranked as a standard-setter in teaching both journalism and integrated marketing communications (IMC). Its Media Management Center is world renowned for its groundbreaking media and communications research on what motivates readers, viewers, and listeners to use news media and for its work with industry professionals and leaders. Building on these strengths, the Medill curriculum emphasizes journalism excellence, multimedia storytelling, ethics and professional behavior, audience understanding, research, quantitative literacy, visual literacy, and creativity.

The bachelor of science in journalism (BSJ) degree program develops well-rounded students who are broadly educated in the liberal arts and sciences, knowledgeable about diverse cultures and the world beyond the United States, and ready for careers in traditional and non-traditional media and communications. Core journalism courses make up 30 percent of the curriculum, with opportunities to take 2 to 4 journalism electives that develop specialized skills and knowledge.

Medill's valuable "learn-by-doing" philosophy extends beyond the traditional classroom to real-world training and immersion experiences. In a sophomore-year course, for instance, students report from storefront newsrooms in Chicago. One of the cornerstones of the Medill curriculum, this course sharpens students' reporting and writing skills by sending them into diverse neighborhoods to discover issues important to particular audiences and to produce relevant and engaging multimedia stories.

During their junior or senior year, students participate in the Journalism Residency, an academic internship that gives them invaluable real-world experience and networking potential within a media company. They receive course credit for working alongside professional mentors in one

of more than 100 newspapers, magazines, broadcast stations, public relations/marketing firms, and online news operations across the United States and selected locations abroad, including South Africa and Latin America.

Medill also offers a 5-unit certificate program in integrated marketing communications in which students develop skills for understanding and analyzing consumers in traditional markets and evolving digital communities and networks. Learning about message creation and delivery through a wide variety of media channels, they obtain the basic qualitative and quantitative analytical skills necessary in this field.

In 2008 Northwestern opened a branch campus in Qatar, where programs in journalism and communication are offered. As these programs develop, journalism students in Evanston may be eligible to spend a semester in Qatar to take electives and courses at other universities. Journalism Residencies are also available in the Persian Gulf as a result of Medill's presence in the region. (For more on Northwestern University in Qatar, see page 9.)

Many Medill students find jobs in print, broadcast, or online journalism, public relations, or related fields directly after graduation. Some pursue graduate programs in medicine, law, and other fields, including the graduate programs at Medill. Medill offers two graduate programs. The master of science in journalism (MSJ) program offers advanced study in specialized subject reporting (such as business, politics, or science) and techniques (such as magazine writing and editing, interactive media, and videography). A separate track in the MSJ program provides seasoned professionals with advanced education in journalism, IMC, and media management. The master of science in IMC program has five specialized concentrations: brand strategy and advertising, direct and interactive marketing communications, corporate communications and public relations, marketing analytics, and media management.

Medill graduates stand among the leaders of the journalism and IMC professions. The school's 950 students — 650 undergraduates and 300 graduate students representing nearly every one of the United States and many countries — take pride in its ranking as one of the nation's preeminent journalism centers. They continue to distinguish Medill by winning national awards such as the Hearst Foundation's Journalism Awards and the Scripps Howard Foundation's "Top Ten Scholars" competition.

ACADEMIC POLICIES

Requirements for the Degree of Bachelor of Science in Journalism

All undergraduates in the Medill School of Journalism pursue the bachelor of science in journalism degree. To earn the degree, students must complete a minimum of 45 units. In addition to their studies in journalism, students acquire a strong background in the arts and sciences. The following policies apply:

- Students must take the final 23 units at Northwestern and must complete the last three quarters of work while enrolled at Medill. (Exceptions: Students who are enrolled in a study abroad program that has been approved in advance by Northwestern's Study Abroad Office and by Medill are exempt from this requirement. Credit for summer work taken at other colleges or universities may be counted as part of the final 23 units if approved in advance by Medill.) In addition to and independent of the requirements set by Medill, all students must satisfy the Undergraduate Residence Requirement. (See page 17.)
- Of the 45 units, at least 31 must be earned in courses outside of Medill, and at least 12 must be earned in Medill courses. Students with more than 45 units may take additional journalism units.
- Students complete 12–14 journalism courses, including a 5-course Journalism Residency with a focus on newspaper/online journalism, magazine journalism, or broadcast journalism.
- Exceptions to any degree requirements must be approved by Medill's senior director of undergraduate education and teaching excellence. Petitions and rules for filing petitions are available in the Medill Office of Student Life.
- No course may be counted in more than one requirement category, with the following exception: Medill students completing a double major in Weinberg College may apply courses used to meet Medill's distribution requirements toward the second major. Courses used for Medill's 3-unit social science concentration may not be applied to a Weinberg College major (except those requiring related courses) or minor.
- When journalism courses are repeated, both grades are computed in the GPA; one course does not substitute for another.
- Before starting the Journalism Residency, students must
 - Earn a grade of C or better in JOUR 301 Enterprise Reporting in Diverse Communities and in the presentation and storytelling courses taken before the residency.
 - Have a minimum GPA of 2.25 in those three courses plus JOUR 201-1 Reporting and Writing and JOUR 201-2 Multimedia Storytelling.
- Students may earn grades of C– or worse in no more than one-fifth of the courses taken at Northwestern and offered for graduation.
- All Y and X grades, unless made up satisfactorily by the end of the subsequent quarter, are counted as F's.
- Students who do not meet the minimum GPA requirements are placed on academic probation. Continued poor performance will result in further academic disciplinary action, including academic probation or dismissal.
- Medill undergraduates are required to take the following courses for letter grades (A, A–, B+, B, B–, C+, C, C–, D, F):
 - All distribution requirements
 - All courses in the social science concentration
 - All journalism courses (except for the Journalism Residency and courses offered by the faculty under the P/N option)
- Other courses may be taken pass/no credit (P/N) if that option is available. No more than 3 courses taken P/N may be counted toward the 45 units required for graduation (excluding the Journalism Residency). Only 1 course per quarter may be taken P/N.

Academic Warning, Probation, and Dismissal

The University's policies about academic probation and dismissal are given on page 23 of Undergraduate Education chapter. Medill adheres to these policies with the following exceptions and additions:

- A warning letter is sent by e-mail when the student
 - Has a one-quarter GPA of below C (2.0), but has a cumulative GPA of above 2.5.
 - Receives one grade of X or Y.
 - Merits any reason for probation during his or her first two quarters at Northwestern.
- Academic probation occurs when, in addition to the circumstances stated on page 23, the student
 - Fails to maintain a C+ average (2.25) in journalism classes.
 - Receives a D or an F in a journalism class.
 - Fails to fulfill the journalism curriculum requirements.
 - Receives more than one grade of X or Y in any one quarter.
 - Has earned consistently lower grades.

Grade Requirements

Students must achieve a minimum grade point average (GPA) of 2.00 in all nonjournalism courses taken for a letter grade and a minimum GPA of 2.25 in journalism courses. In addition, all journalism students are subject to the following grade requirements:

- The journalism GPA is an average of the grades (including F's) in all journalism courses attempted.
- Students who earn a grade of D or worse in a journalism course must retake the course until they have earned a C– or better.

- Students receiving academic warning or probation must meet with their advisers and/or the senior director of undergraduate education to develop a plan for improvement.

Early Graduation

Students who plan to graduate early must notify the school in writing at least three quarters before the expected date of graduation. These students also should check with the Office of the Registrar to make sure they have fulfilled the Undergraduate Residence Requirement (see page 17).

Medill Integrity Code

All Medill students are required to uphold the Medill Integrity Code, which, among others things, requires adherence to principles of honesty, fairness, and integrity in academic efforts and related professional media, journalism, and marketing communications work, whether students are in school, on an internship or a job, or acting as volunteers in a professional or academic activity.

ACADEMIC OPTIONS

Accelerated Master's Program

Students who exhibit exceptional ability in undergraduate work may apply to Medill's graduate division for early admission to the graduate journalism program. This program allows students to earn bachelor of science in journalism and master of science in journalism degrees in less than five years, or 12 to 15 quarters of full-time study. Candidates apply during their junior year and are admitted after the Journalism Residency on the basis of academic excellence and promise of success in journalism. Interested students are encouraged to begin planning for this option early in their undergraduate careers. Information and admission materials are available from the Medill Office of Graduate Admissions and Financial Aid.

Dual Bachelor's Degree Program

Northwestern offers extremely talented students the opportunity to earn in five years both a BSJ from the Medill School of Journalism and a BMus or BAMus degree from the Bienen School of Music. This dual bachelor's degree program is intended to prepare exceptional students for journalism careers emphasizing music and arts reporting. Prospective students typically apply to this joint program while applying for undergraduate admission to Northwestern (see page 11). For a detailed description of the dual degree program, see page 28 in the Cross-School Options chapter.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

Integrated Marketing Communications Certificate Program

The integrated marketing communications (IMC) certificate program focuses on effective marketing communications strategies, tactics, and tools for an increasingly consumer-controlled environment. It prepares students for entry-level marketing communications positions in such fields as advertising, public relations, corporate communications, and direct, database, e-commerce, and interactive marketing. All students are eligible to apply to the certificate program, but qualified BSJ students in Medill receive priority. See page 234 for more information.

Medill Undergraduate Program in Washington, D.C.

A select group of Medill students may study for one quarter in Medill's Washington, D.C., news bureau. The 15 students in the program take 2 intensive journalism courses (a two-day reporting experience covering Capitol Hill as mobile journalists, producing up-to-the-minute political stories for Medill's Washington, D.C., web site [<http://news.medill.northwestern.edu/390>], and a one-day political reporting seminar) and a political science course approved by Weinberg College.

This interdisciplinary program exposes students to the challenging dynamics of Capitol Hill, public policy, political organizations, think tanks, and federal agencies. It is best suited to students interested in learning more about the political process and covering important national and global issues from the nation's capital in a rigorous, web-driven reporting environment.

Internships, Field Studies, and Special Programs

Internship employment by newspapers, magazines, radio and television stations, online media, governmental agencies, and advertising and public relations agencies may be available to Medill students, particularly during the summer. Many employers look to Medill for talented young journalists who can be introduced to their organizations through internships. The school encourages these opportunities as a means of enriching students' education but gives academic credit only for the Journalism Residency.

Medill students also may seek internship or field study credit through other schools at Northwestern. If these experiences involve work in journalism (newspaper, magazine, radio, television), mass communications, public relations, advertising, and/or direct marketing, students must receive prior approval from Medill's senior director of undergraduate education and teaching excellence before applying internship or field study credit to the 45 units required for the BSJ degree.

Other Undergraduate Programs

Students in the Medill School also may enroll in courses offered by the Center for the Writing Arts (see page 32), the Undergraduate Leadership Program (see page 32), and

the adjunct majors in international studies (see page 109) and legal studies (see page 113), among other areas.

ROTC Course Credits

ROTC course credits may be used as a portion of the 45 units required for graduation. These units are considered elective courses.

STUDENT RESOURCES

Advising

A student entering Medill is assigned a faculty adviser. The adviser offers support and guidance and is a valuable source of information regarding Medill courses and career goals. First-year students are required to meet with their advisers three times and to spend one quarter in an adviser-led discussion section of JOUR 202 Introduction to 21st-Century Media.

Staff members in Medill's Office of Student Life help students make the most of their time at the University. They assist students with a variety of issues, including course planning, degree requirements, registration, study abroad, interschool transfers, petitions to graduate, and resources within and outside Medill.

Medill Career Services helps students with career advising and employment services. It works with academic departments and individual faculty members, student services, employers, alumni, and other constituencies to enhance student and alumni career development. Career Services staff members provide information on careers, jobs, and internships through e-mails, an interactive web site, presentations, various campus media, and outreach and orientation programs.

Activities

Through student publications and broadcast media, professional organizations, and convocations, Medill students have many journalistically related opportunities outside of the classroom.

Students write, edit, and manage the *Daily Northwestern*, *North by Northwestern*, and a variety of other print and online campus publications during the academic year as well as during Summer Session, when they publish the *Summer Northwestern*, a weekly newspaper. Although the University awards no academic credit for work on student-run publications since they have no formal connection with Medill, these publications do provide valuable real-world experience to complement course work, Journalism Residencies, and summer internships.

Radio station WNUR-FM provides another outlet for student reporters, sportscasters, editors, and commentators, as does Northwestern News Network, a student-produced news program aired on local and Chicago public access and cable television channels and online. Writing skills are helpful in other extracurricular activities such as

student government, the Waa-Mu Show, student-planned colloquia, and various literary publications.

Professional organizations that promote high standards among journalists maintain chapters on campus, including the Society of Professional Journalists, the National Association of Black Journalists, the Asian American Journalists Association, the National Association of Hispanic Journalists, and the National Lesbian and Gay Journalists Association. Other organizations for students interested in journalism include Blackboard and the Communications Residential College. Top scholars in the senior and graduate classes are initiated into Kappa Tau Alpha, the national journalism honorary society.

ACADEMIC OFFERINGS

JOURNALISM PROGRAM

Major in Journalism (45 units)

All Medill students pursue a major in journalism.

Arts and sciences requirements (23 units)

Students take 23 courses in the arts and sciences: 14 distribution requirements, a 3-course social science concentration, and a 6-course elective concentration. See the *Medill Undergraduate Handbook* for a complete list of courses that fulfill these requirements.

Distribution requirements (14 units)

- 1 art or art history course
- 1 economics course
- 3 history courses; at least 1 course must be in U.S. history and at least 1 course in non-U.S. history
- 3 literature courses chosen from any department in the University dealing with literature, either in English or in a foreign language
- 2 political science courses: 1 course in American government and 1 course in international relations or international studies
- 1 religion, philosophy, or ethics course (not including courses in logic)
- 3 science, mathematics, or logic courses
 - 1 course in statistics chosen from ANTHRO 362; BME 220; IEMS 201; MATH 202, 285; POLI SCI 310, 311, 312, 315; PSYCH 201; SESP 210; SOCIOL 226, 303, 329
 - 2 courses in astronomy, biological sciences, chemistry, computer science, electrical engineering and computer science, geological sciences, mathematics, or physics or from the list above or chosen from ANTHRO 213, 306, 310, 312, 313, 314, 315, 317; CIV ENV 206; COG SCI 210, 211; GEOG 210, 211, 235, 313, 341; MAT SCI 101; PHIL 150, 250, 350, 351, 352; PSYCH 212, 337

Social science concentration (3 units)

- 3 courses in anthropology, economics, gender studies, history, political science, psychology, or sociology
 - No more than 1 unit may be at the 100 level.
 - At least 1 unit must be at the 300 level.
 - No more than 1 unit of field study or independent study credit and no AP credits may be applied toward the social science concentration.
- Students may not double-count economics, history, or political science courses toward both the distribution requirements and the social science concentration.
- Students should check with an adviser about whether the social science courses they have chosen also meet the global and diverse cultures requirement.
- INTL ST 201-1,2 may be counted toward the social science concentration in political science.

Elective concentration (6 units)

- 6 courses in any Weinberg College department outside the area selected for the 3-unit social science concentration
 - No more than 1 unit may be at the 100 level.
 - At least 2 units must be at the 300 level.
 - No more than 1 unit of field study or independent study credit and no AP credits may be applied toward the elective concentration.
- Exempt from these requirements are students concentrating in astronomy, biological sciences, chemistry, geological sciences, mathematics, physics, or a foreign language and students completing a minor, a second major, or an adjunct major in Weinberg College. Permission to pursue a minor or a second or adjunct major must be secured from the appropriate Weinberg College department.
- Students should check with an adviser about whether the courses they have chosen also meet the global and diverse cultures requirement.

Elective requirement (8–10 units)

Students take 8 to 10 non-Medill credit courses to explore or extend their interests.

Global and diverse cultures requirement

The Medill faculty believes that all students should understand and appreciate diverse cultures and the world beyond the United States, and thus has established the global and diverse cultures requirement:

- 11 of the courses chosen to meet the arts and sciences and elective requirements must relate to the study of global and diverse cultures.
 - 3 courses must be in a foreign language, unless students can demonstrate proficiency as defined by Weinberg College.
 - 8 courses must focus on one or more of the following themes: gender, race, age, class, ethnicity, religion, or disability.

- Students choose from a Medill-approved list of courses offered throughout the University but may appeal to Medill's senior director of undergraduate education and teaching excellence if they believe other courses qualify; JOUR 301, 372, and the 390 section Connecting with Immigrant and Multiethnic Communities also count toward this requirement.

Major requirements (12–14 units)**Core courses (5 units)**

- *Freshman year:* JOUR 201-1,2; 202
- *Sophomore year:* JOUR 301
- *Junior year:* JOUR 370

Journalism Residency (5 units)

- *Newspaper/Online:* JOUR 310; 320, 321, or 322; 1 or 2 units of 345 and 346 for a total of 3 courses
- *Magazine:* JOUR 311; 320, 321, or 322; 1 or 2 units of 355 and 356 for a total of 3 courses
- *Broadcast:* JOUR 312; 320, 321, or 322; 1 or 2 units of 365 and 366 for a total of 3 courses

Electives (2–4 units)

Students must take at least 2 journalism electives. Electives may be taken as early as sophomore year — particularly if students take 4 electives — and may be chosen regardless of a student's Journalism Residency program. For example, a student pursuing a Journalism Residency in broadcast may take courses in magazine writing, newspaper reporting, investigative journalism, IMC, audio and video, or a combination. JOUR 390 Special Topics courses may be counted as electives.

Courses

JOUR 201-1 Reporting and Writing Introduction to the fundamentals of journalism necessary for any platform or storytelling format. Includes news and information gathering; story construction; using basic numbers and data to tell a story and assess information; editing and presentation; ethical issues while covering stories; and visual literacy. The course emphasizes drills and practice in basic reporting and writing skills and working on deadline.

JOUR 201-2 Multimedia Storytelling Introduction to multimedia skills and how to use them to create more effective web-based journalism. Skills include still photography, photo editing, audio recording, audio editing, audio slide-shows, video shooting, video editing, video storytelling, web page creation and design, and basic exposure to Flash. Prerequisite: 201-1.

JOUR 202-0 Introduction to 21st-Century Media Exposes students to the range of journalism genres and media in which they are practiced; how and why journalism practices and industries have evolved and continue to evolve in the digital age; how people access, use, and participate in news and information. Includes modules on ethical decision making and professional behavior. The course connects current trends with the history of journalism.

JOUR 301-0 Enterprise Reporting in Diverse Communities

Advanced-skills course on in-depth multimedia reporting and storytelling. By getting to know a specific audience within a Chicago neighborhood and experimenting with a variety of storytelling techniques, students produce cross-platform content for print, broadcast, and the web. The course also provides training in reporting for and about diverse audiences. Prerequisites: JOUR 201-1,2 and sophomore standing.

JOUR 310-0 Media Presentation: Newspaper/Online Essentials of newspaper editing and online production, including headlines, page layout and design, photo editing, information graphics, and appropriate electronic tools. Prerequisite: JOUR 301.

JOUR 311-0 Media Presentation: Magazine Fundamentals of editing magazine copy and graphics, with emphasis on precision, style, and structure for print and online products. Provides an overview of the magazine industry — both traditional and increasingly interactive — and the role of magazines in society. Prerequisite: JOUR 301.

JOUR 312-0 Media Presentation: Producing for Broadcast and the Web Writing and producing broadcasts for television, the web, and alternative digital platforms (such as PDAs) using the appropriate computer and editing equipment, news wires, and video feeds. Emphasis on the editorial decision-making process. Prerequisite: JOUR 301.

JOUR 320-0 Storytelling: Interactive News The craft of digital storytelling, with emphasis on creating compelling packages for the web and other digital platforms (such as PDAs) using a variety of narrative formats, interactive tools (such as Flash), and other digital content, including blogs, RSS feeds, and citizen journalism. Prerequisites: JOUR 301; JOUR 310, 311, or 312.

JOUR 321-0 Storytelling: Magazine and Feature Writing The craft of magazine and feature writing, with emphasis on character, scene and theme development, story architecture, voice, alternative story forms, in-depth reporting, public service journalism, and marketing ideas for articles. Prerequisites: JOUR 301; JOUR 310, 311, or 312.

JOUR 322-0 Storytelling: Video Reporting, Shooting, and Editing The craft of audio-video storytelling for television and the web, including practice in field reporting and producing packages ranging from one- to three-minute television news pieces to longer alternative audio-video formats for the web and other digital platforms. Prerequisite: JOUR 301; JOUR 310, 311, or 312.

JOUR 342-0 Advanced Online Storytelling Students work in groups throughout the quarter on a single reporting project that incorporates video, audio, interactivity, and photography. The class discusses and critiques existing work from media professionals. Students must have experience with Adobe Flash and nonlinear digital video editing software. Prerequisite: 320.

JOUR 345-0 Journalism Residency in Newspaper/Online: Reporting (1 or 2 units) Hones reporting and newswriting

skills in a newsroom through practical assignments, including multimedia opportunities whenever possible, under deadline pressure and close editorial supervision. Prerequisites: JOUR 310; JOUR 320, 321, or 322; JOUR 370. Taken with JOUR 346.

JOUR 346-0 Journalism Residency in Newspaper/Online: Presentation (1 or 2 units) Hones skills in news editing, headline writing, page layout/design, and graphics for print and the web in a newsroom environment through practical assignments under deadline pressure and close editorial supervision. Prerequisites: JOUR 310; JOUR 320, 321, or 322; JOUR 370. Taken with JOUR 345.

JOUR 355-0 Journalism Residency in Magazine: Writing (1 or 2 units) Exploration of aspects of magazine writing and reporting. Practical assignments, including print and web content whenever possible, in a magazine office with deadline pressure and close professional supervision. Prerequisites: JOUR 311; JOUR 320, 321, or 322; JOUR 370. Taken with JOUR 356.

JOUR 356-0 Journalism Residency in Magazine: Presentation (1 or 2 units) Exploration of aspects of magazine editing, graphics, and publishing for print and/or online products. Practical assignments in a magazine office with deadline pressure and close professional supervision. Prerequisites: JOUR 351; JOUR 320, 321, or 322; JOUR 370. Taken with JOUR 355.

JOUR 365-0 Journalism Residency in Broadcast: Reporting (1 or 2 units) Gathering television news in the field; writing scripts, readers, voiceovers, voxes, packages, and on-camera news for reporters and anchors. Practical assignments in a broadcast newsroom under close professional supervision. Prerequisites: JOUR 312; JOUR 320, 321, or 322; JOUR 370. Taken with JOUR 366.

JOUR 366-0 Journalism Residency in Broadcast: Production (1 or 2 units) The television production process: working with the assignment desk; editing voiceovers, sound bites, and packages; possibly producing entire shows. Practical assignments in a broadcast newsroom under close professional supervision. Prerequisites: JOUR 312; JOUR 320, 321, or 322; JOUR 370. Taken with JOUR 365.

JOUR 368-0 Documentary Formats used in audio and video documentary production, with emphasis on transforming a major research effort into a radio or broadcast program or a multipart series. Prerequisites: JOUR 301.

JOUR 370-0 Media Law and Ethics The legal and ethical framework defining media freedoms and constraints in the United States, including copyright and trademark issues. Historical context and focus on the evolution of constitutional, statutory, judicial, and ethical standards. Prerequisite: sophomore standing.

JOUR 371-0 Journalism of Empathy Exploration of writing and reporting about people and places neglected and misunderstood by mainstream America. Prerequisite: 301.

JOUR 372-0 International Journalism: South Africa An introduction to South Africa, with a special focus on the country's newspapers, magazines, and broadcast outlets. Students compare and contrast various aspects of South African and U.S. life — especially the history of the HIV/AIDS pandemic — and explore historical, political, and cultural connections between the two countries. Required for South Africa Journalism Residency. Prerequisites: JOUR 301 and junior standing for Medill students; consent of instructor for others.

JOUR 373-0 Investigative Journalism The news media in their adversarial role in public affairs reporting, including field reporting of the legal system and possible miscarriages of justice; investigative and interpretative reporting and advocacy journalism; the impact of the news media on public opinion and policy making. Prerequisite: senior standing and consent of instructor. A second unit of 373 may be counted toward the 45 units required for the BSJ with consent of instructor.

JOUR 374-0 Investigative Reporting Examines the methods and techniques of investigative reporting through hands-on practice — brainstorming, framing the reporting, digging through documents, analyzing numbers, tracking down sources, writing, and rewriting. Prerequisite: JOUR 301.

JOUR 375-0 Literary Journalism A survey of the work of several print and broadcast journalists to explore the intersection of journalism and literature; analysis of the relationships between form and content within the historical contexts in which pieces were produced. Prerequisite: 301.

JOUR 376-0 Media Design Advanced tools of layout, typographic contrast, and color theory, including creating infographics, with a focus on current approaches to newspaper, magazine, web, and newsletter design. Prerequisite: JOUR 310, 311, or 312.

JOUR 378-0 Photojournalism Advanced skills and practice in telling stories with photographs, photo slideshows, photo galleries, and audio slideshows. Ethics as it applies to photojournalism. Prerequisite: sophomore standing.

JOUR 380-0 Legal Reporting Students gain in-depth knowledge of legal issues while covering and writing stories related to the courts and the law. Students are encouraged to take this course in conjunction with a non-Medill course complementing the subject matter. Prerequisite: sophomore standing.

JOUR 381-0 Business Reporting Students gain in-depth knowledge of business and economic issues while covering and writing stories related to business. Students are encouraged to take this course in conjunction with a non-Medill course complementing the subject matter. Prerequisite: sophomore standing.

JOUR 382-0 Environmental Reporting Students gain in-depth knowledge of environmental issues while covering and writing stories related to the environment. Students are encouraged to take this course in conjunction with

a non-Medill course complementing the subject matter. Prerequisite: sophomore standing.

JOUR 383-0 Health and Science Reporting Students gain in-depth knowledge of health and science issues while covering and writing stories related to health, science, and technology. Students are encouraged to take this course in conjunction with a non-Medill course complementing the subject matter. Prerequisite: sophomore standing.

JOUR 388-0 Internship (0 units) Student-initiated internships in journalism. Supervised by Medill's career services director. Prerequisites: sophomore standing and consent of Medill's Director of Career Services.

JOUR 388-1 Undergraduate Research Student-initiated research projects, such as the Eric Lund Global Reporting and Research Grant projects. Application required.

JOUR 390-0 Special Topics Specialized, experimental courses offered from time to time by faculty. Topics may include Connecting with Immigrant and Multiethnic Communities; The Press, the Pentagon, and the Public; Journalism in a Networked World; Database Reporting; and Innovation in News and Technology. Prerequisites: vary depending on the course.

JOUR 399-0 Independent Study Academic work sponsored and supervised by a faculty member working one-on-one with a student. Prerequisite: consent of Medill's senior director of undergraduate education and teaching excellence.

INTEGRATED MARKETING COMMUNICATIONS

The integrated marketing communications (IMC) certificate program focuses on effective marketing communications strategies, tactics, and tools for an increasingly consumer-controlled environment. It prepares students for entry-level marketing communications positions in such fields as advertising, public relations, corporate communications, and direct, database, e-commerce, and interactive marketing.

The program covers traditional and digital areas of marketing communications. Students develop skills for understanding and analyzing consumers in traditional markets and in newly forming communities and networks. They learn about message creation and delivery through a wide variety of media channels, and they obtain the basic qualitative and quantitative analytical skills necessary in this field.

Students in all undergraduate schools at Northwestern are eligible to apply to the certificate program, but qualified BSJ students in Medill receive priority. Students apply through a process described on the Medill web site. Admission is granted by Medill and is conditional upon the successful completion of 3 prerequisite courses. Students with sophomore status may take the 2 core courses — IMC 300 and 301 — before applying. Students admitted to

the program have enrollment access to IMC courses during preregistration. Non–Medill students must have junior status before taking IMC writing courses and electives.

Students accepted into the certificate program must earn a minimum grade of B in IMC 300 and 301 and a minimum GPA of 2.7 in their prerequisites and in IMC 300 and 301. To successfully complete the program, students must earn a minimum grade of B in each IMC course.

Certificate in Integrated Marketing Communications

Certificate requirements (8 units)

- 3 prerequisite courses:
 - ECON 202 and 260
 - 1 course from ANTHRO 211, 235, 389; BUS INST 390; COMM ST 205, 360, 363, 380; ECON 322, 330, 350; IEMS 383; POL SCI 348, 375; PSYCH 204, 228, 316, 335, 351, 385; SOCIO 302, 303, 315, 332, 345
- 2 core courses: IMC 300 and 301
- 1 writing course: IMC 305 or 306
- 2 electives from IMC 302, 303, 304, 307, 308, 309

Courses

IMC 300-0 Consumer Insight and Analysis Introduces students to concepts and theories that explain and predict consumer behavior. Emphasizes customer-centric marketing and communications. Topics include understanding customer wants and needs and assessing and enhancing customer satisfaction. Prerequisite: sophomore standing.

IMC 301-0 Introduction to Integrated Marketing Communications Engaging consumers in an increasingly customer-controlled environment through advertising, public relations, direct and digital marketing, and other forms of communication, such as packaging, “buzz,” and word-of-mouth marketing. The role of integrated marketing communications in the overall marketing process and in creating and maintaining a brand: positioning products, understanding communication theory and consumer behavior; measuring and evaluating the influence of advertising; thinking critically about new creative strategies; and developing appropriate media plans. Prerequisite: sophomore standing.

IMC 302-0 Senior Immersion Project Students work with a real client/sponsor to develop a total marketing communications program. Final product consists of a research report that outlines the learning and insight that led to the strategic, creative, and marketing recommendations; a client presentation; and a project book detailing the research, analysis, and recommendations of the plan, including strategy, creative execution, media use, and other integrated communications activities. Prerequisites: IMC 300 and 301; 305 or 306; 303, 304, 307, 308, or 309; admission to IMC certificate program.

IMC 303-0 Marketing Research Applications of modern marketing research procedures to a variety of marketing problems. Students develop basic skills in conducting and evaluating marketing research projects. Emphasizes problem formulation, research design, methods of data collection (including qualitative, quantitative, primary, and secondary data-collection methods and instruments, sampling, and field operations), data-analysis techniques, and the presentation of results. Prerequisites: IMC 300, 301, and admission to IMC certificate program; for non–Medill students, junior standing as well.

IMC 304-0 Media and Message Delivery for Interactive Communications Focuses on engaging an audience and communicating effectively. Strategies for reaching and engaging affinity groups, audiences, and stakeholders; alternative media strategies to connect to the increasingly digital consumer; the economics and technologies of delivery. Prerequisites: IMC 300 or 301; for non–Medill students, IMC 300, 301, admission to IMC certificate program, and junior standing.

IMC 305-0 Message Strategy and Writing for Persuasion Writing and publishing skills for the corporate world: press releases for print and web, vodcasts and video packages, argumentation and advocacy pieces, executive summaries and speeches, corporate web pages, quarterly earnings reports, podcasts, viral video, blogs, open-source text, and metaverse (Second Life). Prerequisites: IMC 300 or 301; for non–Medill students, IMC 300, 301, admission to IMC certificate program, and junior standing.

IMC 306-0 Introduction to Public Relations Strategies and Tactics The role of public relations, one of the fastest-growing professional fields within for-profit, not-for-profit, and government organizations. Emphasizes communications and management strategies to develop relationships with a wide range of stakeholders. Covers traditional and contemporary communication channels, including blogs, YouTube, podcasts, Second Life, social communities, newspapers, magazines, and broadcast outlets. Course consists of lecture and discussion sessions and a writing lab. Prerequisites: IMC 300 or 301; for non–Medill students, IMC 300, 301, admission to IMC certificate program, and junior standing.

IMC 307-0 Direct, Database, and E-Commerce Marketing and Interactive Communications Planning direct-marketing programs; methods of acquiring customers through search, e-mail, direct mail, direct-response advertising, list management, and lead-generation programs; the economics of customer retention and lifetime value; retention strategies and tactics, including e-mail marketing, loyalty programs, and proactive and reactive contacts; customer databases and overlays; and testing for on- and off-line strategies and tactics. Prerequisites: IMC 300, 301, and admission to IMC certificate program; for non–Medill students, junior standing as well.

IMC 308-0 Marketing Models Explores the use of probabilistic models and customer databases to improve the design, management, and execution of marketing programs. Topics vary by instructor and may include predictive modeling, recommendation agents, segmentation methods, marketing-mix models, and customer lifetime-value models. Prerequisites: IMC 300, 301, admission to IMC certificate program, and 2 courses in statistics; for non-Medill students, junior standing as well.

IMC 309-0 Introduction to Entertainment and Gaming for Marketers The business and financial backgrounds of the entertainment industry, including the strategic and tactical use of entertainment and events in integrated marketing communication programs and evaluation of their success and financial return. Students explore the role that amusement and entertainment play in the lives of consumers. Prerequisites: IMC 300, 301, and admission to IMC certificate program; for non-Medill students, junior standing as well.

Henry and Leigh Bienen School of Music

www.music.northwestern.edu

One of the oldest degree-granting music institutions in the United States, Northwestern University's Henry and Leigh Bienen School of Music combines a nationally ranked music program of conservatory-level intensity with the academic rigor and scholarly resources found only at a world-class private research university. The Bienen School of Music is a professional school within the University; students accepted into the school are also accepted into the University. Entering freshmen rank on average in the top 10 percent of their high school class and show highest-level achievement in academics as well as music. The school believes that by carefully developing outstanding musicianship and keen intelligence, while nurturing a curiosity about the world, we can best encourage the emergence of each student's unique creative voice.

All students at the Bienen School of Music are expected to grow as artists and as people. They are encouraged to explore in depth other areas of interest, drawing on the vast resources of Northwestern's other schools, and to develop the critical thinking and communication skills necessary for a successful career in music.

Key to all degree programs is intensive one-on-one training with a celebrated faculty that includes members of the Chicago Symphony and Lyric Opera of Chicago Orchestras, internationally acclaimed soloists, sought-after conductors, and distinguished scholars and clinicians. Students work in small classes with these dedicated teachers and musicians in a curriculum that comprises music history and theory, aural and piano skills, instrumental and voice lessons, and electives. Special programs include a five-year double-degree curriculum — enabling students to earn a degree in music as well as one in engineering, journalism, or arts and sciences — and the ad hoc (self-designed) degree, an option offered by no other major music school. Additionally, the world-class music making and other cultural resources of downtown Chicago provide exceptional opportunities for learning outside the classroom.

Performing and research opportunities abound at Northwestern. Students may participate in 16 ensembles and chamber groups and have access to more than 400 performances each year, including three critically acclaimed professional series as well as master classes given by such notables such as Renée Fleming, Oscar Ghiglia, Richard Goode, Susan Graham, Lynn Harrell, and Karl Leister. In addition, the school sponsors the biennial Michael Ludwig Nemmers Prize in Music Composition and the Jean Gimbel

Lane Prize in Piano Performance, which regularly bring world-renowned composers and pianists to campus. The music collection in Deering Library comprises more than 142,000 books, scores, journals, and microfilms, and the Listening Center boasts 53,000 sound recordings. The library's collection of post-1945 music is considered the finest in the world and is frequently used by scholars from around the world.

A Bienen School of Music education provides students with skills and values — superb musicianship, a mastery of communication, a sense of discipline, a commitment to excellence — that prepare them for success wherever their interests may lead.

The Bienen School of Music is a founding member of the National Association of Schools of Music, which fully accredits all its degree programs.

ACADEMIC POLICIES

Programs of Study

The Bienen School of Music offers programs leading to the professional degrees of bachelor of music, master of music, artist certificate, and doctor of music. The school also offers a nonprofessional degree, the bachelor of arts in music.

The curriculum allows flexibility for students while providing an education that is basic for all musicians. Applicants in all areas who are accepted by the Bienen School of Music enter directly into a program of specialization that begins in the freshman year. The core studies, taken by all students, require the acquisition of minimum competencies and provide fundamental and essential experiences that complement the specialized studies in the declared major. Students are also required to complete studies in a number of allied subjects throughout the University.

Bachelor of Music

Courses of study leading to the bachelor of music degree include majors in piano, strings, voice, winds and percussion, jazz, music cognition, music composition, music education, musicology, music technology, and music theory. It is also possible to design an ad hoc major program that cuts across specializations to meet a particular student's needs and career ambitions. Ad hoc majors are designed in consultation with faculty and area professionals with

expertise in the particular area of interest; specializations have included areas such as arts administration, music criticism, music theater production, and popular musicology. For degree requirements for the bachelor of music, see below.

Bachelor of Arts in Music

The bachelor of arts in music is a nonperformance degree that offers a broad liberal arts education with a major in music. The requirements of this degree are essentially identical to those for the BA in the Weinberg College of Arts and Sciences. Within the degree's focus on music, there are a wide range of possibilities for study, from cultural musicology to cognitive studies of music and from music composition to advanced theory; the options also include an ad hoc specialization designed to meet a particular student's needs and career ambitions. This degree is an excellent stepping-stone to further education in music or to any career for which a knowledge of music brings depth and enrichment. The BA curriculum offers considerable latitude in designing a sequence of courses to suit the student's interests and goals. A key feature for the student is the planning and execution of a senior project. For degree requirements for the bachelor of arts in music, see next column.

Dual Bachelor's Degree Programs

The Bienen School of Music offers dual bachelor's degree programs with the Weinberg College of Arts and Sciences (music and liberal arts), the McCormick School of Engineering and Applied Science (music and engineering), and the Medill School of Journalism (music and journalism). For information on program requirements, see page 28 in the Cross-School Options chapter. For information on applying to these programs, see Application to Dual Bachelor's Degree Programs on page 11.

Degree Requirements

Bachelor of music (50–54 units)

Candidates for the degree of bachelor of music must complete 50–54 units, depending on the minimum number of courses required for their major. The degree can usually be completed within four years. All students in the bachelor of music degree program take a core set of music requirements (19 units of credit for all but jazz studies majors) in addition to the requirements for the individual major.

- Music core requirements (19 units; 15.5 for jazz studies)
 - 2 years of music theory (3 units)
 - 2 years of aural skills (3 units)
 - 1 year of keyboard skills (1.5 units)
 - 6 courses in music history (6 units)
 - 1 course in conducting (1 unit)
 - 1 year of ensemble (1.5 units)
 - 1 year of 100-level applied study (3 units)

- General education (nonmusic) (12 units; 8 units for music education)
- Free electives (music or nonmusic) (0–3 units)
- Major studies requirement (16–27 units)

Bachelor of arts in music (45 units)

Candidates for the degree of bachelor of arts in music must complete 45 units.

- Music core requirements (10 units)
 - 2 years of music theory (3 units)
 - 1 year of aural skills (1.5 units)
 - 4 courses in music history (4 units)
 - 1 year of ensemble (1.5 units)
- Additional music courses (10 units)
- General education (nonmusic) (13 units)
- Nonmusic electives (6 units)
- Foreign language (6 units)

Other Requirements

Music majors must earn a grade of C or above in all courses required in the major, including all core requirements and all specialization courses, in order to count those courses toward graduation requirements. A grade of D or above (including P grades for four-year students) may be used to fulfill distribution requirements and electives. If a student receives a D in a major course, then takes that course a second time and receives a C grade or above, the initial D grade remains on the permanent record and cannot count toward elective requirements. The second (improved) grade does not replace the first, and the same course cannot be counted twice in the degree. A maximum of 6 quarter-courses in nonmusic subjects taken under the P/N grade option may be counted toward the degree. Music students may not take music courses under the P/N grade option, except for those courses graded solely with P/N grades.

If students interrupt their program of study for an extended period of time and degree requirements are changed during this period, they will normally be held to the new requirements.

Every candidate for a degree must file a graduation petition one year in advance of the date of graduation.

Students coming to Northwestern University for a second undergraduate degree must transfer at least 9 units of credit in music, audition for admission at the 300 level, complete the general education distribution requirement with transfer credit, and comply with the University's Undergraduate Residence Requirement for transfer students.

In addition to and independent of the requirements set by the Bienen School of Music, all students must satisfy the Undergraduate Residence Requirement (see page 17 in the Undergraduate Education chapter of this catalog).

Applied Music Study

The Bienen School of Music offers individual instruction for majors in piano, strings, voice, winds and percussion, and jazz. Students should consult their program coordinators for the assignment of an instructor. Consent of the instructor, program coordinator, and department chair as well as concurrent registration in ensemble are required. Elective applied study assignments are made by the appropriate program coordinator and department chair as space is available.

Attendance Policy

Students are expected to attend all sessions of courses and ensembles for which they are registered. It is the responsibility of students enrolled in the Bienen School of Music to acquaint themselves and comply with the attendance policy of their departments, class instructors, and ensemble conductors. In addition, students who are absent from classes for three or more consecutive days because of illness are required to notify the Office of Student Affairs.

Outside professional opportunities may arise for music students. If such an opportunity directly interferes in any way with curricular responsibilities, students must first obtain permission from faculty of record for courses potentially affected, including classes, opera, and ensembles, along with the signature of the program coordinator and a signature from one of the cochairs of the Department of Music Performance.

Failure to comply with these regulations can cause failure in the courses or ensembles for which a student is registered during that quarter.

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

ACADEMIC OPTIONS

Double Major

Students may earn a double major in four years by fulfilling the requirements of both majors. Typically, the double major within the Bienen School of Music combines a specialization in a performance area with one in an academic area, although double majors in two academic areas are also possible. A double major in two performance areas is generally not permitted. Four-year bachelor of music students may also complete a second major outside the music school but may earn only one bachelor's degree. Bienen School of Music students who choose to leave the school for another school at Northwestern may still complete a music major as a second major, although in these cases no degree from the Bienen School will be awarded.

Bachelor of arts in music candidates may double major with any major offered in the Weinberg College of Arts and Sciences but may earn only one bachelor of arts degree.

Minor Programs

The Bienen School of Music offers minors in arts administration, commercial music, jazz studies, music cognition, music composition, music criticism, musicology, music technology, and music theory and the certificate program in music theatre. Minor programs include a minimum of 6 and a maximum of 9 courses, of which a minimum of 5 courses are not double counted in the major. Students must receive a grade of C or above in all courses counted toward the minor; no P/N grades are allowed. Students who wish to complete a minor program should fill out a Minor Declaration Form, available in the Office of Student Affairs, and should fill out a minor petition form one year before graduation. Students may pursue more than one Bienen School of Music minor.

Program Honors

Each year faculty are invited to nominate graduating students for program honors. To be eligible for program honors, students must have a cumulative GPA of 3.5 or above and be outstanding contributors to their respective programs. Additional criteria govern the selection of voice majors; see the coordinator of the voice and opera program for details. Faculty select only a small number of students in each program for program honors in a given year; for more information, contact the Office of Student Affairs in the Bienen School of Music.

Graduate Studies

The Bienen School of Music offers programs of study leading to the master of music degree, the artist certificate, and the doctor of music degree. Information concerning these programs is available from the Office of Admission and Financial Aid in the Bienen School of Music. For information about the requirements for the doctor of philosophy degree in music, contact the Graduate School.

Music Studies for Nonmajors

The Bienen School of Music offers many opportunities for students registered in other schools of the University to participate in ensembles and to take courses and private lessons. For information on these options, see page 253.

STUDENT RESOURCES

Musical Organizations

As a part of their program of study, music majors are required to participate in music school ensembles. Students from all other schools of the University are encouraged to participate in any organizations for which they qualify.

Symphony Orchestra

This large ensemble provides experience in the concert presentation of representative symphonic repertoire as well as operas and concertos, emphasizing major works and

striving for performance excellence through high standards of individual musicianship and advanced playing technique.

Chamber Orchestra

The Chamber Orchestra provides the experience of performing fundamental repertoire written for the orchestra until the early 19th century and repertoire specifically written for chamber orchestra since the early 19th century.

Philharmonia

The school's largest orchestra is open upon audition to interested and qualified students from any school in the University and performs a wide range of repertoire.

Symphonic Wind Ensemble

The Symphonic Wind Ensemble emphasizes major original works for band and strives for performance excellence through high standards of individual musicianship and advanced playing technique.

Symphonic Band

An ensemble of fine wind and percussion musicians who wish to perform the finest works available for large band or wind orchestra.

Concert Band

The Concert Band provides an excellent performing experience for interested and qualified students from any school in the University. The Concert Band performs fine literature, including both original and transcribed works.

Wildcat Marching Band

The Marching Band combines marching precision and exceptional playing ability to create a finely polished, spirited unit. The band performs at all Wildcat home football games and at one or more away games each season.

Jazz Groups

The Jazz Orchestra and a variety of small combo groups enable students to gain experience in the jazz idiom and to improve improvisation skills. They also offer student composers and arrangers the chance to write for various jazz instrumental combinations.

Percussion Ensemble

The Percussion Ensemble offers students an opportunity to perform percussion chamber works representative of diverse musical styles from renaissance transcriptions through avant-garde theater pieces. The ensemble maintains an active performance schedule both on and off campus.

Contemporary Music Ensemble

The Contemporary Music Ensemble provides experience for student performers and composers in the performance of contemporary works.

University Chorale

An ensemble of 40 to 46 voices, University Chorale is the most selective of the University's choral ensembles. The Chorale's membership is drawn from upper-level undergraduate and graduate students whose musicianship meets high performance standards. Choral literature from renaissance through the present day comprises the ensemble's repertoire. The Chorale also frequently collaborates with various instrumental ensembles to perform choral works calling for chamber orchestra and/or wind ensemble.

University Singers

University Singers, an ensemble of 40 to 50 voices, draws its membership primarily from the music school as well as from qualified singers throughout the University. The group performs music of various periods, both accompanied and unaccompanied, and often combines with other choral ensembles to perform larger works.

University Chorus

The University Chorus, the University's largest choral ensemble, includes students primarily from the music school as well as those from other schools of the University. The ensemble is also open to faculty and staff as well as residents of the off-campus community by audition. Numbering 90 to 100 singers, University Chorus primarily performs large, extended works from the oratorio and cantata repertoire.

Alice Millar Chapel Choir

A select ensemble of 50 to 60 voices, the Chapel Choir includes music majors and other qualified students. Repertoire includes a cappella and accompanied masterworks from all periods and in many languages. Emphasis is placed on sight-reading and musicianship development.

University Women's Chorus

The Women's Chorus is primarily designed for nonmajor young women who are interested in continuing their singing experiences but with a less rigorous rehearsal commitment than that of other music school choruses. The ensemble performs one concert each quarter.

Baroque Music Ensemble

The Baroque Music Ensemble provides study and performance of music written before 1800, primarily from the baroque period, for select instrumentalists and vocalists. Performance-based activities focus on historically informed performance practices with occasional coachings and master classes from distinguished performers and scholars. Instruction on period-instrument techniques is a possible option. The ensemble is open to performers on modern instruments and period instruments and singers of every voice type. At least one performance is given each quarter.

Guitar Ensemble

The ensemble performs the chamber literature for guitar: guitar duos, trios, and quartets as well as chamber works with strings and music for flute and guitar, voice and guitar, and other instrumental combinations.

Chamber Music Ensembles

Chamber ensembles include piano trio; string trio, quartet, quintet, sextet, and octet; harp ensemble; brass quintet, choir, and band; woodwind quintet; trombone quartet and ensemble; and tuba, saxophone, mixed winds, trumpet, horn, and flute ensembles.

Facilities

The Bienen School of Music occupies five buildings. The Music Administration Building houses administrative offices, classrooms, studios, and practice rooms. The faculties of the Department of Music Studies, Voice and Opera Program, and Piano Program have offices in this building. Regenstein Hall houses rehearsal facilities, practice rooms, a 200-seat lecture/recital room, the library and offices for the University bands, the Music Performance Department Office, and faculty studios for the Conducting and Ensembles, String Instruments, and Winds and Percussion Instruments Programs. Practice Hall (the “Beehive”) contains 35 practice rooms. Lutkin Hall, seating 400, is used for student and faculty recitals and lecture classes. Pick-Staiger Concert Hall provides a 1,000-seat concert hall, rehearsal facilities, and offices and library for the University Symphony Orchestra. A new state-of-the-art building adjacent to Regenstein Hall of Music is scheduled to open in 2012. It will include a 400-seat recital hall as well as classrooms, labs, and rehearsal spaces.

Music Library

Among the nation’s largest music libraries, the Northwestern University Music Library supports all areas of musical study with a broad collection of books, scores, sound recordings, periodicals, and online resources. The facility, located in historic Deering Library, offers a reading room rich in reference materials, a music listening center, and a computer lab equipped with specialized music hardware and software. The Music Library is also distinguished internationally for its extensive collection of contemporary music, which includes one copy of nearly every score published since 1945 as well as many original manuscripts by prominent composers such as Pierre Boulez, John Cage, George Crumb, and Iannis Xenakis. The Music Library’s collections and staff serve the Bienen School of Music, the entire Northwestern University community, and researchers from around the world. For more information see www.library.northwestern.edu/music.

ACADEMIC OFFERINGS

INTERDEPARTMENTAL COURSES FOR MUSIC MAJORS

The music theory, aural skills, keyboard skills, and music history sequences are required for, and limited to, all undergraduates in the Bienen School of Music.

Courses Open to Undergraduates

MUSIC 101-1,2,3 Theory Skills Testing (0) Skills tests taken in conjunction with MUSIC 111-1,2,3.

MUSIC 111-1,2,3 Music Theory I, II, III (.5) Music as sound in time. Analytical studies in forms, media, textures, and harmonic and melodic materials. Prerequisite: preceding quarters of 111.

MUSIC 126-1,2,3 Aural Skills I, II, III (.5) Sight-singing and ear-training; drill in recognition of melodic, rhythmic, and harmonic patterns and aural analysis through listening and dictation. Progresses through six levels of proficiency.

MUSIC 127-0 Keyboard Skills (.5) Class instruction, in electronic piano classroom; six levels of proficiency.

MUSIC 211-1,2,3 Music Theory IV, V, VI (.5) Continuation of 111. Prerequisite: 111-1,2,3 or consent of instructor.

MUSIC 213-0 Introduction to World Music Cultures Introduction to both the world’s musical variety and common issues related to music production worldwide.

MUSIC 214-0 Music History I First part of a yearlong sequence. Principles, materials, and concepts of Western art traditions from the ancient Greeks through the beginning of the 17th century. As a core component for music majors, this course assumes completion of 111-1,2,3 and 126-1,2,3 or their equivalents as prerequisites.

MUSIC 215-0 Music History II Second part of a yearlong sequence. Principles, materials, and concepts of Western art traditions from the early baroque through the early 19th century. As a core component for music majors, this course assumes completion of 111-1,2,3 and 126-1,2,3 or their equivalents as prerequisites.

MUSIC 216-0 Music History III Third and final part of a yearlong sequence. Principles, materials, and concepts of Western art traditions from the 19th century through the present. As a core component for music majors, this course assumes completion of 111-1,2,3 and 126-1,2,3 or their equivalents as prerequisites.

MUSIC 226-1,2,3 Aural Skills IV, V, VI (.5) Continuation of 126.

MUSIC 227-0 Keyboard Skills (.5) Continuation of 127.

MUSIC 327-1 Advanced Keyboard Skills VII (.5) Advanced score-reading. Reading various voice parts in combination and harmonically reducing four-part textures.

MUSIC 327-2 Advanced Keyboard Skills VIII (.5) Techniques of accompanying by reducing and rewriting accompaniments to make initial performances more effective.

MUSIC 327-3 Advanced Keyboard Skills IX (.5) Advanced accompanying. Adding accompaniments to a given vocal line. Improvising accompaniments in various styles, including “swing.” Transposition of individual lines.

MUSIC 335-0 Selected Topics in Music Topics vary; announced before registration. May be repeated.

MUSIC 350-0 Alexander Technique (.5) Methods of using the body efficiently to reduce unnecessary tension and stress in instrumental and vocal performance.

MUSIC 397-0 Summer Internship (0) Field experience as an intern.

MUSIC 398-0 Internship (.5–4) Field experience as an intern. Requirements include journal and final paper.

MUSIC 399-0 Independent Study (.5–1)

MUSIC STUDIES

This department consists of the Music Composition, Music Education, Musicology, Music Technology, and Music Theory and Cognition Programs. Bachelor of music specializations are available in music cognition, music composition, music education, musicology, music technology, and music theory. These specializations are described on the following pages.

Music Cognition

See Music Theory and Cognition.

Music Composition

www.music.northwestern.edu/programs/composition.html

Composition students pursue a course of study that develops analytical and creative skills and enjoy many opportunities to hear their works performed. Students have access to the electronic and computer music studios, which provide the latest technology for experimentation and experience with 21st-century compositional materials. Students intending to major in composition may substitute composition class for applied studies during their freshman and sophomore years.

Major in Music Composition

For a major in composition, 16 course units are required beyond the core degree and general education requirements.

- 212 Applied Composition (3 units; some credit may be given for applied instrument or voice lessons)
- 312 Applied Composition (6 units)
- 314-1 Instrumentation (1 unit)
- 314-2 Orchestration (1 unit)
- MUS THRY 316 Renaissance Counterpoint (1 unit)
- MUS THRY 318 Baroque Counterpoint (1 unit)
- 335 Selected Topics (1 unit)
- 2 music theory courses in analysis (1 unit must be in 20th-century analysis)
- 380 Senior Recital (0 units)
- 12 quarters of 390 Composition Colloquium (0 units)

Minor in Music Composition

A minor in music composition requires 9 units, of which a minimum of 5 courses are not double counted in the major. Students must receive a grade of C or above in all courses counted toward the minor. Admission requires submission of a composition portfolio.

- 111 and 311 Class Composition (6 units)
- 314-1 Instrumentation or 314-2 Orchestration (1 unit)
- 1 elective chosen from 300-level music composition courses
- 1 elective in music technology
- 390 Composition Colloquium (6 quarters, 0 credit)

Courses Open to Undergraduates

MUS COMP 111-1,2,3 Class Composition Class instruction in techniques of composition. Open to nonmusic majors.

1. Writing for solo instruments. **2.** Writing for two to four instruments. **3.** Writing for instruments and/or voices.

Prerequisite: preceding quarters of 111 or consent of instructor.

MUS COMP 112-0 Applied Composition Original composition; individual instruction.

MUS COMP 212-0 Applied Composition Original composition; individual instruction.

MUS COMP 311-1,2,3 Class Composition Class instruction in techniques of composition. Open to nonmusic majors.

1. Writing for solo instruments. **2.** Writing for two to four instruments. **3.** Writing for instruments and/or voices. Prerequisites: for 311-1, 111-3 or consent of instructor; for 311-2,3, preceding quarters of 311 or consent of instructor.

MUS COMP 312-0 Applied Composition Original composition; individual instruction.

MUS COMP 314-1 Instrumentation Instruments of the orchestra; scoring techniques; analysis of instrumental combinations. Prerequisite: MUSIC 211-3 or consent of instructor.

MUS COMP 314-2 Orchestration Stylistic scoring projects; analysis of orchestral and chamber scores. Prerequisite: 314-1 or consent of instructor.

MUS COMP 314-3 Advanced Orchestration Contemporary scoring techniques; creative projects; analysis of orchestral and chamber scores. Prerequisite: 314-2, graduate standing, or consent of instructor.

MUS COMP 335-0 Selected Topics in Music Composition Topics vary; announced before registration. Writing projects; analysis of scores; 20th-century stylistic techniques, performers, and composers. Contemporary materials; in-class performances of original work. Prerequisite: preceding quarter of 335 or consent of instructor. May be repeated for credit.

MUS COMP 336-1,2 Contemporary Repertoire I, II Close study of specific recent compositional styles; modernism post-1945, music since 1975. Prerequisite: consent of instructor.

MUS COMP 337-0 Topics in Contemporary Repertoire Topics vary by quarter. Close study of specific recent compositional styles, which may include minimalism, complexity, music of the last decade, experimental music. Prerequisite: consent of instructor.

MUS COMP 338-0 Composer Portraits Composers vary by quarter. Portrait studies of the work of a major composer or composers, e.g., Ferneyhough; Lutoslawski; Cage; Birtwistle and Maxwell Davies. Prerequisite: consent of instructor.

MUS COMP 339-0 Compositional Concepts and Techniques Topics vary by quarter. Content, musical spaces, extended techniques, and spectralism. Prerequisite: consent of instructor.

MUS COMP 340-0 Composition Workshop Topics vary by quarter. Examples include Composer/Performer, Composing for Percussion, Composing for Dance, Composing for Solo Instrument. Prerequisite: consent of instructor.

MUS COMP 380-0 Senior Recital (0)

MUS COMP 390-0 Composition Colloquium (0) Discussion of contemporary compositional techniques.

MUSIC COMP 399-0 Independent Study (.5–1)

Music Education

www.music.northwestern.edu/programs/musiced.html

Graduates with a major in music education meet all requirements for teacher certification in the state of Illinois as well as most other states. Students take the professional program required of all music students, a structured sequence of courses in general education, a basic set of courses in music education, and special courses in the chosen music education specialization. The combination results in a program that prepares professionals with a broad understanding of music and education as well as the skills to be effective music teachers.

Students in the undergraduate music education program must take all the core studies in music and all the professional studies in music education plus the general education courses required for teacher certification. They must also choose one of the three specialization tracks — instrumental, choral, or general — and take the required courses for that track. All music education majors are required to complete 100 hours of clinical observation.

Major in Music Education

For a major in music education, 25 to 27 course units are required beyond the core degree and general education requirements.

- Additional applied lessons (6 units)
- Additional keyboard skills (as needed by track) (1.5–3 units)
- 258 Philosophy of Music Education
- 260 The Music Teacher as Communicator
- 314 Music Education Rehearsal Practicum (11 quarters, 0 units)

- 368 Teaching Composition in the Schools
- 380–387 Student Teaching (3 units)
- 390 Student Teaching Colloquium (0 units)
- MUS TECH 262 Technology in the Music Classroom
- CONDUCT 340-1,2, or 3 Advanced Conducting

***Instrumental Track* (11.5 additional units)**

- Additional large ensemble (7 quarters, 3.5 units)
- Chamber music (1 quarter, .5 unit)
- 230 Flute Class (.5 unit)
- 232 Voice Class (.5 unit)
- 233 Clarinet and Saxophone Class (.5 unit)
- 234 Double Reeds Class (.5 unit)
- 235 High Brass Class (.5 unit)
- 236 Low Brass Class (.5 unit)
- 237 String Class I (.5 unit)
- 238 String Class II (.5 unit)
- 239 Percussion Class (.5 unit)
- 362 Teaching General Music II
- 364 Teaching Instrumental Music I
- 365 Teaching Instrumental Music II

***Choral Track* (10 additional units)**

- Additional large ensemble (8 quarters, 4 units)
- 231-1 Guitar Class I (.5 unit)
- 232 Voice Class (.5 unit)
- 240 Classroom Instruments (.5 unit)
- 361 Teaching General Music I
- 362 Teaching General Music II
- 366 Teaching Choral Music I
- 367 Teaching Choral Music II
- Instrumental techniques elective (.5 unit)
- VOICE 111-1,2,3 Phonetics and Diction (0 units)
- VOICE 311 Vocal Solo Class (9 quarters, 0 units)

***General Track* (9.5 additional units)**

- Additional large ensemble (8 quarters, 4 units)
- 231-1,2 Guitar Class I, II (.5 unit each)
- 232 Voice Class (.5 unit)
- 240 Classroom Instruments (.5 unit)
- 361 Teaching General Music I
- 362 Teaching General Music II
- 366 Teaching Choral Music I
- Instrumental techniques elective (.5 unit)

General Education (8 units)

- ENGLISH 105 Expository Writing or 205 Intermediate Composition
- SESP 201 Human Development: Childhood and Adolescence or PSYCH 218 Developmental Psychology
- TEACH ED 327 Educating Exceptional Children or CSD 336 The Field of Special Education
- Weinberg distribution area I (natural sciences) (1 unit)
- Weinberg distribution area III (social and behavioral sciences) (2 units)

- Weinberg distribution area IV (historical studies) and/or V (ethics and values) (2 units)

Courses Open to Undergraduates

MUSIC ED 230-0 Flute Class (.5)

MUSIC ED 231-1,2 Guitar Class I, II (.5)

MUSIC ED 232-0 Voice Class (.5)

MUSIC ED 233-0 Clarinet and Saxophone Class (.5)

MUSIC ED 234-0 Double Reeds Class (.5)

MUSIC ED 235-0 High Brass Class (.5)

MUSIC ED 236-0 Low Brass Class (.5)

MUSIC ED 237-0 String Class I (.5)

MUSIC ED 238-0 String Class II (.5)

MUSIC ED 239-0 Percussion Class (.5)

MUSIC ED 240-0 Classroom Instruments (.5)

MUSIC ED 242-0 Recorder Class (.5)

MUSIC ED 258-0 Philosophy of Music Education

Philosophical issues in music education relating to the teaching and learning of music in schools.

MUSIC ED 260-0 The Music Teacher as Communicator

Discussion and observation of school music programs and effective presentational skills.

MUSIC ED 314-0 Music Education Rehearsal Practicum (0)

Students rehearse their peers in a public school-level ensemble, learn public school repertoire, and gain practical experience on their secondary instruments.

MUSIC ED 335-0 Selected Topics in Music Education Topics vary; announced before registration. May be repeated.

MUSIC ED 345-0 Music in the Interdisciplinary Curriculum

For individuals interested in promoting music- and arts-based interdisciplinary experiences for elementary and secondary school students. Focuses on curriculum development that relates various arts disciplines to one another (such as music, art, and literature) and establishes valid connections between the arts and disciplines outside the arts (such as history and social studies).

MUSIC ED 361-0 Teaching General Music I For grades K–5, curriculum materials and strategies for developing musical growth. Laboratory experiences; developing creativity in the music classroom. Open only to music majors or with consent of instructor.

MUSIC ED 362-0 Teaching General Music II For grades 6–12, effective teaching of general music classes in middle and high school. Available curriculum materials; innovative approaches.

MUSIC ED 363-0 Teaching High School Nonperformance Courses Planning and teaching high school music, arts, humanities courses. Present practices; development of exemplary course plans.

MUSIC ED 364-0 Teaching Instrumental Music I Teaching and administrative principles for elementary and middle school instrumental music programs. Rehearsal dynamics, conducting, rehearsal room management, and pedagogy for school ensembles. Prerequisite: MUSIC ED 237.

MUSIC ED 365-0 Teaching Instrumental Music II Teaching and administrative principles for secondary school instrumental music programs. Rehearsal dynamics, conducting, rehearsal room management, and pedagogy for school ensembles. Prerequisite: 364.

MUSIC ED 366-0 Teaching Choral Music I Development and application of skills, knowledge, and understandings for teaching choral music in elementary and middle school.

MUSIC ED 367-0 Teaching Choral Music II Continuation of 366. High school choral program, curriculum model, repertoire, sight-reading, rehearsal techniques, programming, administration.

MUSIC ED 368-0 Teaching Composition in the Schools

Practical and research literature in teaching composition; design of curricular materials for teaching composition and improvisation in school music programs.

MUSIC ED 369-0 Research and Evaluation in Music Education

Procedures and issues in research and evaluation in music teaching. Practical application of research to decision making.

MUSIC ED 390-0 Student Teaching Colloquium (0)

MUSIC ED 399-0 Independent Study (.5–1)

Student Teaching Courses

Students are assigned to specific classes in cooperating schools under joint University/school supervision.

MUSIC ED 380-0 Student Teaching in the Elementary School: General Music (1–4)

MUSIC ED 381-0 Student Teaching in the Middle School/Junior High School: General Music, Choral (1–4)

MUSIC ED 383-0 Student Teaching in the Senior High School: Choral and Nonperformance Courses (1–4)

MUSIC ED 385-0 Student Teaching in the Elementary School: Instrumental (1–4)

MUSIC ED 386-0 Student Teaching in the Middle School/Junior High School: Instrumental (1–4)

MUSIC ED 387-0 Student Teaching in the Senior High School: Instrumental and Nonperformance Courses (1–4)

Musicology

www.music.northwestern.edu/programs/musicology.html

An undergraduate major in musicology is available within the bachelor of music degree or as a specialization within the bachelor of arts degree. The courses required for this specialization are selected from musicology, analysis, and the departmental core. As some of the courses are offered on a two-year alternating schedule, certain courses may not be available during a given year.

Major in Musicology

For a major in musicology, 16 course units are required beyond the core degree requirements.

Historic Musicology Track

- 350–355 history of music courses (6 units)
- Musicology electives or cognates (6 units)

- Applied lessons/performance experience (3 units)
- 385 Senior Project (1 unit)
- 390 Musicology Colloquium (12 quarters, 0 units)
-

Ethnomusicology Track

- Ethnomusicology courses (3 units)
- Area and topics courses (9 units)
- Applied lessons/performance experience (3 units)
- 385 Senior Project (1 unit)
- 390 Musicology Colloquium (12 quarters, 0 units)

Minor in Musicology

A minor in musicology requires 6 units, of which a minimum of 5 courses are not double counted in the major. The minor in musicology is open to music majors only. Students must receive a grade of C or above in all courses counted toward the minor.

- 6 units in musicology, at least one of which must be chosen from 323 or 326–329 (courses on music of the world's cultures) and at least one of which must be chosen from 350–355 (courses on historical art music). Students who wish to emphasize a particular concentration within the field of musicology should speak to the program coordinator or a musicology faculty member of their choosing.

Courses Open to Undergraduates

MUSICOL 323-0 Topics in Ethnomusicology Ethnomusicology; its history, bibliographical resources, methods, and theories.

MUSICOL 326-0 Topics in World Music: Asia The musical traditions of South Asia, East Asia, and Southeast Asia. Topics include characteristics of instruments and instrumental ensembles, sound structures, theatrical traditions, and vocal performance.

MUSICOL 327-0 Topics in World Music: Africa Introduces students to the diverse musics of Africa through the multi-disciplinary lens of ethnomusicology. Topics include music learning and transmission, aesthetics, musical styles and structures, performance practice, compositional process, musical change, and the role of music in society.

MUSICOL 328-0 Topics in World Music: The Americas An ethnomusicological perspective on music of the Americas as influenced by the European, African, Hispanic, and native American cultures. The socioeconomic impact of jazz, rock, gospel, and popular music; the role of music in the spiritual and social life of the Americas' diverse peoples.

MUSICOL 329-0 Music and Islam History, basic tenets, and aesthetic of Islam; the musics of Islamic cultures from North Africa, Spain, the Middle East, central Asia, and the Indian subcontinent. Methods of contextualizing musical cultures and critical methodology related to gender, post-colonial theory, and religion.

MUSICOL 330-0 Russian Fairy Tale and Opera Russian cultural and national identity through the study of folk tales

and their musical counterparts in such operas as Glinka's *Ruslan and Ludmila*, Tchaikovsky's *The Sleepers*, and Rimsky-Korsakov's *The Snow Maiden*, *Sadko*, and *The Tale of Tsar Saltan*. Current critical theory, concepts related to the portrayal of women, the interplay of nationalism and gender, and the dichotomy between East and West.

MUSICOL 331-0 Orientalism and Music The imagery of the East in the music of the West expressed in musical genres of various historical periods; focus on romantic opera and contemporary musical culture. Orientalism as formulated by Edward Said and developed by John MacKenzie is defined and further clarified through references in literature and the visual arts.

MUSICOL 332-0 Music and Gypsies Romany music from Hungary, Spain, the Balkans, Turkey, the Middle East, and India; Andalusian flamenco; 19th-century opera and operetta (Bizet's *Carmen*, Verdi's *La Traviata*); instrumental works by Haydn, Liszt, Brahms, and others; and more recent "world" music phenomena.

MUSICOL 333-0 Europop Explores major popular genres such as French chanson, Italian disco, Russian bardic song, and British ensembles. Second half of the quarter focuses on Eurovision song contest relative to the structure and dynamics of the European Union, studying popular musics as entwined with sociopolitics, gender, and globalization.

MUSICOL 335-0 Selected Topics in Musicology Topics vary; announced before registration. May be repeated.

MUSICOL 338-0 Expressionism The interaction of music with other art forms (painting, poetry, theater, dance) in early-20th-century Germany and Austria. Schoenberg, Berg, Webern, Weill, Hindemith; poets such as Stefan George; playwrights such as Frank Wedekind and Bertolt Brecht; choreographers such as Kurt Jooss; visual artists such as Vasily Kandinsky.

MUSICOL 339-0 Music and Gender The many intersections between music and ideas of gender; focus on issues of composition, characterization, patronage, and performance. Elite and popular forms of Western music from the Middle Ages to 2000 explored in relation to gender issues in musics of other cultures.

MUSICOL 341-0 Music and the Visual Arts The many ways in which the senses of sight and hearing interact in Western images of music and music making as well as in select musical works inspired by concurrent ideas or movements in the visual arts.

MUSICOL 342-0 Authenticity Focus on authenticity in music at the end of the 20th century and beginning of the 21st century by examining the three music genres most closely associated with the cultural and philosophical considerations of the idea: early music, country music, and "world" or "ethnic" music.

MUSICOL 343-0 Music and Shakespeare An exploration of some of the many intersections between Shakespearean drama and music from the late 16th through early 21st

centuries, including study of plays, opera, ballet, film, musical theater, art song, popular music, and the symphony.

MUSICOL 344-0 Music and Film Theory and practice of music as a part of the processes of making and viewing films, from the beginning of the sound era to the present. Specific topic varies from year to year but typically concentrates on a specific film genre and its musical traditions, techniques, personalities, and problems.

MUSICOL 345-0 From Literature to Opera to Film Selected operas, based on literary or theatrical works, that in turn inspired films. Examination of the literary or theatrical inspiration, the opera as written for stage, and film and video adaptations. Cross-listed as COMP LIT 375.

MUSICOL 346-0 Composer Topics Topics vary; announced before registration. May be repeated.

MUSICOL 347-0 The Lied Survey of voice-piano settings of German poems, from Mozart through Richard Strauss.

MUSICOL 348-0 Bel Canto Opera Italian opera in the early-to mid-19th century. The relations of Rossini, Donizetti, and Bellini to the operatic culture of their time.

MUSICOL 350-0 Topics in Medieval Music Gregorian and medieval chant, secular monophony, and the development of polyphony from the earliest records through the music of Ockeghem and Busnois.

MUSICOL 351-0 Topics in 16th-Century Music Middle and late renaissance and early manifestations of the baroque, from Josquin through the Gabriels.

MUSICOL 352-0 Topics in 17th-Century Music The baroque from Monteverdi through Bach and Handel.

MUSICOL 353-0 Topics in 18th-Century Music Representative works and critical studies of European art music from the Arcadian reform of opera through the Napoleonic era.

MUSICOL 354-0 Topics in 19th-Century Music Representative works and critical studies of European art music from the Congress of Vienna to the death of Mahler.

MUSICOL 355-0 Topics in 20th-Century Music Representative works and critical studies of art music from Debussy to the present.

MUSICOL 385-0 Senior Project

MUSICOL 390-0 Musicology Colloquium (0)

MUSICOL 399-0 Independent Study (.5–1)

Music Technology

www.music.northwestern.edu/programs/musictech.html

The major in music technology offers a unique professional preparation for a career in the technological sectors of the musical world — from games and web-based multimedia to programming and composing for electronic media.

Music technology students are engaged in creating music content for media as well as building technological tools for musical tasks. Students have access to the electronic and computer music studios, which provide the latest technology for experimentation and experience with 21st-century compositional materials. (Admission to the program is suspended for the 2010–11 academic year.)

Major in Music Technology

For a major in music technology, 16 course units are required beyond the core degree requirements.

- Required courses in music technology (6 units)
 - 338 Programming (1 unit)
 - 340 Composing with Computers (1 unit)
 - 342-1,2 Computer Sound Synthesis (2 units)
 - 384 Senior Project Development (2 quarters, .5 unit each)
 - 385 Senior Project (1 unit)
 - 390 Music Technology Colloquium (6 quarters, 0 units)
- Electives in music technology and related areas (7 units), chosen from
 - 259 Introduction to Music Technology or
 - 262 Technology in the Music Classroom
 - 320 Physics of Sound
 - 321 Producing in the Virtual Studio
 - 322 Recording and Basic Audio
 - 335 Selected Topics in Music Technology
 - 337 Multimedia for the Web
 - 343 Sound Design for New Media
 - 344 Advanced Projects in Music Technology
 - 345 Technology-Based Performance
 - 348 3-D Sound and Spatial Audio
 - RTVF 383 Sound Production
 - RTVF 384 Foundations of Sound Design
- Applied lesson/performance experience (3 units)

Minor in Music Technology

A minor in music technology requires 6 units, of which a minimum of 5 courses are not double counted in the major. Students must receive a grade of C or above in all courses counted toward the minor. The 6 units required for the minor in music technology are to be chosen from the following list of courses.

- 259 Introduction to Music Technology or
- 262 Technology in the Music Classroom
- 321 Producing in the Virtual Studio
- 322 Recording and Basic Audio
- 335 Selected Topics in Music Technology
- 337 Multimedia for the Web
- 338 Programming
- 340 Composing with Computers
- 342 Computer Sound Synthesis
- 345 Technology-Based Performance
- 348 3-D Sound and Spatial Audio

Courses Open to Undergraduates

MUS TECH 259-0 Introduction to Music Technology

Survey of music software and hardware for the professional musician. Topics include music notation, sequencing and MIDI, audio recording and editing, synthesis, multimedia, and web publishing. Assignments include projects demonstrating the practical use of software tools.

MUS TECH 262-0 Technology in the Music Classroom Survey of music software and hardware in the context of teaching. Topics include computer-aided instruction, music notation, sequencing and MIDI, multimedia, and web publishing. Assignments include projects related to teaching music. No prerequisite.

MUS TECH 320-0 Physics of Sound Principles of physical acoustics. Acoustics of musical instruments, the human voice, and concert halls. Fundamentals of psychoacoustics. Assignments include informal experiments.

MUS TECH 321-0 Producing in the Virtual Studio Techniques for creating and producing music in the context of a computer-based audio production environment. Topics include MIDI, audio editing, plug-ins, effects processing, mastering, and basic surround mixing. Assignments include creative projects. Prerequisites: 259, 262, or equivalent experience and consent of instructor.

MUS TECH 322-0 Recording and Basic Audio Microphone and placement techniques including stereo and close/distant miking of voices, acoustic instruments, and ensembles. Topics also include console design, signal flow, and dynamics processing. Projects include recording assignments. Prerequisites: 259, 262, or equivalent experience and consent of instructor.

MUS TECH 335-0 Selected Topics in Music Technology Topics vary; announced before registration. May be repeated with change of topic.

MUS TECH 337-0 Multimedia for the Web Advanced instruction in web design and programming with a focus on the design and maintenance of multimedia intended for distribution via the Internet. Assignments include web-based projects. Prerequisite: consent of instructor.

MUS TECH 338-0 Programming Syntax of programming languages, program development, user interfaces, and music-specific algorithms. Techniques for creating musical applications. Prerequisite: 259, 262, or equivalent experience.

MUS TECH 340-0 Composing with Computers Foundational techniques of composition using music and audio software. Techniques of algorithmic composition, sound processing. Analysis of electroacoustic music. Assignments include student compositions. Prerequisite: 259, 262, or equivalent experience.

MUS TECH 342-1,2 Computer Sound Synthesis 1. Synthesis of musical sounds, including the characteristics of digital audio signals, wavetable synthesis, modulation, and sample-based synthesis. **2.** Processing of audio signals, including digital filtering, reverberation, and effects processing; physical modeling synthesis. Assignments include sound synthesis programming. Prerequisite: 259, 262, or equivalent experience.

MUS TECH 343-0 Sound Design for New Media Creative projects for the web and DVD. Topics include philosophies and techniques of sound design, authoring for 5.1

surround sound, techniques of sound montage. Prerequisite: consent of instructor.

MUS TECH 344-0 Advanced Projects in Music Technology Individual instruction in projects related to music technology. Prerequisite: consent of instructor.

MUS TECH 345-0 Technology-Based Performance Creation, rehearsal, and performance of technology-based music in a group setting. Topics include real-time interaction, technological performance interfaces, application of algorithmic methods. Prerequisite: consent of instructor.

MUS TECH 348-0 3-D Sound and Spatial Audio Techniques and applications of 3-D sound and spatial audio. The physical acoustics and psychoacoustics of spatial hearing, simulating 3-D cues, stereo sound reproduction, multichannel audio formats, environmental acoustics, and environmental simulation. Prerequisite: fundamental knowledge of acoustics.

MUS TECH 384-0 Senior Project Development (.5)

MUS TECH 385-0 Senior Project Independent project in music technology. Prerequisite: permission of department.

MUS TECH 390-0 Music Technology Colloquium (0)

MUS TECH 399-0 Independent Study (.5–1)

Music Theory and Cognition

www.music.northwestern.edu/programs/musictheorycognition.html

Undergraduates majoring in theory or cognition receive a broad education in music and the cognitive sciences.

The emphasis is on cognitive musicology, whereby music is studied using the tools and insights of cognitive science and musicological research.

Major in Music Theory or Music Cognition

For a major in music theory or in music cognition, 16 course units are required beyond the core degree requirements.

Major in Music Theory

- 300- and 400-level courses in music theory and cognition (6 units)
- Musicology (2 units)
- Music technology (1 unit)
- Cognate areas (3 units)
- Applied lessons/performance experience (3 units)
- 385 Senior Project (1 unit)

Major in Music Cognition

- 251 Music and Mind (1 unit)
- 336 Selected Topics in Music Cognition (2 units)
- PSYCH 201 Statistical Methods in Psychology (1 unit)
- PSYCH 205 Research Methods in Psychology (1 unit)
- Cognate areas (3 units)
- Electives (4 units)
- Applied lessons/performance experience (3 units)
- 385 Senior Project (1 unit)

Minor in Music Theory or Music Cognition

Students must receive a grade of C or above in all courses counted toward the minor.

Minor in Music Theory

A minor in music theory requires 6 units, of which a minimum of 5 courses are not double counted in the major.

The minor in music theory is open to music majors only.

- 3 300-level music theory courses in music analysis
- 3 300-level courses in music cognition

Minor in Music Cognition

A minor in music cognition requires 9 units, of which a minimum of 5 courses are not double counted in the major.

- 3 units in music cognition
- 3 units in musical analysis and music technology
- 3 units in cognate areas (psychology, linguistics, and/or communication sciences and disorders)

Courses Open to Undergraduates

MUS THRY 251-0 Music and Mind An introduction to music cognition for music undergraduates as well as students with limited music backgrounds. Readings primarily from secondary sources, with some primary sources as well.

MUS THRY 316-0 Renaissance Counterpoint Contrapuntal textures from two to four voices. Cadence and form, melodic line and motive, rhythm, simple and complex imitation, and treatment of dissonance in the sacred music of Lassus, Josquin, and Palestrina.

MUS THRY 317-0 Figured Bass The study of harmony at the keyboard as learned by musicians since the early 17th century. Figured bass is an essential subject for performers of early music (including Bach and Mozart) and a key to the analysis of most pre-20th-century European music.

MUS THRY 318-0 Baroque Counterpoint Baroque dance suite, chorale prelude, invention, fugue, chiefly involving the music of J. S. Bach. Melodic, harmonic, structural characteristics; contrapuntal techniques.

MUS THRY 321-0 Analytical Techniques Detailed analysis of all parameters of selected musical examples; compositional procedures as a means of developing an intelligent rationale for interpretation. Prerequisite: MUSIC 211-1,2,3 or consent of instructor.

MUS THRY 331-0 Analytical Studies Extension and refinement of concepts and techniques acquired in MUSIC 111-1,2,3, MUSIC 211-1,2,3.

MUS THRY 335-0 Selected Topics in Music Theory Topics vary; announced before registration. May be repeated.

MUS THRY 336-0 Selected Topics in Music Cognition Topics vary; announced before registration. May be repeated.

MUS THRY 355-0 Atonal Analysis Techniques for analysis of atonal and nonfunctional tonal music, including serial, set-theoretic, and parametric approaches. Emphasis on music of Schoenberg, Webern, Berg, Stravinsky,

and Debussy. Selected readings in analytic literature.

Prerequisite: MUSIC 211-1,2,3 or equivalent.

MUS THRY 385-0 Senior Project (1)

MUS THRY 390-0 Music Theory/Cognition Colloquium (0)

Discussion of current research in music theory and cognition.

MUS THRY 399-0 Independent Study (.5–1)

Other Minor Programs

Students must receive a grade of C or above in all courses counted toward the minor.

Minor in Arts Administration

A minor in arts administration requires 8 units, of which a minimum of 5 courses are not double counted in the major. The minor in arts administration is open to music majors only.

- ECON 202 Introduction to Microeconomics
- MKTG 201 Marketing I: Principles of Marketing (School of Continuing Studies)
- ADVERT 203 Basic Advertising (School of Continuing Studies)
- ORG BEH 309 Human Resource Management (School of Continuing Studies)
- ORG BEH 367 Strategic Planning and Management (School of Continuing Studies)
- 2 business-related electives
- MUSIC 398 Internship

Minor in Commercial Music

A minor in commercial music requires 8 units, of which a minimum of 5 courses are not double counted in the major.

- JAZZ ST 330 Jazz Composition and Arranging (2 units)
- RTVF 383 Sound Production
- MUS COMP 311 Class Composition
- MUS COMP 314-1 Instrumentation
- 2 courses chosen from music technology
- 1 course in popular music

Minor in Music Criticism

A minor in music criticism requires 7 units, of which a minimum of 5 courses are not double counted in the major. The minor in music criticism is open to music majors only.

- JOUR 201-1 Reporting and Writing
- JOUR 201-2 Multimedia Storytelling
- JOUR 301 Enterprise Reporting in Diverse Communities (prerequisite: 201)
- JOUR 202 Introduction to 21st-Century Media or 370 Media Law and Ethics
- JOUR 310 Media Presentation: Newspaper/Online, 311 Media Presentation: Magazine, or 312 Media Presentation: Video Producing for Broadcast and the Web
- MUSIC 398 Internship or 399 Independent Study
- 1 300-level musicology course

See the Cross-School Options chapter for opportunities open to all Northwestern undergraduates.

MUSIC PERFORMANCE

This department consists of the Conducting and Ensembles, Jazz, Piano, Strings, Voice and Opera, and Winds and Percussion Programs.

Conducting and Ensembles

Courses in the Conducting and Ensembles Program are available to all music majors.

Courses Open to Undergraduates

CONDUCT 323-0 Marching Band Techniques Writing for marching and pep bands; rehearsing for the marching band.

CONDUCT 326-0 Basic Conducting Fundamentals in both instrumental and choral conducting; transpositions, ranges, and podium technique. Extensive laboratory experience with videotaped evaluation.

CONDUCT 335-0 Selected Topics in Conducting Topics relevant to the professional needs of conducting majors.

CONDUCT 336-0 Wind Orchestral Repertoire for Conductors (.5)

CONDUCT 340-1,2,3 Advanced Conducting Separate quarters of band, orchestral, and choral conducting that emphasize the techniques of score preparation and analysis, repertoire, and rehearsal methods. Prerequisite: 326 or equivalent. May be repeated for credit.

CONDUCT 341-0 Choral Literature I A comprehensive examination of choral music literature from 1600 to 1800.

CONDUCT 342-0 Choral Literature II A comprehensive examination of choral music literature from 1800 to the present.

CONDUCT 345-0 Orchestral Bowing: Style and Function

Designed for nonstring-playing conductors, teachers, and composers wishing to enhance their knowledge of bowing principles and practices as well as string players wishing to explore teaching concepts and in-depth bowing analyses. Topics include sound production principles, applied bowing techniques and pedagogy, performance practice, interpretation, and analysis.

CONDUCT 364-0 Choral Organizations University Chorale, University Singers, University Chorus, Alice Millar Chapel Choir, and Women's Chorus. Open to all qualified students.

CONDUCT 374-0 Band Organizations Marching Band, Concert Band, Symphonic Band, Symphonic Wind Ensemble. Open to all qualified students.

CONDUCT 378-0 Contemporary Music Ensemble (.5)
Membership by audition.

CONDUCT 391-0 Chamber Music (.5) Performance of chamber music literature in a variety of small-ensemble settings.

CONDUCT 393-0 Orchestral Organizations Membership by audition in Symphony Orchestra, Chamber Orchestra, or Philharmonia.

CONDUCT 395-0 Baroque Music Ensemble (.5)

Performance of choral, solo, and instrumental music of the Middle Ages through the early baroque.

CONDUCT 399-0 Independent Study (.5–1)

Jazz

www.music.northwestern.edu/programs/jazz.html

The jazz program offers courses in jazz improvisation, composition and arranging, history, and ensembles.

Major in Jazz Studies

For a major in jazz studies performance, 25 course units are required beyond the core degree requirements. For jazz majors, the 19-unit core requirement for the bachelor of music degree is reduced to 15.5 units by the omission of one year of keyboard skills (1.5 units) and two music history courses (2 units). Those requirements are replaced by the jazz keyboard and jazz history requirements below.

- 210-1,2 Jazz History (2 units)
- 236-1,2,3 Jazz Improvisation (1.5 units)
- 262 Applied Jazz (3 units)
- 330-1,2 Jazz Composition and Arranging (2 units)
- 336-1,2,3 Jazz Improvisation (1.5 units)
- 337 The Business of Jazz (.5 unit)
- 361-1,2 Jazz Keyboard (1 unit)
- 362 Applied Jazz (6 units)
- 377 Jazz Orchestra (4.5 units)
- 380 Senior Recital (0 units)
- 391 Small Ensemble (3 units)

Minor in Jazz Studies

A minor in jazz studies requires 8 units, of which a minimum of 5 courses are not double counted in the major. Students must receive a grade of C or above in all courses counted toward the minor. Admission requires a performance audition.

- JAZZ ST 160 Applied Jazz (3 quarters, 1.5 units)
- JAZZ ST 210-1,2 Jazz History (2 units)
- JAZZ ST 236-1,2,3 Jazz Improvisation (1.5 units)
- JAZZ ST 377-0 Jazz Orchestra or
391-0 Small Ensemble (6 quarters, 3 units)

Courses Open to Undergraduates

JAZZ ST 160-0 Applied Jazz for Minors (.5)

JAZZ ST 162-0, 262-0, 362-0 Applied Jazz

JAZZ ST 210-1,2 Jazz History The origins of jazz, its performers, and their contributions. Includes a look at contemporaneous social conditions during its development.

JAZZ ST 236-1,2,3 Jazz Improvisation I, II, III (.5 each) The language of jazz. Focus is on melodic development and ear training via repertoire and solos of jazz's most influential figures.

JAZZ ST 305-0 Optional Recital (0)

JAZZ ST 330-1,2 Jazz Composition and Arranging The techniques of composing and arranging for large and small

ensembles in the jazz tradition. Study of scores by major composers and arrangers from throughout jazz history.

JAZZ ST 333-0 Jazz Theory (.5) Chord symbols, melodic and harmonic structures, and other analyses as applied to the language of jazz.

JAZZ ST 335-0 Selected Topics in Jazz Studies Topics vary. May be repeated for credit as topics change.

JAZZ ST 336-1,2,3 Jazz Improvisation IV, V, VI (.5 each) Continuation of 236-1,2,3.

JAZZ ST 337-0 The Business of Jazz (.5) A survey of the music industry as it pertains to jazz. Includes discussions on songwriting, music publishing, national and international copyright law, music licensing, artist management, music production, and related topics.

JAZZ ST 361-1,2 Jazz Keyboard (.5 each) Basic keyboard skills, with an emphasis on jazz voicing, harmonization, and analysis.

JAZZ ST 377-0 Jazz Orchestra (.5)

JAZZ ST 380-0 Senior Recital (0)

JAZZ ST 391-0 Small Ensemble (.5)

JAZZ ST 399-0 Independent Study (.5–1)

Piano

www.music.northwestern.edu/programs/piano.html

The major in piano performance focuses on private lessons, studio classes, piano repertoire, piano pedagogy, and accompanying classes. Frequent performances as a soloist and as an assisting musician develop skills in public presentation. Solo recitals, required in both the junior and senior years, are considered an integral part of the program.

Major in Piano

For a major in piano performance, 17 course units are required beyond the core degree requirements.

- 261 Applied Piano (3 units)
- 313-1,2,3 Repertoire Studies (3 units)
- 315-1,2,3 Piano Pedagogy (3 units)
- 328 Beginning Collaborative Piano (1.5 units)
- 340 Piano Recital Hour (12 quarters, 0 units)
- 361 Applied Piano (6 units)
- 370 Junior Recital (0 units)
- 380 Senior Recital (0 units)
- CONDUCT 391 Chamber Music (.5 unit)

Students enrolled in a five-year double-degree program may substitute three 300-level musicology and/or music theory electives for the pedagogy requirement.

Courses Open to Undergraduates

PIANO 161-0, 261-0, 361-0 Applied Piano

PIANO 255-0 Piano Sight-Reading (0)

PIANO 305-0 Optional Recital (0)

PIANO 313-1,2,3 Repertoire Studies Analytical and historical study of piano solo and concerto repertoire from early keyboard literature to the present.

PIANO 315-1,2,3 Piano Pedagogy Lecture/demonstration/laboratory course in piano teaching at all levels. Principles and techniques of group and individual instruction; survey of teaching materials. Seniors and graduate students.

PIANO 328-0 Beginning Collaborative Piano (.5) Piano students work with a singer and instrumentalist in the preparation and performance of mainstream recital repertoire.

PIANO 329-0 Duo Collaborative Coaching (.5) Provides an opportunity for pianists and their vocal and/or instrumental partners to receive intensive coaching on works of their choice. A final performance is required.

PIANO 335-0 Selected Topics in Piano Topics vary; announced before registration. May be repeated.

PIANO 340-0 Piano Recital Hour (0)

PIANO 358-0 Other Keyboard: Instruction in Harpsichord or Organ (.5)

PIANO 370-0 Junior Recital (0)

PIANO 380-0 Senior Recital (0)

PIANO 392-0 Studio Ensemble (.5)

PIANO 399-0 Independent Study (.5–1)

String Instruments

www.music.northwestern.edu/programs/strings.html

Majors in string instruments prepare for professional performance and teaching as well as for advanced study. The curriculum is built around individual study and ensemble participation, including chamber music and orchestra, with orchestral repertoire studies and string pedagogy available to qualified juniors and seniors. A junior recital and a senior recital are required. Students in this program may major in violin, viola, cello, double bass, harp, or classical guitar.

Major in String Instruments

For a major in violin, viola, or cello, 19.5 course units are required beyond the core degree requirements.

Violin, Viola, and Cello Performance

- 200-level applied study (3 units)
- 300-level applied study (6 units)
- 300-level string pedagogy (1.5 units)
- 319-1,2,3 Orchestral Studies (1.5 units)
- 370 Junior Recital (0 units)
- 380 Senior Recital (0 units)
- CONDUCT 391 Chamber Music (3 units)
- CONDUCT 393 Orchestral Organizations (4.5 units)

For a major in double bass performance, 18 course units are required beyond the core degree requirements.

Double Bass Performance

- 200-level applied study (3 units)
- 300-level applied study (6 units)
- 300-level string pedagogy (1.5 units)
- 319-1,2,3 Orchestral Studies (1.5 units)
- 370 Junior Recital (0 units)

- 380 Senior Recital (0 units)
- CONDUCT 391 Chamber Music (1.5 units)
- CONDUCT 393 Orchestral Organizations (4.5 units)

For a major in harp or guitar performance, 16.5 course units are required beyond the core degree requirements.

Harp Performance

- 200-level applied study (3 units)
- 300-level applied study (6 units)
- Large ensemble (4.5 units)
- 318-1,2,3 Harp Pedagogy and Maintenance (1.5 units)
- 319-1,2,3 Orchestral Studies (1.5 units)
- 380 Senior Recital (0 units)

Guitar Performance

- 200-level applied study (3 units)
- 300-level applied study (6 units)
- 376-1,2,3 Guitar Pedagogy (1.5 units)
- 370 Junior Recital (0 units)
- 374 Guitar Ensemble (4.5 units)
- 375-1,2,3 Lute and Guitar Literature (1.5 units)
- 380 Senior Recital (0 units)

Courses Open to Undergraduates

STRINGS 141-0, 241-0, 341-0 Applied Violin

STRINGS 142-0, 242-0, 342-0 Applied Viola

STRINGS 143-0, 243-0, 343-0 Applied Cello

STRINGS 144-0, 244-0, 344-0 Applied Double Bass

STRINGS 151-0, 251-0, 351-0 Applied Harp

STRINGS 171-0, 271-0, 371-0 Applied Classical Guitar

STRINGS 305-0 Optional Recital (0)

STRINGS 311-0 Suzuki Pedagogy (.5) Fundamental principles of Suzuki philosophy and materials, with emphasis on application to violin. Open to all string players.

STRINGS 312-0 String Class Pedagogy (.5) Group teaching strategies, materials, and techniques for violin, viola, cello, and double bass. Pedagogical applications to school settings and teaching college-level string techniques classes. Open to all string players.

STRINGS 313-0 History of String Pedagogy (.5) Historical survey of major violin, viola, cello, and double bass pedagogues from the early baroque through the 20th century and their contributions to contemporary pedagogical schools. Open to all string players.

STRINGS 314-0 Comprehensive String Pedagogy (.5)

Survey and application of general principles of successful string teaching. Lecture, discussion, and demonstration format. Open to all string players.

STRINGS 315-1,2,3 Beginning Violin and Viola Pedagogy (.5) Developmental approach to teaching beginning through advanced precollege violin and viola students. Includes apprenticeship teaching and observations. Designed as a one-year sequence. Open to all violinists and violists.

STRINGS 316-1,2,3 Beginning Cello and Double Bass

Pedagogy (.5) Developmental approach to teaching beginning through advanced precollege cello and double bass students.

STRINGS 317-0 Principles of Advanced/College-Level Studio Teaching (.5) In-depth analysis of pedagogy for advanced violin, viola, cello, or double bass playing. Observation of artist faculty. Open to all string players.

STRINGS 318-1,2,3 Harp Pedagogy and Maintenance (.5)

1. Guests and master classes related to playing and teaching. **2.** Instrument maintenance and repair clinic with hands-on experience in routine maintenance and common repairs. **3.** Pedagogical instruction and demonstration of teaching techniques for all levels and ages.

STRINGS 319-1,2,3 Orchestral Studies (Violin, Viola, Cello, Double Bass, Harp) (.5)

STRINGS 335-0 Selected Topics in Strings Topics vary; announced before registration. May be repeated.

STRINGS 370-0 Junior Recital (0)

STRINGS 374-0 Guitar Ensemble Performance of the chamber literature for guitar: guitar duos, trios, and quartets; flute and guitar; voice and guitar; chamber works with strings; other instrumental combinations.

STRINGS 375-1,2,3 Lute and Guitar Literature Analytical and historical survey of the literature for plucked instruments from the 16th through the 20th centuries. The study of tablatures, instrument construction and tuning, performance practice, and style.

STRINGS 376-1,2,3 Guitar Pedagogy Principles of individual and group study. Survey of development of right- and left-hand technique from 16th-century lute and vihuela tutors through modern classical guitar methods. Interaction between musical texture and technical innovations; influence of fingering on stylistic inflection and ornamentation.

STRINGS 380-0 Senior Recital (0)

STRINGS 392-0 Studio Ensembles (.5) Small ensembles based on studio instruments.

STRINGS 399-0 Independent Study (.5–1)

Voice and Opera

www.music.northwestern.edu/programs/voiceandopera.html

Students majoring in voice take a concentrated program of courses designed to prepare them for professional performance. In addition to individual instruction, students take courses in vocal pedagogy, conducting, opera workshop, repertoire, and diction. A senior recital is required, and students are urged to take advantage of the numerous other performance opportunities offered by the school.

The opera program generally presents three opera productions each year, including two with full orchestra.

Major in Voice

For a major in voice performance, 18 course units are required beyond the core degree requirements.

- 111-1,2,3 Phonetics and Diction (0 units)
- 210 Applied Voice (3 units)
- 211 Sophomore Practicum (0 units)
- 212 Opera Crew (0 units)
- 310 Applied Voice (6 units)
- 311 Vocal Solo Class (12 quarters, 0 units)
- 323 Vocal Pedagogy for Undergraduates (.5 unit)
- 351-1,2,3 Opera Workshop for Juniors (1.5 units)
- 352-1,2,3 Opera Workshop for Seniors (1.5 units)
- 380 Senior Recital (0 units)
- 393 Repertoire Studies (2 quarters, 1 unit)
- CONDUCT 364 Choral Organizations (4.5 units)

It is recommended that voice performance majors take 3 units of one foreign language and achieve a level-five competency in Keyboard Skills. See the voice program coordinator concerning the honors program in voice performance.

Certificate in Music Theatre

The Certificate in Music Theatre is jointly offered by the voice and opera program and the School of Communication's Department of Theatre. The program provides the opportunity for Bienen School of Music students majoring in voice and School of Communication students majoring in theatre to create a second area of specialization that is important to their development as musical theatre artists. For voice majors the program provides training in acting and other theatre courses. Theatre majors have weekly voice classes and exposure to other music offerings.

The prescribed sequence of courses is open only to students accepted into the program through audition. The auditions are held annually in the spring quarter and are limited to freshman and sophomore theatre and voice majors. Auditionees are required to perform a vocal selection and a monologue and to participate in a dance audition.

Certificate Requirements for Voice Majors (8 units)

- THEATRE 243-1,2,3 Acting I: Principles of Characterization (3 units)
- THEATRE 352-1,2 Music Theatre Techniques (2 units)
- THEATRE 367 History of the Lyric Theatre (1 unit)
- Design, dance, or acting elective (1 unit)
- 3 dance classes (.33 unit each; 1 unit total)

It is also recommended that sophomores enroll in THEATRE 272 Special Topics: Music Theatre.

For certificate requirements for theatre majors, see page 173.

Courses Open to Undergraduates

VOICE 102-0 Beginning Voice Class instruction for Music Theatre Certificate students. Basic music skills required. Prerequisite: admission to the Music Theatre Program.

VOICE 110-0, 210-0, 310-0 Applied Voice Lessons consist of individual instruction, with each student receiving the equivalent of 50 minutes of instruction weekly.

VOICE 111-1,2,3 Phonetics and Diction (0) Required of freshman and transfer students majoring in voice. Three quarters: Italian, German, French.

VOICE 202-0 Intermediate Voice Private instruction for Music Theatre Certificate students. Prerequisites: admission to the Music Theatre Program and 102 or equivalent.

VOICE 211-0 Sophomore Practicum (0)

VOICE 212-0 Opera Crew (0) One quarter required for voice majors. Students work crew for one opera production during sophomore year.

VOICE 305-0 Optional Recital (0)

VOICE 311-0 Vocal Solo Class (0) Weekly recital hour. Required for any student registered for full-credit private voice lessons.

VOICE 323-0 Vocal Pedagogy for Undergraduates (.5) The fundamentals of vocal production, including laryngeal anatomy, posture, breathing, resonance, articulation, and registration. Topics also include health care of the professional voice and some pathologies of the vocal folds.

VOICE 335-0 Selected Topics in Voice Topics vary; announced before registration. May include chanson, recitative, and non-English languages. May be repeated.

VOICE 351-1,2,3 Opera Workshop for Juniors (.5) Advanced techniques for the performance of arias; methods of text and character analysis; audition techniques; study of opera scenes. Must be taken sequentially.

VOICE 352-1,2,3 Opera Workshop for Seniors (.5) Specialty seminars (stage makeup, combat, etc.); audition techniques, opera scene work and performance. Prerequisites: 351-1,2,3. Must be taken sequentially.

VOICE 370-0 Junior Recital (0)

VOICE 380-0 Senior Recital (0)

VOICE 393-0 Repertoire Studies (.5) Topics vary by quarter and may include the German *Lied*, *chanson*, oratorio repertoire, and recitative.

VOICE 399-0 Independent Study (.5–1) Permission of instructor and department required.

Winds and Percussion Instruments

www.music.northwestern.edu/programs/windsandpercussion.html

Designed to prepare students for professional performance and teaching as well as for advanced study, the major in winds and percussion instruments offers a concentrated curriculum emphasizing applied studies, frequent master classes, required participation in large and small ensembles,

and a required senior recital. Students anticipating graduate study in wind or percussion performance are advised to elect additional courses in 300-level theory and history.

Major in Winds and Percussion Instruments

For a major in winds and percussion performance, 17.5 course units are required beyond the core degree requirements.

- 200-level applied study (3 units)
- 300-level applied study (6 units)
- Large ensemble (4.5 units)
- 359 Teaching Techniques (1 quarter, .5 unit)
- 380 Senior Recital (0 units)
- 393 Repertoire Studies (1 quarter, .5 unit)
- CONDUCT 374 Band Organizations or
CONDUCT 393 Orchestral Organizations (4.5 units)
- CONDUCT 391 Chamber Music (3 units)

Courses Open to Undergraduates

WIND PER 111-0, 211-0, 311-0 Applied Flute
WIND PER 112-0, 212-0, 312-0 Applied Oboe
WIND PER 113-0, 213-0, 313-0 Applied Clarinet
WIND PER 114-0, 214-0, 314-0 Applied Saxophone
WIND PER 115-0, 215-0, 315-0 Applied Bassoon
WIND PER 121-0, 221-0, 321-0 Applied Trumpet
WIND PER 122-0, 222-0, 322-0 Applied French Horn
WIND PER 123-0, 223-0, 323-0 Applied Euphonium
WIND PER 124-0, 224-0, 324-0 Applied Trombone
WIND PER 125-0, 225-0, 325-0 Applied Tuba
WIND PER 131-0, 231-0, 331-0 Applied Percussion
WIND PER 305-0 Optional Recital (0)
WIND PER 335-0 Selected Topics in Winds and Percussion
 Topics vary; announced before registration. May be repeated.
WIND PER 339-0 Performance Practices and Criticism
 Performance and criticism of woodwind, brass, and percussion repertoire in a master class setting. Team-taught.
WIND PER 347-0 Percussion Pedagogy and Performance
 (.5) Methods, materials, and writings related to percussion playing and teaching.
WIND PER 352-0 Preparing for an Audition (.5)
WIND PER 354-0 Woodwind Instrument Repair (.5)
WIND PER 357-0 Reedmaking (.5)
WIND PER 359-0 Teaching Techniques (.5)
WIND PER 360-0 Bass Clarinet (.5)
WIND PER 361-0 English Horn (.5)
WIND PER 362-0 Baroque Flute (.5)
WIND PER 370-0 Junior Recital (0)
WIND PER 380-0 Senior Recital (0)
WIND PER 390-0 Studio Class (0)
WIND PER 392-0 Studio Ensembles (.5)
WIND PER 393-0 Repertoire Studies (.5) Includes winds/brass/percussion orchestral repertoire (required), clarinet

orchestral studies, and studies in woodwind and brass literature.

WIND PER 399-0 Independent Study (.5–1)

MUSIC STUDIES FOR NONMAJORS

www.music.northwestern.edu/programs/nonmajors.html

Students registered in other schools of the University are encouraged to continue their development as instrumentalists or vocalists through ensemble participation, class instruction, or private study. Ensembles and music performance instruction require an audition. For more information, visit the Office of Student Affairs for a brochure.

Concentration in Music

The concentration in music is a program offered to students in any school at Northwestern outside the Bienen School of Music. The program requires a total of 6 units of credit and is focused on the academic study of music; no more than 2 credits of performance-related credits (nonmajor applied lessons and/or ensembles) may be counted toward the concentration. The program is limited to 20 students per year. For information, contact the Office of Student Affairs in the Bienen School of Music.

Applied Lessons for Credit

Nonmusic majors may take half-hour individual music lessons for .5 course credit in GEN MUS 115 Applied Piano and Organ, 120 Applied Strings, and 125 Applied Winds/Percussion; they may take voice classes or individual voice lessons, for up to .5 course credit (subject to instructor consent), in GEN MUS 131, 133, 134, 160, 231, 260, and 360. A registration fee is billed to the student's tuition and fees account; for 2010–11 registration fees, see the "Music Opportunities for Nonmajors" brochure, available in the Bienen School's Office of Student Affairs. Students are accepted for instrumental lessons and for vocal lessons and classes based on an audition and the availability of an instructor.

Courses Open to Undergraduates

The following courses were designed to meet the needs of any students interested in studying music. Students with a basic music foundation are encouraged to register for 252 Harmony (a basic music theory course), followed by 253 Form and Analysis and/or Composition. The music literature sequence is designed to permit students with limited background to start with 170. For courses for which Weinberg students may earn distribution requirement credits, the distribution area is indicated in parentheses.
GEN MUS 115-0 Applied Piano and Organ (.5 units) Private lessons for nonmajors; audition required.
GEN MUS 120-0 Applied Strings (.5) Private lessons for nonmajors; audition required.

GEN MUS 121-0 Beginning Nonmajor Guitar Class (.5)

Class instruction in classical guitar.

GEN MUS 125-0 Applied Winds/Percussion (.5) Private lessons for nonmajors; audition required.

GEN MUS 131-0 Nonmajor Vocal Performance Seminar, Beginning (.5) Must be concurrently registered for 133 or 160.

GEN MUS 133-0 Nonmajor Class Voice, Beginning (.5)

Audition required.

GEN MUS 134-0 Nonmajor Class Voice, Intermediate/Advanced (.5) Audition required.

GEN MUS 160-0 Nonmajor Private Voice, Beginning (.5) Private lessons for nonmajors; audition required.

GEN MUS 170-0 Introduction to Music Principles of musical organization. Score study and recognition of what is heard in all music, including classical, jazz, rock, and popular. (VI. Literature and fine arts)

GEN MUS 175-0 Selected Topics Topics vary; announced before registration. May be repeated.

GEN MUS 220-0 History of the Symphony Study of music for the symphony orchestra from the 17th century to the modern period. (VI. Literature and fine arts)

GEN MUS 230-0 Masterpieces of Opera History of opera from its origins in Italy at the end of the 16th century to the modern period. (VI. Literature and fine arts)

GEN MUS 231-0 Nonmajor Vocal Performance Seminar, Intermediate/Advanced (.5) Must be concurrently registered for 134, 160, 260, or 360.

GEN MUS 250-0 History of Rock The basic elements of rock from its roots in pop, country and western, and rhythm and blues to the present. Prerequisite: consent of instructor. (VI. Literature and fine arts)

GEN MUS 252-0 Harmony A basic course in music theory fundamentals, including harmonic materials and tonal structures. Analysis of harmonic structures; harmonization of melodies. Prerequisite: 170 or consent of instructor. (II. Formal studies)

GEN MUS 253-0 Form and Analysis Nature of musical forms found in musical literature from renaissance to the present; analysis of musical examples. Prerequisite: 252, or music-reading skills and some understanding of harmony.

GEN MUS 260-0 Nonmajor Private Voice, Intermediate (.5) Private lessons for nonmajors; audition required.

GEN MUS 270-1 The Western Musical Tradition Major genres and composers from 1600 to 1825. Primary emphasis on the generations of Bach and Handel, Haydn and Mozart, Beethoven and Schubert. Prerequisite: 170 or equivalent. (VI. Literature and fine arts)

GEN MUS 270-2 The Western Musical Tradition Major genres and composers from 1825 to the present. Prerequisite: 170 or equivalent. (VI. Literature and fine arts)

GEN MUS 335-0 Selected Topics Topics vary; announced before registration. May be repeated.

GEN MUS 360-0 Nonmajor Private Voice, Advanced (.5) Private lessons for nonmajors; audition required.

Administration and Faculty

UNIVERSITY ADMINISTRATION

University Officials

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Daniel I. Linzer, PhD, *Provost*

Eugene S. Sunshine, MPA, *Senior Vice President for Business and Finance*

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Jean E. Shedd, MBA, *Associate Provost for Budget, Facilities, and Analysis*

James B. Young, PhD, *Associate Provost for Faculty Affairs*

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Carretta A. Cooke, MEd, *Assistant to the Vice President for Student Affairs*

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Tausak Tedd Vanadilok, MA, *Director, Asian/Asian American Student Affairs*

R. Christian Yanez, MA, *Director, Hispanic/Latino Student Affairs*

Mark D'Arienzo, MS, *Associate Director, University Housing*

Dianne K. Siekmann, MA, *Associate Director, University Career Services*

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Timothy S. Stevens, PhD, *University Chaplain*

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Maria Di Benedetto, BPhil, *Senior Assistant Registrar*

Leigh Ann Dreves, MS, *Senior Assistant Registrar for Scheduling and Registration*

Oralia G. Gomez, BSGS, *Senior Assistant Registrar for Transcripts, Grading, and Verification Services*

William R. Berry, *Assistant Registrar for Systems*

Jason Compton, *Senior Research Analyst, Academic Report Services*

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Adina Andrews, MS, *Director, Student Financial Services Operations*

Angela Yang, MS, *Director, Financial Aid Operations*

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Sarah M. Pritchard, MALS, *University Librarian and Charles Deering McCormick Distinguished Chair of Research Librarianship*

Stu Baker, BA, *Associate University Librarian for Library Technology*

Jeffrey Garrett, MLIS, *Associate University Librarian for Special Libraries*

Marianne Ryan, PhD, *Associate University Librarian for Public Services*

Roxanne J. Sellberg, MLS, *Assistant University Librarian for Technical Services and Resource Management*

UNDERGRADUATE SCHOOLS

The following lists of the respective administration and faculty of the undergraduate schools were current as of summer 2010. In the administration lists, the administrative title precedes the academic rank. In the department lists, faculty rank within the department is given first; an administrative assignment, joint appointment in another department, or affiliation with a University center, if any, follows. The highest academic or professional degree and the institution granting the degree are shown. *University* and *College* are usually omitted; familiar abbreviations and short forms are used when appropriate. The department chair is designated when the appointment was known at the time the catalog went to press.

Judd A. and Marjorie Weinberg College of Arts and Sciences**Administration**

Sarah Mangelsdorf, PhD, *Dean and Professor of Psychology*

Craig Bina, PhD, *Associate Dean for Research and Graduate Studies and Wayne V. Jones II Professor of Earth and Planetary Sciences*

Mary E. Finn, PhD, *Associate Dean for Undergraduate Academic Affairs and Distinguished Senior Lecturer in English*

John M. Franks, PhD, *Associate Dean for Faculty Affairs and Henry S. Noyes Professor of Mathematics*

Catherine Grimsted, MBA, *Associate Dean for Finance and Administration*

Marie Thourson Jones, PhD, *Associate Dean for Faculty Processes and Governance and Lecturer in Political Science*

Mónica Russel y Rodriguez, PhD, *Associate Dean for the Lecturer Faculty and Senior Lecturer in Anthropology*

Joel Trammel, MA, *Associate Dean for Facilities and Planning*

Lane Fenrich, PhD, *Assistant Dean for Freshmen and Charles Deering McCormick University Distinguished Senior Lecturer in History*

Joan A. W. Linsenmeier, PhD, *Assistant Dean for Curriculum and Senior Lecturer in Psychology*

Mark Sheldon, PhD, *Assistant Dean for Academic Integrity and Advising and Distinguished Senior Lecturer in Philosophy; also Medical Humanities and Bioethics*

Richard P. Weimer, MA, *Assistant Dean for Academic and Advanced Standing*

Steven W. Cole, PhD, *Director of Faculty Evaluation and Lecturer in Asian and Middle East Studies*

William N. Haarlow, PhD, *Director of College-Admission Relations and Undergraduate Research and Lecturer in American Studies; also Undergraduate Admission*

Christine Bell, PhD, *College Adviser and Lecturer in Art History*

Jaime Dominguez, PhD, *College Adviser and Lecturer in Political Science*

Sheila Donohue, MFA, *College Adviser and Senior Lecturer in English*

Angela Grant, PhD, *College Adviser and Lecturer in Mathematics*

Michael Kramer, PhD, *College Adviser and Lecturer in History and American Studies*

Hilarie H. Lieb, PhD, *College Adviser and Senior Lecturer in Economics*

James O'Laughlin, MA, *College Adviser and Senior Lecturer in Writing Program*

Laura J. Panko, PhD, *College Adviser and Lecturer in Biological Sciences*

Jeanne R. Ravid, MA, *College Adviser and Senior Lecturer in Classics*

Jeffrey Rice, MSc, *College Adviser and Senior Lecturer in History*

Andrew Rivers, PhD, *College Adviser and Senior Lecturer in Physics*

William Savage, PhD, *College Adviser and Senior Lecturer in English*

Glenn Sucich, PhD, *College Adviser and Lecturer in English*

Elizabeth Fekete Trubey, PhD, *College Adviser and Senior Lecturer in English*

African American Studies

Darlene Clark Hine (PhD Kent State) *Board of Trustees Professor and Chair; also History*

Ana Aparicio (PhD CUNY) *Assistant Professor; also Anthropology, Latina/o Studies*

Henry C. Binford (PhD Harvard) *Associate Professor; also History*

Martha Biondi (PhD Columbia) *Associate Professor; also History, Political Science*

Victoria DeFrancesco Soto (PhD Duke) *Assistant Professor; also Political Science, Institute for Policy Research*

Sherwin Bryant (PhD Ohio State) *Assistant Professor; also History*

Traci R. Burch (PhD Harvard) *Assistant Professor; also Political Science*

Huey G. Copeland (PhD UC Berkeley) *Assistant Professor; also Art History*

Marla Frederick (PhD Duke) *Visiting Associate Professor*

Dilip P. Gaonkar (PhD Pittsburgh) *Associate Professor; also Communication Studies*

Mark Hauser (PhD Syracuse) *Assistant Professor; also Anthropology*

Geraldine Henderson (PhD Northwestern) *Associate Professor; also Journalism*

Barnor Hesse (PhD Essex) *Associate Professor; also Political Science, Sociology*

Richard Iton (PhD Johns Hopkins) *Professor; also Political Science*

E. Patrick Johnson (PhD Louisiana State) *Professor; also Performance Studies*

John Keene (MFA NYU) *Associate Professor; also English*

Carol D. Lee (PhD Chicago) *Professor; also Education and Social Policy*

John Marquez (PhD UC San Diego) *Assistant Professor; also Latina/o Studies*

Kate Masur (PhD Michigan) *Assistant Professor; also History*

Charles Mills (PhD Toronto) *Professor; also John Evans Professor in Philosophy*

Toni-Marie Montgomery (PhD Michigan) *Professor; also Dean, Bienen School of Music*

Aldon D. Morris (PhD SUNY Stony Brook) *Leon Forrest Professor; also Sociology*

Larry Murphy (PhD Graduate Theological Union) *Professor; also Garrett-Evangelical Theological Seminary*

Mary Pattillo (PhD Chicago) *Professor; also Sociology*

Dylan Penningroth (PhD Johns Hopkins) *Associate Professor; also History*

Sandra L. Richards (PhD Stanford) *Professor; also Performance Studies, Theatre*

Jennifer Richeson (PhD Harvard) *Professor; also Psychology*

Dorothy Roberts (JD Harvard) *Professor; Kirkland & Ellis Professor of Law*

Reuel R. Rogers (PhD Princeton) *Associate Professor; also Political Science*

Nitasha Sharma (PhD UC Santa Barbara) *Assistant Professor; also Asian American Studies*

Jacqueline Stewart (PhD Chicago) *Associate Professor; also Radio/Television/Film*

Krista A. Thompson (PhD Emory) *Associate Professor; also Art History*

Tracy Vaughn (PhD Massachusetts) *Lecturer*

Celeste Watkins-Hayes (PhD Harvard) *Associate Professor; also Sociology*

Alexander G. Weheliye (PhD Rutgers) *Associate Professor; also English, German*

Ivy Wilson (PhD Yale) *Assistant Professor; also English*

Michelle Wright (PhD Michigan) *Associate Professor*

Harvey Young (PhD Cornell) *Associate Professor; also Performance Studies, Radio/Television/Film, Theatre*

African and Asian Languages

Licheng Gu (PhD Oregon) *Professor of Instruction in the Chinese Language and Director*

Hyeryeong Baek (MEd DePaul) *Lecturer*

Mika Changet (MA Illinois Chicago) *Lecturer*

Edna G. Grad (PhD Texas) *Distinguished Senior Lecturer*

Hong Jiang (MEd Cincinnati, MA Zhongshan) *Distinguished Senior Lecturer*

Fatima Khan (MA Michigan) *Lecturer*

Bruce Knickerbocker (PhD Wisconsin) *Lecturer*

Eunmi Lee (MA Indiana) *Distinguished Senior Lecturer*

Richard Lepine (PhD Wisconsin) *Senior Lecturer*

Phyllis I. Lyons (PhD Chicago) *Associate Professor*

Ragy Mikhaeel (MSc Cairo) *Lecturer*

Rami Nair (PhD Northwestern) *Senior Lecturer*

Hsiu-ling Robertson (EdD Massachusetts) *Senior Lecturer*

Junko Sato (MEd Massachusetts) *Senior Lecturer*

Rana Shabaneh (MA Jordan) *Lecturer*

Hong Shao (MA Beijing) *Lecturer*

Yumi Shiojima (MS Pennsylvania) *Senior Lecturer*

Jili Sun (PhD Sorbonne Nouvelle) *Lecturer*

Lynn Whitcomb (PhD Northwestern) *Senior Lecturer*

Judith Wilks (PhD Chicago) *Lecturer*

Noriko Taira Yasohama (MEd Massachusetts) *Distinguished Senior Lecturer*

Guofang Yuan (PhD Cleveland State) *Lecturer*

Anthropology

William R. Leonard (PhD Michigan) *Abraham Harris Professor and Chair; also Neurobiology and Physiology*

Ana Aparicio (PhD CUNY) *Assistant Professor; also African American Studies, Latina/Latino Studies*

Caroline H. Bledsoe (PhD Stanford) *Melville J. Herskovits Professor of African Studies*

James A. Brown (PhD Chicago) *Professor*

Elizabeth M. Brumfiel (PhD Michigan) *Professor*

Micaela di Leonardo (PhD UC Berkeley) *Professor; also Performance Studies*

Timothy Earle (PhD Michigan) *Professor*

Karen Tranberg Hansen (PhD Washington) *Professor*

Mark Hauser (PhD Syracuse) *Assistant Professor; also African American Studies*

Katherine E. Hoffman (PhD Columbia) *Associate Professor*

John C. Hudson (PhD Iowa) *Professor*

William Irons (PhD Michigan) *Professor Emeritus in Service*

Christopher Kuzawa (PhD Emory) *Associate Professor*

Robert G. Launay (PhD Cambridge) *Professor*

Thomas McDade (PhD Emory) *Associate Professor; also Education and Social Policy*

Cynthia Robin (PhD Pennsylvania) *Associate Professor*

Mónica Russel y Rodriguez (PhD UCLA) *Senior Lecturer; Associate Dean for the Lecturer Faculty*

Helen B. Schwartzman (PhD Northwestern) *Professor*

Shalini Shankar (PhD NYU) *Associate Professor*

Kearsley Stewart (PhD Florida) *Senior Lecturer*

Mary J. Weismantel (PhD Illinois) *Professor; also Spanish and Portuguese*

Jessica Winegar (PhD NYU) *Assistant Professor*

Art History

Jesús Escobar (PhD Princeton) *Associate Professor and Chair*

Christine Bell (PhD Northwestern) *Lecturer and College Adviser*

S. Hollis Clayson (PhD UCLA) *Bergen Evans Professor in the Humanities; also History*

Huey Copeland (PhD UC Berkeley) *Assistant Professor; also African American Studies*

Stephen F. Eisenman (PhD Princeton) *Professor*

Hannah Feldman (PhD Columbia) *Assistant Professor*

Bernadette Fort (PhD Sorbonne) *Professor; also French and Italian*

Sarah E. Fraser (PhD UC Berkeley) *Associate Professor*

Ann C. Gunter (PhD Columbia) *Professor; also Classics, Humanities*

Christina Kiaer (PhD UC Berkeley) *Associate Professor*

Hamid Naficy (PhD UCLA) *Professor; also Hamid Bin Khalifa Al-Thani Professor in Communication (Radio/Television/Film)*

Christina Normore (PhD Chicago) *Assistant Professor*
 David Alan Robertson (PhD Pennsylvania) *Lecturer*;
Ellen Philips Katz Director, Mary and Leigh Block
Museum of Art

Marco Ruffini (PhD UC Berkeley) *Assistant Professor*;
also French and Italian

Claudia Swan (PhD Columbia) *Associate Professor*

Krista A. Thompson (PhD Emory) *Associate Professor*;
also African American Studies

David T. Van Zanten (PhD Harvard) *Mary Jane Crowe*
Professor in Art and Art History

Art Theory and Practice

Judy Ledgerwood (MFA Art Institute Chicago)
Associate Professor and Chair

Pamela Bannos (MFA Illinois) *Senior Lecturer*

Jeanne Dunning (MFA Art Institute Chicago) *Professor*

Andrew Falkowski (MFA CalArts) *Lecturer*

Kelly Kaczynski (MFA Bard) *Assistant Professor*

Marlena Novak (MFA Northwestern) *Lecturer*

Michael Rakowitz (MS MIT) *Associate Professor*

Steve Reinke (MFA Nova Scotia) *Associate Professor*

Lane Relyea (PhD Texas) *Associate Professor*

Biological Sciences, Program in

Richard F. Gaber (PhD Wisconsin) *Professor and Director*;
also Molecular Biosciences

Roberta W. Ellington (BA Barat) *Lecturer*

Gary J. Galbreath (PhD Chicago) *Distinguished Senior*
Lecturer and Associate Director

Tracy M. Hodgson (PhD Pittsburgh) *Lecturer*

Teresa H. Horton (PhD Utah) *Lecturer*

John C. Mordacq (PhD Northwestern) *Distinguished Senior*
Lecturer and Director of Undergraduate Laboratories

Laura J. Panko (PhD Chicago) *Lecturer and College Adviser*

Christina T. Russin (PhD Wisconsin) *Senior Lecturer*

Joseph S. Walsh (PhD Chicago) *Lecturer*

Nyree J. C. Zerega (PhD NYU) *Lecturer; also Plant Biology*
and Conservation

Chemistry

Mark A. Ratner (PhD Northwestern) *Lawrence B. Dumas*
Distinguished University Professor and Chair

Lin Chen (PhD Chicago) *Professor*

Barry A. Coddens (PhD Wayne State) *Senior Lecturer*

Theresa A. Collins (PhD Vermont) *Lecturer and*
Assistant Chair

Donald E. Ellis (PhD MIT) *Professor; also Physics and*
Astronomy

Franz F. Geiger (PhD Georgetown) *Associate Professor*

Bartosz A. Grzybowski (PhD Harvard) *Associate Professor*;
also Chemical and Biological Engineering

Shelby L. Hatch (PhD Rochester) *Lecturer*

Mark C. Hersam (PhD Illinois) *Professor; also Materials*
Science and Engineering

Brian M. Hoffman (PhD Caltech) *Charles E. and*
Emma H. Morrison Professor; also Molecular Biosciences

Joseph T. Hupp (PhD Michigan State) *Charles E. and*
Emma H. Morrison Professor

James A. Ibers (PhD Caltech) *Charles E. and Emma H.*
Morrison Professor

Mercouri G. Kanatzidis (PhD Iowa) *Charles E. and*
Emma H. Morrison Professor

Neil Kelleher (PhD Cornell) *Professor; also Hematology/*
Oncology, Molecular Biosciences

Joseph B. Lambert (PhD Caltech) *Clare Hamilton Hall*
Professor

Frederick D. Lewis (PhD Rochester) *Professor*

Tobin J. Marks (PhD MIT) *Vladimir Ipatieff Research*
Professor in Organic Chemistry; also Materials Science
and Engineering

Thomas J. Meade (PhD Ohio State) *Eileen Foell Professor*;
also Molecular Biosciences, Neurobiology and Physiology,
Radiology

Chad A. Mirkin (PhD Penn State) *George B. Rathmann*
Professor; also Biomedical Engineering, Infectious Diseases,
Materials Science and Engineering

SonBinh T. Nguyen (PhD Caltech) *Professor*

Frederick J. Northrup (PhD Toronto) *Distinguished Senior*
Lecturer

Teri W. Odom (PhD Harvard) *Associate Professor; also*
Materials Science and Engineering

Monica Olvera de la Cruz (PhD Cambridge) *Professor*;
also Lawyer Taylor Professor (Chemical and Biological
Engineering, Materials Science and Engineering); Director,
Materials Research Center

Thomas V. O'Halloran (PhD Columbia) *Charles E. and*
Emma H. Morrison Professor; Director, Chemistry of Life
Processes Institute; also Molecular Biosciences

Michael Pellin (PhD Illinois) *Professor*

Kenneth R. Poeppelmeier (PhD Iowa State) *Charles E. and*
Emma H. Morrison Professor

Owen P. Priest (PhD Minnesota) *Distinguished Senior*
Lecturer

Amy Rosenzweig (PhD MIT) *Professor; also Molecular*
Biosciences

Alfred P. Sattelberger (PhD Indiana) *Professor*

George C. Schatz (PhD Caltech) *Charles E. and Emma H.*
Morrison Professor

Karl A. Scheidt (PhD Indiana) *Associate Professor; Director, Center for Molecular Innovation and Drug Discovery*
 Tamar Seideman (PhD Weizmann Institute) *Professor; also Physics and Astronomy*
 Richard B. Silverman (PhD Harvard) *John Evans Professor; also Molecular Biosciences*
 Peter C. Stair (PhD UC Berkeley) *Professor; Director, Center for Catalysis and Surface Science*
 Alexander Statsuk (PhD Chicago) *Assistant Professor*
 J. Fraser Stoddart (PhD Edinburgh) *Board of Trustees Professor*
 Samuel I. Stupp (PhD Northwestern) *Board of Trustees Professor of Materials Science and Engineering, Chemistry, and Medicine*
 Igal Szleifer (PhD Hebrew Jerusalem) *Professor; also Christina Enroth-Cugell Professor (Biomedical Engineering)*
 Regan J. Thomson (PhD Australian National) *Assistant Professor*
 Larry S. Trzupek (PhD MIT) *Senior Lecturer*
 Olke Uhlenbeck (PhD Harvard) *Board of Trustees Professor; also Molecular Biosciences*
 Richard P. Van Duyne (PhD North Carolina) *Charles E. and Emma H. Morrison Professor*
 Michael R. Wasielewski (PhD Chicago) *Clare Hamilton Hall Professor*
 Emily Weiss (PhD Northwestern) *Assistant Professor*
 Eric Weitz (PhD Columbia) *Professor*
 Jonathan Widom (PhD Stanford) *William Deering Professor in Biological Science; also Molecular Biosciences*

Classics

S. Sara Monoson (PhD Princeton) *Associate Professor and Chair; also Political Science*
 Kathryn Boshier (PhD Michigan) *Assistant Professor*
 Reginald Gibbons (PhD Stanford) *Professor; also English, Spanish and Portuguese*
 Ann C. Gunter (PhD Columbia) *Professor; also Art History, Humanities*
 Marianne Hopman (PhD Harvard, Sorbonne) *Assistant Professor*
 Richard Kraut (PhD Princeton) *Charles E. and Emma H. Morrison Professor in the Humanities; also Philosophy*
 Martin Mueller (PhD Indiana) *Professor; also English*
 Barbara J. Newman (PhD Yale) *John Evans Professor in the Latin Language and Literature; also English, Religious Studies*
 Jeanne R. Ravid (MA Northwestern) *Senior Lecturer and College Adviser*

John Schafer (PhD Harvard) *Assistant Professor*
 Francesca Tataranni (PhD Pisa) *Lecturer and Director of Latin Instruction*
 Robert W. Wallace (PhD Harvard) *Professor*
 William N. West (PhD Michigan) *Associate Professor; also English*
 John Wynne (PhD Cornell) *Assistant Professor*
 Claudia Zatta (PhD Johns Hopkins) *Lecturer*

Earth and Planetary Sciences

Bradley B. Sageman (PhD Colorado) *Professor and Chair*
 Yarrow Axford (PhD Colorado) *Visiting Assistant Professor*
 Patricia Beddows (PhD Bristol) *Lecturer and Assistant Chair*
 Craig R. Bina (PhD Northwestern) *Wayne V. Jones II Professor of Earth and Planetary Sciences; Associate Dean for Research and Graduate Studies*
 Neal Blair (PhD Stanford) *Professor; also Civil and Environmental Engineering*
 Jean-François Gaillard (DSc Paris) *Associate Professor; also Civil and Environmental Engineering*
 Matthew T. Hurtgen (PhD Penn State) *Assistant Professor*
 Steven D. Jacobsen (PhD Colorado) *Assistant Professor*
 Andrew D. Jacobson (PhD Michigan) *Associate Professor*
 Donna M. Jurdy (PhD Michigan) *Professor*
 Gilbert Klapper (PhD Iowa) *Visiting Professor*
 Abraham Lerman (PhD Harvard) *Professor*
 Francesca S. McInerney (PhD Chicago) *Assistant Professor*
 Emile André Okal (PhD Caltech) *Professor*
 Seth A. Stein (PhD Caltech) *William Deering Professor of Earth and Planetary Sciences*
 Suzan Van der Lee (PhD Princeton) *Associate Professor*

Economics

William P. Rogerson (PhD Caltech) *Harold and Virginia Anderson Professor and Chair; Director, Mathematical Methods in the Social Sciences Program*
 Lori A. Beaman (PhD Yale) *Assistant Professor*
 Ronald R. Braeutigam (PhD Stanford) *Harvey Kapnick Professor of Business Institutions; Associate Provost for Undergraduate Education*
 Ivan Canay (PhD Wisconsin) *Assistant Professor*
 Jannet Chang (PhD Illinois) *Lecturer*
 Lawrence J. Christiano (PhD Columbia) *Alfred W. Chase Professor of Business Institutions*
 Eddie Dekel (PhD Harvard) *William R. Kenan Jr. Professor*
 Matthias Doepke (PhD Chicago) *Associate Professor*
 Martin Eichenbaum (PhD Minnesota) *Ethel and John Lindgren Professor*

Jeffrey C. Ely (PhD UC Berkeley) *Charles E. and Emma H. Morrison Professor*

Joseph P. Ferrie (PhD Chicago) *Professor*

Robert J. Gordon (PhD MIT) *Stanley G. Harris Professor in the Social Sciences*

Steffen Habermalz (PhD Wisconsin Milwaukee) *Senior Lecturer*

David Haddock (PhD Chicago) *Professor; also School of Law*

Igal Hendel (PhD Harvard) *Professor*

James Hornsten (PhD Northwestern) *Senior Lecturer*

Joel Horowitz (PhD Cornell) *Charles E. and Emma H. Morrison Professor in Market Economics*

Lynne Kiesling (PhD Northwestern) *Senior Lecturer*

Cynthia Kinnan (PhD MIT) *Assistant Professor*

Hilarie H. Lieb (PhD Northwestern) *Senior Lecturer and College Adviser*

Charles F. Manski (PhD MIT) *Board of Trustees Professor; also Statistics*

Kiminori Matsuyama (PhD Harvard) *Professor*

Joel Mokyr (PhD Yale) *Robert H. Strotz Professor of Arts and Sciences; also History*

Dale T. Mortensen (PhD Carnegie Mellon) *Ida C. Cook Professor of Consumer Economics*

Aviv Nevo (PhD Harvard) *HSBC Professor of Economics*

Wojciech Olszewski (PhD Warsaw and Princeton) *Professor*

Alessandro Pavan (PhD Toulouse) *Associate Professor*

Robert H. Porter (PhD Princeton) *William R. Kenan Jr. Professor*

Giorgio Primiceri (PhD Princeton) *Assistant Professor*

Todd D. Sarver (PhD Boston) *Assistant Professor*

Ian P. Savage (PhD Leeds) *Distinguished Senior Lecturer and Associate Chair; Director, Transportation and Logistics Program*

Morton Schapiro (PhD Pennsylvania) *Professor; also University President*

Eric G. Schulz (PhD Northwestern) *Distinguished Senior Lecturer and Charles Deering McCormick University Distinguished Lecturer*

Ron Siegel (PhD Stanford) *Assistant Professor*

Marciano Siniscalchi (PhD Stanford) *Professor*

Bruno Strulovici (PhD Stanford) *Assistant Professor*

Elie Tamer (PhD Northwestern) *Professor*

Sergio S. Urzúa (PhD Chicago) *Assistant Professor; also Education and Social Policy*

Richard Walker (PhD London School of Economics) *Lecturer*

Burton Weisbrod (PhD Northwestern) *John Evans Professor*

Michael Whinston (PhD MIT) *Robert E. and Emily King Professor in Business Institutions*

Mirko Wiederholt (PhD European University Institute) *Assistant Professor*

Mark P. Witte (PhD Northwestern) *Distinguished Senior Lecturer; Director, Harvey Kapnick Business Institutions Program*

Asher Wolinsky (PhD Stanford) *Gordon Scott Fulcher Professor in Decision Making*

Martin Zelder (PhD Chicago) *Senior Lecturer*

English

Susan A. Manning (PhD Columbia) *Professor and Chair; also Performance Studies*

Eula Biss (MFA Iowa) *Artist in Residence*

Brian Bouldrey (MFA Warren Wilson) *Senior Lecturer*

Katharine H. Breen (PhD UC Berkeley) *Assistant Professor*

John Bresland (MFA Iowa) *Artist in Residence*

Paul Breslin (PhD Virginia) *Professor*

Averill Curdy (PhD Missouri) *Artist in Residence*

John Alba Cutler (PhD UCLA) *Assistant Professor*

Nicholas Davis (PhD Cornell) *Assistant Professor; also Gender Studies*

Tracy Davis (PhD Warwick) *Professor; also Ethel M. Barber Professor of Performing Arts (Performance Studies); also Spanish and Portuguese, Theatre*

Sheila Donohue (MFA North Carolina Greensboro) *Senior Lecturer and College Adviser*

Stuart Dybek (MFA Iowa) *Distinguished Writer in Residence*

Brian T. Edwards (PhD Yale) *Associate Professor*

Betsy Erkkila (PhD UC Berkeley) *Henry Sanborn Noyes Professor in English Literature*

Kathryn (Kasey) Evans (PhD UC Berkeley) *Assistant Professor*

Mary E. Finn (PhD Bryn Mawr) *Distinguished Senior Lecturer; Associate Dean for Undergraduate Academic Affairs*

Christine Froula (PhD Chicago) *Professor*

Reginald Gibbons (PhD Stanford) *Professor; also Classics, Spanish and Portuguese*

Susannah Gottlieb (PhD Chicago) *Associate Professor*

Jay A. Grossman (PhD Pennsylvania) *Associate Professor*

Christopher C. Herbert (PhD Yale) *Chester D. Tripp Professor in the Humanities*

Rebecca Johnson (PhD Yale) *Assistant Professor; also Humanities*

John Keene (MFA NYU) *Associate Professor; also African American Studies*

Mary Kinzie (PhD Johns Hopkins) *Professor*

Christopher Lane (PhD London) *Professor*
 Jules David Law (PhD Johns Hopkins) *Associate Professor*
 John D. Margolis (PhD Princeton) *Professor; also Dean,*
Northwestern University in Qatar
 Jeffrey Masten (PhD Pennsylvania) *Associate Professor and*
Herman and Beulah Pearce Miller Research Professor in
Literature; also Gender Studies
 Martin Mueller (PhD Indiana) *Professor; also Classics*
 Evan Mwangi (PhD Nairobi) *Assistant Professor*
 Barbara J. Newman (PhD Yale) *Professor; John Evans*
Professor in the Latin Language and Literature (Classics);
also Religious Studies
 Susan E. Phillips (PhD Harvard) *Associate Professor*
 Charles Edward Roberson *Artist in Residence*
 Emily Rohrbach (PhD Boston) *Assistant Professor*
 William Savage (PhD Northwestern) *Senior Lecturer*
and College Adviser
 Regina M. Schwartz (PhD Virginia) *Professor; also*
Religious Studies
 Shauna Seliy (MFA Massachusetts) *Artist in Residence*
 Laurie Shannon (PhD Chicago) *Associate Professor*
 Carl S. Smith (PhD Yale) *Franklyn Bliss Snyder Professor*
in English Literature; also History
 Vivasvan Soni (PhD Duke) *Associate Professor*
 Julia Stern (PhD Columbia) *Professor and Charles Deering*
McCormick Professor of Teaching Excellence
 Glenn Sucich (PhD Northwestern) *Lecturer and College*
Adviser
 Helen F. Thompson (PhD Duke) *Associate Professor*
 Elizabeth Fekete Trubey (PhD Northwestern) *Senior*
Lecturer and College Adviser
 Wendy Wall (PhD Pennsylvania) *Professor*
 Rachel Jamison Webster (MFA Warren Wilson) *Artist*
in Residence
 Alexander G. Weheliye (PhD Rutgers) *Associate Professor;*
also African American Studies, German
 William N. West (PhD Michigan) *Associate Professor;*
also Classics
 Ivy Wilson (PhD Yale) *Associate Professor; also African*
American Studies

French and Italian

Scott Durham (PhD Yale) *Associate Professor and Chair*
 Christopher P. Bush (PhD UCLA) *Assistant Professor*
 Margaret Mary Dempster (PhD Indiana) *Senior Lecturer*
 Bernadette Fort (PhD Sorbonne) *Professor; also Art History*
 Doris L. Garraway (PhD Duke) *Associate Professor*

Michal P. Ginsburg (PhD Yale) *Professor; Director, Program*
in Comparative Literary Studies
 Giulia Guidotti (MED American) *Senior Lecturer*
 Scott Hiley (PhD Yale) *Assistant Professor*
 Phyllis Horn-Liparini (MA Northwestern) *Senior Lecturer*
 Dominique Licops (PhD Northwestern) *Lecturer*
 Paola Morgavi (Laurea in Lettere Genoa) *Senior Lecturer*
 Edward W. Muir (PhD Rutgers) *Professor; Clarence L.*
Ver Steeg Professor in the Arts and Sciences; Charles
Deering McCormick Professor of Teaching Excellence;
also History
 Cynthia Nazarian (PhD Princeton) *Assistant Professor*
 Daniela Pozzi Pavan (MA Toulouse) *Lecturer*
 Marie-Simone Pavlovich (PhD Northwestern)
Distinguished Senior Lecturer
 Marie-Thérèse Pent (MA Grenoble III) *Senior Lecturer*
 Nasrin Qader (PhD Wisconsin) *Associate Professor*
 Aude Raymond (MA Illinois) *Lecturer*
 Christiane Rey (Licence en Droit Liège) *Senior Lecturer*
 Alessia Ricciardi (PhD Yale) *Associate Professor*
 Sylvie Romanowski (PhD Yale) *Professor*
 Marco Ruffini (PhD UC Berkeley) *Assistant Professor;*
also Art History
 Thomas H. Simpson (PhD Chicago) *Distinguished Senior*
Lecturer
 Margaret Sinclair (PhD UC Berkeley) *Distinguished Senior*
Lecturer
 Janine W. Spencer (PhD Northwestern) *Distinguished*
Senior Lecturer
 Domietta Torlasco (PhD UC Berkeley) *Assistant Professor*
 Samuel Weber (PhD Cornell) *Avalon Foundation Professor*
in the Humanities; also German
 Jane Winston (PhD Duke) *Associate Professor; also*
Gender Studies
 Melissa Wittmeier (PhD Stanford) *Lecturer*

Gender Studies

Ann S. Orloff (PhD Princeton) *Professor and Director;*
also Political Science, Sociology
 Nicola K. Beisel (PhD Michigan) *Associate Professor;*
also Sociology
 Hector Carrillo (PhD Berkeley) *Associate Professor;*
also Sociology
 Nicholas Davis (PhD Cornell) *Assistant Professor;*
also English
 Mary G. Dietz (PhD UC Berkeley) *Board of Lady*
Managers of the Columbian Exposition Professor;
also Political Science
 Jillana Enteen (PhD Rutgers) *Senior Lecturer*

Tessie P. Liu (PhD Michigan) *Associate Professor;*
also History

Jeffrey Masten (PhD Pennsylvania) *Associate Professor;*
also English

Alexandra Owen (PhD Sussex) *Professor; also History*

Amy Partridge (PhD Northwestern) *Lecturer*

Helen Thompson (PhD Duke) *Associate Professor;*
also English

German

Franziska B. Lys (PhD Northwestern) *Associate Professor*
and Chair

Peter D. Fenves (PhD Johns Hopkins) *Joan E. and*
Sarepta Harrison Professor of Literature

Jeffrey B. Garrett (MLIS UC Berkeley) *Lecturer; Assistant*
University Librarian for Collection Management

Peter F. Hayes (PhD Yale) *Charles Deering McCormick*
Professor of Teaching Excellence; also Theodore Z. Weiss
Professor in Holocaust Studies (History)

Christine Helmer (PhD Yale) *Professor; also Religious*
Studies

Martina Kerlova (MA Charles University Prague) *Lecturer*

Jörg Kreienbrock (PhD NYU) *Assistant Professor*

Christian Martin (PhD Konstanz) *DAAD Visiting Assistant*
Professor; also Political Science

Denise M. Meuser (MA Indiana) *Distinguished Senior Lecturer*

Marcus Moseley (PhD Oxford) *Associate Professor; also*
Jewish Studies

John Paluch (MA Illinois) *Distinguished Senior Lecturer*

Anna M. Parkinson (PhD Cornell) *Assistant Professor*

Rainer Rumold (PhD Stanford) *Professor*

Kristine A. Thorsen (PhD Northwestern) *Lecturer*

Khane-Faygl Turteltaub (PhD Case Western Reserve)
Lecturer

Katrin Völkner (PhD Duke) *Lecturer*

Samuel Weber (PhD Cornell) *Avalon Foundation Professor*
in the Humanities; also French and Italian

Alexander G. Weheliye (PhD Rutgers) *Associate Professor;*
also African American Studies, English

Ingrid Zeller (MA Columbia) *Senior Lecturer*

History

Peter F. Hayes (PhD Yale) *Theodore Z. Weiss Professor in*
Holocaust Studies and Chair; Charles Deering McCormick
Professor of Teaching Excellence; also German

Kenneth L. Alder (PhD Harvard) *Milton H. Wilson*
Professor in the Humanities

Michael Allen (PhD Northwestern) *Assistant Professor*

Henry C. Binford (PhD Harvard) *Associate Professor;*
also African American Studies

Martha Biondi (PhD Columbia) *Associate Professor;*
also African American Studies, Political Science

Francesca Bordogna (PhD Chicago) *Associate Professor*

Timothy H. Breen (PhD Yale) *William Smith Mason*
Professor of American History; Director, Nicholas D.
Chabraja Center for Historical Studies

Sherwin Bryant (PhD Ohio State) *Assistant Professor;*
also African American Studies

John S. Bushnell (PhD Indiana) *Professor*

Geraldo Cadava (PhD Yale) *Assistant Professor*

Peter J. Carroll (PhD Yale) *Associate Professor*

S. Hollis Clayson (PhD UCLA) *Bergen Evans Professor in*
the Humanities; also Art History

Deborah Cohen (PhD UC Berkeley) *Peter B. Ritzma*
Professor in the Humanities

Dyan Elliott (PhD Toronto) *Peter B. Ritzma Professor in*
the Humanities

Lane Fenrich (PhD Northwestern) *Distinguished Senior*
Lecturer and Charles Deering McCormick University
Distinguished Lecturer; Assistant Dean for Freshmen

Brodwyn Fischer (PhD Harvard) *Associate Professor*

Benjamin Frommer (PhD Harvard) *Associate Professor*

Jonathon P. Glassman (PhD Wisconsin) *Associate Professor*

Regina Grafe (PhD London School of Economics)
Assistant Professor

Laura E. Hein (PhD Wisconsin) *Professor*

Darlene Clark Hine (PhD Kent State) *Professor;*
also Board of Trustees Professor in African American
Studies (African American Studies)

Richard Kieckhefer (PhD Texas) *Professor; also John Evans*
Professor in Religion

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Michael Kramer (PhD North Carolina) *Lecturer and*
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Henri Lauzière (PhD Georgetown) *Assistant Professor*

Jennifer S. Light (PhD Harvard) *Associate Professor;*
also Communication Studies, Sociology

Tessie P. Liu (PhD Michigan) *Associate Professor;*
also Gender Studies

Melissa Macauley (PhD UC Berkeley) *Associate Professor*

Kate Masur (PhD Michigan) *Assistant Professor;*
also African American Studies

Sarah C. Maza (PhD Princeton) *Jane Long Professor in*
the Humanities

Joel Mokyr (PhD Yale) *Professor; also Robert H. Strotz*
Professor of Arts and Sciences (Economics)

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Alexandra Owen (PhD Sussex) *Professor; also Gender Studies*

Susan Pearson (PhD North Carolina) *Assistant Professor*

Dylan Penningroth (PhD Johns Hopkins) *Associate Professor; also African American Studies*

Yohanan Petrovsky-Shtern (PhD Brandeis) *Associate Professor; Director, Crown Family Center for Jewish Studies*

Carl F. Petry (PhD Michigan) *Professor; Hamid Bin Khalifa al-Thani Professor in Middle East Studies*

Claire Priest (PhD Yale) *Associate Professor; also Law*

Jeffrey Rice (MSc Edinburgh) *Senior Lecturer and College Adviser*

David L. Schoenbrun (PhD UCLA) *Associate Professor*

Michael S. Sherry (PhD Yale) *Richard W. Leopold Professor*

David Shyovitz (MA Pennsylvania) *Instructor*

Carl S. Smith (PhD Yale) *Professor; also Franklyn Bliss Snyder Professor in English Literature (English)*

Scott Sowerby (PhD Harvard) *Assistant Professor*

Amy Stanley (PhD Harvard) *Assistant Professor*

Kristin Stilt (PhD Harvard) *Associate Professor; also Law*

İpek K. Yosmaoğlu (PhD Princeton) *Assistant Professor*

Ji-Yeon Yuh (PhD Pennsylvania) *Associate Professor*

Linguistics

Ann R. Bradlow (PhD Cornell) *Professor and Chair*

Brady Clark (PhD Stanford) *Assistant Professor*

Matthew A. Goldrick (PhD Johns Hopkins) *Associate Professor*

Robert A. Gundlach (PhD Northwestern) *Professor; also Director, Writing Program*

Stefan Kaufmann (PhD Stanford) *Associate Professor*

Julia Moore (PhD Northwestern) *Lecturer*

Janet B. Pierrehumbert (PhD MIT) *Professor*

Gregory Ward (PhD Pennsylvania) *Professor*

Masaya Yoshida (PhD Maryland) *Assistant Professor*

Mathematics

Bryna Kra (PhD Stanford) *Professor and Chair*

John Alongi (PhD Northwestern) *Lecturer*

Myoungjean Bae (MA Wisconsin) *Boas Assistant Professor*

Dean Baskin (PhD Stanford) *Boas Assistant Professor*

Martina Bode (PhD Brandeis) *Distinguished Senior Lecturer*

Keith H. Burns (PhD Warwick) *Professor*

Frank Calegari (PhD UC Berkeley) *Associate Professor*

Gui-Qiang Chen (PhD Academia Sinica) *Professor*

Kevin Costello (PhD Cambridge) *Professor*

Van Cyr (PhD Penn State) *Boas Assistant Professor*

Gabriel Drummond-Cole (PhD CUNY) *Boas Assistant Professor*

Ellen Eischen (MA Michigan) *Boas Assistant Professor*

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Ezra Getzler (PhD Harvard) *Professor*

Paul G. Goerss (PhD MIT) *Professor*

Angela Grant (PhD Maryland) *Lecturer and College Adviser*

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Mehdi Khorami (PhD Wesleyan) *Visiting Assistant Professor*

Eugene Kushnirsky (PhD Michigan) *Lecturer*

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David Nadler (PhD Princeton) *Associate Professor*

Mark A. Pinsky (PhD MIT) *Professor*

Charles Pugh (PhD Johns Hopkins) *Visiting Professor*

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R. Clark Robinson (PhD UC Berkeley) *Professor*

Emmanuel Schenck (PhD Paris) *Boas Assistant Professor*

Michael R. Stein (PhD Columbia) *Professor*

Andrei A. Suslin (PhD St. Petersburg) *Board of Trustees Professor*

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David Treumann (PhD Princeton) *Boas Assistant Professor*

Boris Tsygan (PhD Moscow State) *Professor*

Kari K. Vilonen (PhD Brown) *Professor*

Amie Wilkinson (PhD UC Berkeley) *Professor*

Jared Wunsch (PhD Harvard) *Professor*

Zhihong Jeff Xia (PhD Northwestern) *Arthur and Gladys Pancoe Professor*

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Eric Zaslow (PhD Harvard) *Professor*

Steven Zelditch (PhD UC Berkeley) *Professor*

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Ravi Allada (MD Michigan) *Professor; also Neurobiology and Physiology, Pathology*

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Jason Brickner (PhD Stanford) *Assistant Professor*

Richard Carthew (PhD MIT) *Owen L. Coon Professor of Molecular Biology*

Andrew Dudley (PhD Harvard) *Assistant Professor*

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Curt Horvath (PhD Northwestern) *Professor*

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Laimonis Laimins (PhD Chicago) *Professor; also Microbiology and Immunology*

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John Marko (PhD UC Berkeley) *Professor; also Physics and Astronomy*

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Ishwar Radhakrishnan (PhD Columbia) *Professor*

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Xiaozhong (Alec) Wang (PhD NYU) *Associate Professor*

Eric Weiss (PhD Colorado) *Associate Professor*

Jonathan Widom (PhD Stanford) *William Deering Professor in Biological Science; also Chemistry*

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Tai Te Wu (PhD Harvard) *Professor; also Biomedical Engineering*

Neurobiology and Physiology

Nelson Spruston (PhD Baylor) *Martin J. and Patricia Koldyke Professor and Chair*

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Jianhua Cang (PhD Virginia) *Assistant Professor*

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Garth A. Fowler (PhD Washington) *Lecturer and Assistant Chair*

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Dave McLean (PhD St. Andrews) *Assistant Professor*

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Fabrizio Cariani (PhD UC Berkeley) *Assistant Professor*

Penelope Deutscher (PhD New South Wales) *Professor*

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Sean Ebels Duggan (PhD UC Irvine) *Lecturer*

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Jonathan Garthoff (PhD UCLA) *Assistant Professor*

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Physics and Astronomy

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Venkat Chandrasekhar (PhD Yale) *Professor*

André de Gouvêa (PhD UC Berkeley) *Associate Professor*

Pulak Dutta (PhD Chicago) *Professor*

Donald E. Ellis (PhD MIT) *Professor; also Chemistry*

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William P. Halperin (PhD Cornell) *John Evans Professor in Physics*

Chris Jacobsen (PhD SUNY Stony Brook) *Professor*

Vassiliki Kalogera (PhD Illinois) *Erastus O. Haven Professor; Codirector, Center for Interdisciplinary Exploration and Research in Astrophysics*

John B. Ketterson (PhD Chicago) *Fayerweather Professor in Physics; also Electrical Engineering and Computer Science*

Jens Koch (PhD Berlin) *Assistant Professor*

Prem Kumar (PhD SUNY Buffalo) *Professor; AT&T Communications Professor of Information Technology (Electrical Engineering and Computer Science)*

Yoram Lithwick (PhD Caltech) *Assistant Professor*

Ian Low (PhD Carnegie Mellon) *Assistant Professor*

John Marko (PhD MIT) *Professor; also Molecular Biosciences*

David M. Meyer (PhD UCLA) *Professor; Codirector, Center for Interdisciplinary Exploration and Research in Astrophysics; Charles Deering Professor of Teaching Excellence*

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Giles A. Novak (PhD Chicago) *Professor*

Brian Odom (PhD Harvard) *Assistant Professor*

Frederic Rasio (PhD Cornell) *Joseph Cummings Professor; Codirector, Center for Interdisciplinary Exploration and Research in Astrophysics*

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Michael H. Schmitt (PhD Harvard) *Associate Professor*

Tamar Seideman (PhD Weizmann Institute) *Professor; also Chemistry*

Kamal K. Seth (PhD Pittsburgh) *Professor*

Selim Shahriar (PhD MIT) *Professor; also Electrical Engineering and Computer Science*

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Melville P. Ulmer (PhD Wisconsin) *Professor*
 Mayda M. Velasco (PhD Northwestern) *Associate Professor*
 Byron Watkins (PhD Kentucky) *Lecturer*
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 Farhad Yusef-Zadeh (PhD Columbia) *Professor*

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James Farr (PhD Minnesota) *Professor and Chair*
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 Jonathan Caverley (PhD Chicago) *Assistant Professor*
 Dennis Chong (PhD UC Berkeley) *John D. and Catherine T. MacArthur Professor*
 Theodore Christov (PhD UCLA) *Visiting Instructor*
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 Victoria DeFrancesco Soto (PhD Duke) *Assistant Professor; also African American Studies*
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 Jaime Dominguez (PhD Illinois Chicago) *Lecturer and College Adviser*
 James Druckman (PhD UC San Diego) *Payson S. Wild Professor*
 Lee Epstein (PhD Emory) *Henry Wade Rogers Professor; Beatrice Kuhn Professor of Law*
 H. Paul Friesma (PhD Iowa) *Professor Emeritus in Service*
 Daniel Galvin (PhD Yale) *Assistant Professor*
 Edward L. Gibson (PhD Columbia) *Professor; also Spanish and Portuguese*
 Jerry Goldman (PhD Johns Hopkins) *Professor*
 Devora Grynspan (PhD Northwestern) *Instructor; Director, Office of International Program Development*
 Brian Hanson (MA MIT) *Instructor*
 Laurel Harbridge (PhD Stanford) *Assistant Professor*
 Bonnie Honig (PhD Johns Hopkins) *Sarah Rebecca Roland Professor*
 Elizabeth Shakman Hurd (PhD Johns Hopkins) *Assistant Professor*
 Ian Hurd (PhD Yale) *Associate Professor*
 Richard Iton (PhD Johns Hopkins) *Professor; also African American Studies*
 Marie Thourson Jones (PhD Princeton) *Lecturer; Associate Dean for Faculty Processes and Governance*
 Richard Joseph (DPhil Oxford) *John Evans Professor*

Georgia Kernell (PhD Cornell) *Assistant Professor*
 Michael M. Loriaux (PhD Princeton) *Professor*
 James Mahoney (PhD UC Berkeley) *Gerald F. and Marjorie G. Fitzgerald Professor of Political Science and Sociology*
 Christian Martin (PhD Konstanz) *DAAD Visiting Assistant Professor; also German*
 S. Sara Monoson (PhD Princeton) *Associate Professor; also Classics*
 Stephen Nelson (PhD Cornell) *Assistant Professor*
 Benjamin I. Page (PhD Stanford) *Gordon Scott Fulcher Professor; also Communication Studies*
 Wendy Pearlman (PhD Harvard) *Assistant Professor and Crown Jr. Professor in Middle East Studies*
 William S. Reno (PhD Wisconsin) *Associate Professor*
 Rachel Riedel (PhD Princeton) *Assistant Professor*
 Andrew Roberts (PhD Princeton) *Associate Professor*
 Reuel R. Rogers (PhD Princeton) *Associate Professor; also African American Studies*
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 Jason Seawright (PhD UC Berkeley) *Assistant Professor*
 Victor Shih (PhD Harvard) *Associate Professor*
 Wesley G. Skogan (PhD Northwestern) *Professor*
 Hendrik Spruyt (PhD UC San Diego) *Norman Dwight Harris Professor in International Relations*
 Jacqueline Stevens (PhD UC Berkeley) *Professor*
 Lawrence L. Stuelpnagel (MA Cal State Chico) *College Lecturer; also Journalism*
 Lars Tønder (PhD Johns Hopkins) *Assistant Professor*
 Jeffrey A. Winters (PhD Yale) *Associate Professor*
 Yael Wolinsky (PhD Chicago) *Senior Lecturer*

Psychology

Dan P. McAdams (PhD Harvard) *Professor and Chair; also Education and Social Policy; Director, Foley Center for the Study of Lives*
 Emma K. Adam (PhD Minnesota) *Associate Professor; also Education and Social Policy*
 J. Michael Bailey (PhD Texas) *Professor*
 Mark Beeman (PhD Oregon) *Associate Professor*
 Galen Bodenhausen (PhD Illinois) *Lawyer Taylor Professor; also Marketing*
 Amy E. Booth (PhD Pittsburgh) *Associate Professor; also Communication Sciences and Disorders*
 James R. Booth (PhD Maryland) *Professor; JoAnn G. and Peter F. Dolle Professor of Learning Disabilities (Communication Sciences and Disorders)*
 C. Miguel Brendl (PhD Columbia) *Associate Professor; also Marketing*

Sara C. Broaders (PhD Chicago) *Senior Lecturer*
 Joan Chiao (PhD Harvard) *Assistant Professor*
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 Shari Diamond (PhD Northwestern) *Professor; Howard J. Trienens Professor of Law*
 John F. Disterhoft (PhD Fordham) *Professor; Director, Northwestern University Interdepartmental Neuroscience Program; also Physiology*
 Alice H. Eagly (PhD Michigan) *James Padilla Professor of Arts and Sciences; also Management and Organizations*
 Renee Engeln-Maddox (PhD Loyola Chicago) *Lecturer*
 Eli J. Finkel (PhD North Carolina) *Associate Professor*
 Steven Franconeri (PhD Harvard) *Assistant Professor*
 Adam Galinsky (PhD Princeton) *Professor; also Morris and Alice Kaplan Professor in Ethics and Decision in Management (Management and Organizations)*
 Wendi Gardner (PhD Ohio State) *Associate Professor*
 Dedre Gentner (PhD UC San Diego) *Alice Gabrielle Twilight Professor; also Education and Social Policy*
 Benjamin Gorvine (PhD Michigan) *Lecturer and Assistant Chair*
 Jay A. Gottfried (PhD, MD NYU) *Assistant Professor; also Neurology*
 Marcia Grabowecky (PhD UC Berkeley) *Lecturer*
 Susan J. Hespos (PhD Emory) *Associate Professor*
 William Sidney Horton (PhD Chicago) *Assistant Professor*
 Angela Y. Lee (PhD Toronto) *Professor; Mechthild Esser Nemmers Professor in Marketing; also International Business and Markets*
 Joan A. W. Linsenmeier (PhD Northwestern) *Senior Lecturer; Assistant Dean for Curriculum*
 Sarah Mangelsdorf (PhD Minnesota) *Professor; Dean*
 Viorica Marian (PhD Cornell) *Associate Professor; also Communication Sciences and Disorders*
 Douglas L. Medin (PhD South Dakota) *Louis W. Menk Professor; also Education and Social Policy*
 Marsel Mesulam (PhD Harvard) *Professor; Ruth and Evelyn Dunbar Professor of Neurology and Psychiatry*
 Susan Mineka (PhD Pennsylvania) *Professor; also Psychiatry and Behavioral Sciences, Family Institute*
 Daniel C. Molden (PhD Columbia) *Assistant Professor*
 Loran Nordgren (PhD Amsterdam) *Assistant Professor; also Management and Organizations*
 Robin Nusslock (PhD Wisconsin) *Assistant Professor*
 Andrew Ortony (PhD London) *Professor; also Education and Social Policy, Electrical Engineering and Computer Science*

Ken A. Paller (PhD UC San Diego) *Professor*
 David Rapp (PhD SUNY Stony Brook) *Associate Professor; also Education and Social Policy*
 Paul J. Reber (PhD Carnegie Mellon) *Associate Professor*
 William R. Revelle (PhD Michigan) *Professor*
 Jennifer Richeson (PhD Harvard) *Professor; also African American Studies*
 Lance J. Rips (PhD Stanford) *Professor*
 Neal Roese (PhD Western Ontario) *Professor; also Marketing*
 J. Peter Rosenfeld (PhD Iowa) *Professor*
 Karl Rosengren (PhD Michigan) *Professor*
 Aryeh Routtenberg (PhD Michigan) *Professor; also Neurobiology and Physiology*
 H. David Smith (PhD Virginia Commonwealth) *Senior Lecturer*
 Bonnie Spring (PhD Harvard) *Professor; also Preventive Medicine*
 Satoru Suzuki (PhD Harvard) *Associate Professor*
 Fred W. Turek (PhD Stanford) *Professor; Charles E. and Emma H. Morrison Professor (Neurobiology and Physiology); also Psychiatry and Neurology*
 David H. Uttal (PhD Michigan) *Associate Professor; also Education and Social Policy*
 Ellen A. Wartella (PhD Minnesota) *Professor; also Communication Studies*
 Richard E. Zinbarg (PhD Northwestern) *Professor; Patricia M. Nielsen Research Professor of the Family Institute; also Psychiatry and Behavioral Sciences*

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 George D. Bond (PhD Northwestern) *Professor*
 Christine Helmer (PhD Yale) *Professor; also German*
 Sarah Jacoby (PhD Virginia) *Assistant Professor*
 Richard Kieckhefer (PhD Texas) *John Evans Professor; also History*
 Eugene Y. Lowe Jr. (PhD Union Theological) *Senior Lecturer; Assistant to the President*
 J. Michelle Molina (PhD Chicago) *John W. Croghan Assistant Professor in Catholic Studies*
 Barbara J. Newman (PhD Yale) *Professor; John Evans Professor in the Latin Language and Literature (Classics); also English*
 Robert Orsi (PhD Yale) *Grace Craddock Nagle Professor in Catholic Studies; also History*
 Regina M. Schwartz (PhD Virginia) *Professor; also English*

Rüdiger Seesemann (PhD Mainz) *Assistant Professor*

Sarah M. Taylor (PhD UC Santa Barbara) *Associate Professor*

Antonio Terrone (PhD Leiden) *Assistant Professor*

Cristina L. H. Traina (PhD Chicago) *Associate Professor*

Muhammad Sani Umar (PhD Northwestern) *Associate Professor*

Sara A. Vaux (PhD Rice) *Lecturer*

Barry Wimpfheimer (PhD Columbia) *Assistant Professor; also Law*

Brook Ziporyn (PhD Michigan) *Professor; also Philosophy*

Laurie Zoloth (PhD Graduate Theological Union) *Professor; also Medical Humanities and Bioethics*

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Clare Cavanagh (PhD Harvard) *Professor*

Elisabeth Elliott (PhD Toronto) *Senior Lecturer*

Nina Gourianova (PhD Moscow State, PhD Columbia) *Associate Professor*

Ilya Kutik (PhD Stockholm) *Associate Professor*

Natalia Malinina (MA Moscow State) *Lecturer*

Gary Saul Morson (PhD Yale) *Frances Hooper Professor of the Arts and Humanities*

Séamas O'Driscoll (PhD Harvard) *Assistant Professor*

Andrew Wachtel (PhD UC Berkeley) *Bertha and Max Dressler Professor in the Humanities*

Sociology

Jeremy Freese (PhD Iowa) *Professor and Chair*

Nicola K. Beisel (PhD Michigan) *Associate Professor; also Gender Studies*

Charles Camic (PhD Chicago) *John Evans Professor*

Hector Carrillo (PhD Berkeley) *Associate Professor; also Gender Studies*

Bruce G. Carruthers (PhD Chicago) *Professor*

Anthony Chen (PhD UC Berkeley) *Associate Professor*

Carolyn Chen (PhD UC Berkeley) *Associate Professor; also Asian American Studies*

Thomas D. Cook (PhD Stanford) *Joan E. and Sarepta Harrison Professor in Ethics and Justice; also Education and Social Policy, Psychology*

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Steven Epstein (PhD UC Berkeley) *Professor; also John C. Shaffer Professor in the Humanities*

Wendy N. Espeland (PhD Chicago) *Professor*

Gary A. Fine (PhD Harvard) *John Evans Professor*

Wendy Griswold (PhD Harvard) *Bergen Evans Professor in the Humanities; also English*

John Hagan (PhD Alberta) *John D. MacArthur Professor*

Carol A. Heimer (PhD Chicago) *Professor*

Albert D. Hunter (PhD Chicago) *Professor*

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Gregoire Mallard (PhD Princeton) *Assistant Professor*

Leslie McCall (PhD Wisconsin) *Associate Professor*

Aldon D. Morris (PhD SUNY Stony Brook) *Leon Forrest Professor; also African American Studies*

Robert L. Nelson (JD, PhD Northwestern) *Professor*

Laura Beth Nielsen (PhD UC Berkeley) *Associate Professor; also Director, Legal Studies Program*

Ann S. Orloff (PhD Princeton) *Professor; also Gender Studies, Political Science*

Mary Pattillo (PhD Chicago) *Professor; also African American Studies*

Christine Percheski (PhD Princeton) *Assistant Professor*

Monica Prasad (PhD Chicago) *Associate Professor*

Lincoln Quillian (PhD Harvard) *Associate Professor*

Karrie Ann Snyder (PhD NYU) *Lecturer*

Susan Thistle (PhD UC Berkeley) *Senior Lecturer and Associate Chair*

Christian Ukaegbu (PhD Northwestern) *Distinguished Senior Lecturer*

Celeste Watkins-Hayes (PhD Harvard) *Associate Professor; also African American Studies*

Spanish and Portuguese

Jorge Coronado (PhD Columbia) *Associate Professor and Chair*

Stewart I. M. Adams (PhD St. Andrews) *Lecturer*

Raquel Amorim (MA Parana) *Lecturer*

Elisa Baena (PhD Illinois Chicago) *Lecturer*

Denise Bouras (MA Chicago) *Lecturer*

Nathalie Bouzaglo (PhD NYU) *Assistant Professor*

Francisco J. Castro (PhD Texas) *Lecturer*

Chyi Chung (MA Loyola Chicago) *Senior Lecturer*

Heather L. Colburn (PhD North Carolina) *Distinguished Senior Lecturer*

Joel Colom-Mena (MA Loyola Chicago) *Lecturer*

Rifka Cook (MA Pedagógica Libertador) *Senior Lecturer*

Anita Damjanovic (MA National Louis) *Lecturer*

Tracy Davis (PhD Warwick) *Professor; also Ethel M. Barber Professor of Performing Arts (Performance Studies), English, Theatre*

Anna Diakow (PhD Chicago) *Lecturer*
 Patricia N. Fahey (PhD Wisconsin) *Senior Lecturer*
 Darío Fernández-Morera (PhD Harvard) *Associate Professor*
 Reginald Gibbons (PhD Stanford) *Professor; also Classics, English*
 Edward L. Gibson (PhD Columbia) *Professor; also Political Science*
 Jeannie Jacob (MA Illinois Chicago) *Lecturer*
 Lucille Kerr (PhD Yale) *Professor*
 Elena Lanza (MA Illinois Chicago) *Senior Lecturer*
 Emily Maguire (PhD NYU) *Assistant Professor*
 Elisa Martí-López (PhD NYU) *Associate Professor*
 Shannon Millikin (MA Illinois Chicago) *Lecturer*
 María Reyes Morán Fuertes (MA Illinois Chicago) *Lecturer*
 Asha Nagaraj (MA Illinois State) *Lecturer*
 Susan D. Pechter (MA Northwestern) *Senior Lecturer*
 Yari Pérez Marín (PhD Brown) *Assistant Professor*
 Sacramento Roselló-Martínez (PhD Georgetown) *Lecturer*
 Deborah Skolnik Rosenberg (PhD Chicago) *Lecturer*
 Tasha Seago-Ramaly (MA Delaware) *Senior Lecturer*
 Benay Stein (MBA DePaul) *Senior Lecturer*
 Vera R. Teixeira (MPhil Yale) *Distinguished Senior Lecturer*
 María Alejandra Uslenghi (PhD NYU) *Assistant Professor*
 María Teresa Villanueva (MA Loyola Chicago) *Lecturer*
 Mary J. Weismantel (PhD Illinois) *Professor; also Anthropology*
 Ana Williams (PhD São Paulo) *Senior Lecturer*
 Nélica Zepeda-Aubeneau (MA Loyola Chicago) *Lecturer*

Statistics

Thomas Severini (PhD Chicago) *Professor and Chair*
 M. Elizabeth Andrews (PhD Colorado State) *Associate Professor*
 Larry V. Hedges (PhD Stanford) *Board of Trustees Professor of Statistics and Social Policy; also Education and Social Policy*
 Hongmei Jiang (PhD Purdue) *Assistant Professor*
 Wenxin Jiang (PhD Cornell) *Professor*
 Charles F. Manski (PhD MIT) *Board of Trustees Professor; also Economics*
 Noelle I. Samia (PhD Iowa) *Assistant Professor*
 Bruce D. Spencer (PhD Yale) *Professor; also Education and Social Policy*
 Ajit C. Tamhane (PhD Cornell) *Professor; also Industrial Engineering and Management Sciences*

Martin A. Tanner (PhD Chicago) *Professor; also Education and Social Policy*
 Ji-Ping Z. Wang (PhD Penn State) *Associate Professor*
 Sandy L. Zabell (PhD Harvard) *Professor; also Mathematics*

Writing Program

Robert A. Gundlach (PhD Northwestern) *Professor and Director; also Linguistics*
 John C. Anderson (MA Northwestern) *Lecturer; also Segal Design Institute*
 Kathleen Carmichael (PhD Northwestern) *Lecturer*
 Marcia B. Gealy (PhD Ohio State) *Distinguished Senior Lecturer; also Jewish Studies*
 Jeanne Herrick (PhD Illinois Chicago) *Senior Lecturer*
 Penny L. Hirsch (PhD Northwestern) *Professor of Instruction in Writing; also McCormick School*
 Phyllis Lassner (PhD Wayne State) *Professor of Instruction in Writing; also Jewish Studies*
 James O'Laughlin (MA Northwestern) *Senior Lecturer and College Adviser*
 Barbara Shwom (PhD Northwestern) *Professor of Instruction in Writing; also McCormick School*
 Edith Skom (PhD Northwestern) *Distinguished Senior Lecturer*
 Ellen Wright (PhD Indiana) *Distinguished Senior Lecturer*
 Charles Yarnoff (PhD Northwestern) *Distinguished Senior Lecturer*

School of Communication

Administration

Barbara J. O'Keefe, PhD, *Dean and Annenberg University Professor*
 Rick G. Morris, LL.M., *Associate Dean for Finance and Administration and Associate Professor of Communication Studies*
 Jane L. Rankin, PhD, *Associate Dean for Research and Senior Lecturer in Communication Sciences and Disorders*
 D. Charles Whitney, PhD, *Associate Dean for Academic Affairs and Professor of Communication Studies*
 Sally E. Ewing, PhD, *Assistant Dean for Undergraduate Advising and Student Affairs and Lecturer in Communication Studies*
 Gaye Markov, *Assistant Dean for Business and Finance*
 Kyla K. Brundage, MA, *Director of Advising and Student Affairs and Lecturer in Theatre*
 Jennifer Baker, MA, *Adviser in Radio/Television/Film and Lecturer in Communication Studies*
 Harold E. Gulley, PhD, *Adviser and Lecturer in Communication Studies*

Lynn Kelso, MFA, *Adviser and Lecturer in Theatre*
 CeCe Klinger, MFA, *Adviser and Lecturer in Theatre*
 Jeanette Ortiz, PhD, *Adviser and Assistant Chair,
 Communication Sciences and Disorders*
 Roberta Stack, MA, *Adviser and Lecturer in Radio/
 Television/Film; Director of Undergraduate Programs*
 Debra Webster, MA, *Adviser and Lecturer in Communication
 Studies; Coordinator of Undergraduate Studies*

Communication Sciences and Disorders

Charles R. Larson (PhD Washington) *Professor and Chair*
 Christopher Atkins (MA Northwestern) *Lecturer*
 Margaret M. Beeman (PhD Northwestern) *Senior Lecturer*
 Frances K. Block (MA Northwestern) *Senior Lecturer*
 Amy E. Booth (PhD Pittsburgh) *Associate Professor;
 also Psychology*
 James R. Booth (PhD Maryland) *JoAnn G. and Peter F.
 Dolle Professor of Learning Disabilities; also Psychology*
 Peter Dallos (PhD Northwestern) *Professor; John Evans
 Professor in Neuroscience (Neurobiology and Physiology);
 also Biomedical Engineering, Otolaryngology*
 Sumitrajit Dhar (PhD Purdue) *Associate Professor*
 Jill Eltanal (MS Arizona State) *Lecturer*
 Kristine E. Erickson (AuD Central Michigan) *Lecturer*
 Susan F. Erler (PhD Northwestern) *Associate Professor*
 Rebecca Field (MS Rush) *Lecturer*
 Dean C. Garstecki (PhD Illinois) *Professor;
 also Otolaryngology*
 Belma Hadziselimovic (MS Columbia) *Lecturer*
 Tracy Hagan (MA Michigan State) *Lecturer*
 Kathy Harper (MA Northwestern) *Lecturer*
 Nina Kraus (PhD Northwestern) *Hugh Knowles Professor;
 also Neurobiology and Physiology, Otolaryngology*
 Kristin A. Larsen (MA Northwestern) *Lecturer*
 Jerilyn Logemann (PhD Northwestern) *Ralph and Jean
 Sundin Professor; also Neurology, Otolaryngology*
 Viorica Marian (PhD Cornell) *Associate Professor;
 also Psychology*
 Lowery A. Mayo (AuD Florida) *Lecturer*
 Paula McGuire (PhD Northwestern) *Lecturer*
 Susan T. Mulhern (MA Northwestern) *Senior Lecturer*
 Elizabeth C. Musto (MA Northwestern) *Lecturer*
 Diane Novak (MS Gallaudet) *Lecturer*
 Jeanette A. Ortiz (PhD Northwestern) *Assistant Chair
 and Lecturer*
 Jane L. Rankin (PhD Colorado) *Senior Lecturer;
 Associate Dean for Research*
 Mario A. Ruggero (PhD Chicago) *Hugh Knowles Professor*

Jonathan Siegel (PhD Washington St. Louis) *Associate
 Professor; also Neurobiology and Physiology*
 Pamela Souza (PhD Syracuse) *Associate Professor*
 Lynda Thill (MA Northern Illinois) *Lecturer*
 Cynthia K. Thompson (PhD Kansas) *Professor*
 Frank Van Santen (MA Northwestern) *Lecturer*
 Sharon L. Veis (MA Northwestern) *Senior Lecturer*
 Aaron Wilkins (MS St. Xavier) *Lecturer*
 Patrick C. M. Wong (PhD Texas) *Associate Professor*
 Beverly A. Wright (PhD Texas) *Professor*
 Dongsun Yim (PhD Minnesota) *Assistant Professor*
 Steven G. Zecker (PhD Wayne State) *Associate Professor*

Communication Studies

Robert Hariman (PhD Minnesota) *Professor and Chair*
 Paul H. Arntson (PhD Wisconsin) *Professor*
 Jennifer Baker (MA Texas) *Lecturer and Adviser*
 Pablo J. Boczkowski (PhD Cornell) *Professor; also Sociology*
 Noshir Contractor (PhD USC) *Professor; also Jane S.
 and William J. White Professor in Behavioral Sciences
 (Industrial Engineering and Management Sciences)*
 Susan Dun (PhD Illinois) *Senior Lecturer, Northwestern
 University in Qatar*
 James S. Ettema (PhD Michigan) *Professor*
 Sally E. Ewing (PhD Princeton) *Lecturer; Assistant Dean
 for Advising and Student Affairs*
 Daniel Fitzmier (PhD Northwestern) *Lecturer and
 Director of Forensics*
 Kathleen M. Galvin (PhD Northwestern) *Professor*
 Dilip P. Gaonkar (PhD Pittsburgh) *Associate Professor;
 also African American Studies*
 Darren Gergle (PhD Carnegie Mellon) *Assistant Professor*
 Jessica Greenberg (PhD Chicago) *Assistant Professor*
 Harold E. Gulley (PhD London) *Lecturer and Adviser*
 Eszter Hargittai (PhD Princeton) *Associate Professor;
 also Sociology*
 Paul M. Hirsch (PhD Michigan) *Professor; James L. Allen
 Distinguished Professor (Management and Organizations)*
 Rodda Leage (MFA St. Mary's) *Lecturer*
 Paul Leonardi (PhD Stanford) *Assistant Professor*
 Jennifer S. Light (PhD Harvard) *Associate Professor; also
 History, Sociology*
 Gregory T. Makoul (PhD Northwestern) *Assistant
 Professor; also Medicine*
 Maria Mastronardi (PhD Illinois) *Associate Professor*
 Peter V. Miller (PhD Michigan) *Associate Professor*
 Rick G. Morris (LLM NYU) *Associate Professor; Associate
 Dean for Finance and Administration*

Barbara J. O'Keefe (PhD Illinois) *Annenberg University Professor; Dean*
 Daniel O'Keefe (PhD Illinois) *Owen L. Coon Professor of Argumentation*
 Benjamin I. Page (PhD Stanford) *Professor; Gordon Scott Fulcher Professor in Decision Making (Political Science)*
 Emilee Rader (PhD Michigan) *Assistant Professor*
 Janice A. Radway (PhD Michigan State) *Walter Dill Scott Professor of Communication Studies; also American Studies*
 Angela Ray (PhD Minnesota) *Associate Professor*
 Irving J. Rein (PhD Pittsburgh) *Professor*
 Michael E. Roloff (PhD Michigan State) *Professor*
 James Schwoch (PhD Northwestern) *Professor*
 James G. Webster (PhD Indiana) *Professor*
 Ellen A. Wartella (PhD Minnesota) *Professor*
 Debra Webster (MA Ohio) *Lecturer; Coordinator of Undergraduate Studies; and Adviser*
 D. Charles Whitney (PhD Minnesota) *Professor; Associate Dean for Academic Affairs*

Performance Studies

E. Patrick Johnson (PhD Louisiana State) *Professor and Chair; also African American Studies*
 Jennifer DeVere Brody (PhD Pennsylvania) *Associate Professor; also African American Studies, English*
 Tracy Davis (PhD Warwick) *Ethel M. Barber Professor of Performing Arts; Director, Interdisciplinary PhD Program in Theatre and Drama (Theatre); also English, Spanish and Portuguese*
 Micaela di Leonardo (PhD UC Berkeley) *Professor; also Anthropology, Institute for Policy Research*
 Margaret Thompson Drewal (PhD NYU) *Associate Professor*
 Paul Edwards (PhD Texas) *Associate Professor; also African American Studies*
 D. Soyini Madison (PhD Northwestern) *Associate Professor; also African American Studies*
 Susan A. Manning (PhD Columbia) *Professor; also English*
 Sandra L. Richards (PhD Stanford) *Professor; also African American Studies, Theatre*
 Ramon H. Rivera-Servera (PhD Texas) *Assistant Professor*
 Jeffrey Sconce (PhD Wisconsin) *Associate Professor; also Radio/Television/Film*
 Carol Simpson Stern (PhD Northwestern) *Professor*
 Harvey Young (PhD Cornell) *Associate Professor; also African American Studies, Radio/Television/Film, Theatre*
 Mary Zimmerman (PhD Northwestern) *Jabaris Family Professor*

Radio/Television/Film

David Tolchinsky (MFA Southern California) *Associate Professor and Chair*
 Bill Bleich (MFA UCLA and JD UC Berkeley) *Senior Lecturer and Assistant Director, MFA Program, Writing for Screen and Stage*
 Brian Cagle (MFA Northwestern) *Lecturer*
 M. Scott Curtis (PhD Iowa) *Associate Professor*
 Max Dawson (PhD Northwestern) *Assistant Professor*
 Zayd Dohrn (MFA NYU) *Assistant Professor*
 Rebecca Gilman (MFA Iowa) *Associate Professor*
 Kyle R. Henry (MFA Texas) *Assistant Professor*
 Dana H. Hodgdon (MA Northwestern) *Associate Professor*
 Laura Kipnis (MFA Nova Scotia College of Art and Design) *Professor*
 David Kukoff (MFA UCLA) *Lecturer*
 Weiko Lin (MFA UCLA) *Lecturer*
 Hamid Naficy (PhD UCLA) *Hamid Bin Khalifa Al-Thani Professor in Communication; also Art History*
 Spencer Parsons (MFA Texas) *Assistant Professor*
 Eric Patrick (MFA California Institute of Arts) *Associate Professor*
 Elaine D. Romero (MFA UC Davis) *Lecturer*
 Jeffrey Sconce (PhD Wisconsin) *Associate Professor; also Performance Studies*
 Jacob Smith (PhD Indiana) *Assistant Professor*
 Lynn Spiegel (PhD UCLA) *Frances E. Willard Professor of Screen Cultures*
 Roberta Stack (MA Pennsylvania) *Lecturer; Adviser; and Director of Undergraduate Programs*
 Jacqueline Stewart (PhD Chicago) *Associate Professor; also African American Studies*
 Debra Tolchinsky (MFA Art Institute of Chicago) *Assistant Professor*
 Mimi White (PhD Iowa) *Professor*
 Harvey Young (PhD Cornell) *Associate Professor; also African American Studies, Performance Studies, Theatre*

Theatre

Rives Collins (MFA Arizona State) *Associate Professor and Chair*
 Joseph Appelt (MA Michigan) *Professor and Director, MFA Program, Design*
 David H. Bell (MA Virginia) *Associate Professor and Donald G. Robertson Director in Music Theatre*
 Kyla K. Brundage (MA Chicago) *Lecturer and Director of Advising and Student Affairs*
 Barbara Butts (BA Mars Hill) *Lecturer*

Daniel Cantor (MFA American Conservatory Theater)
Assistant Professor

Tracy Davis (PhD Warwick) *Ethel M. Barber Professor of Performing Arts and Director, Interdisciplinary PhD Program in Theatre and Drama; also English, Performance Studies, Spanish and Portuguese*

Amanda Dehnert (BFA Illinois Wesleyan) *Assistant Professor*

Shawn Douglass (MFA Missouri) *Lecturer*

Linda Gates (MA NYU) *Senior Lecturer*

Henry Godinez (MFA Wisconsin) *Associate Professor*

Cindy Gold (MFA Alabama) *Associate Professor*

Lynn Kelso (MFA Northwestern) *Lecturer and Adviser*

CeCe Klinger (MFA Minnesota State) *Lecturer*

Ana Kuzmanic (MFA Northwestern) *Assistant Professor*

Susan A. Lee (PhD Northwestern) *Professor; Dance Program; also Education and Social Policy*

Sandra Marquez (MFA Illinois) *Lecturer*

Dominic E. Missimi (MA Wayne State) *Professor Emeritus in Service*

Dawn Mora (MA San Diego State) *Senior Lecturer*

Dan Ostling (MFA Northwestern) *Associate Professor*

Mary Poole (PhD Northwestern) *Senior Lecturer*

Sandra L. Richards (PhD Stanford) *Professor; also African American Studies, Performance Studies*

Linda Roethke (MFA Iowa) *Associate Professor*

Michael Rohd (MFA Virginia Tech) *Assistant Professor*

Todd Rosenthal (MFA Yale) *Associate Professor*

Laura Schellhardt (MFA Brown) *Lecturer*

Anna D. Shapiro (MFA Yale) *Associate Professor and Director, MFA Program, Directing*

Gail Shapiro (MFA Yale) *Lecturer*

Billy Siegenfeld (MA NYU) *Professor*

Jessica Thebus (PhD Northwestern) *Assistant Professor*

Joel Valentin-Martinez (BA SUNY Buffalo) *Senior Lecturer*

Ann E. Woodworth (MA Northwestern) *Associate Professor*

Harvey Young (PhD Cornell) *Associate Professor; also African American Studies, Performance Studies, Radio/Television/Film*

Communication Administration and Faculty in Qatar

Susan Dun (PhD Illinois) *Senior Lecturer*

Muqem Khan (MA Ohio State) *Visiting Associate Professor*

John Laprise (PhD Northwestern) *Visiting Assistant Professor*

Hamid Naficy (PhD UCLA) *Hamid Bin Khalifa Al-Thani Professor in Communication; also Art History*

James Schwoch (PhD Northwestern) *Professor*

Allwyn Tellis (PhD Illinois) *Lecturer*

Tim Wilkerson (MFA Texas) *Visiting Assistant Professor*

Ann E. Woodworth (MA Northwestern) *Associate Professor*

School of Education and Social Policy

Administration

Penelope L. Peterson, PhD, *Dean and Eleanor R. Baldwin Professor of Education*

Coleen T. Coleman, MS, *Associate Dean*

Jeanne M. Hughes, BA, *Assistant Dean*

Susan E. Olson, MA, *Assistant Dean for Student Affairs and Academic Adviser for Human Development and Psychological Services*

Mark P. Hoffman, MS, JD, *Academic Adviser for Social Policy*

Margaret G. Kreuser, BS, *Academic Adviser for Secondary Education*

Margaret K. Redfearn, BA, *Academic Adviser for Learning and Organizational Change*

Faculty

Emma K. Adam (PhD Minnesota) *Associate Professor; also Psychology*

P. Lindsay Chase-Lansdale (PhD Michigan) *Professor*

Jeannette Colyvas (PhD Stanford) *Assistant Professor; also Sociology*

Fay Lomax Cook (PhD Chicago) *Professor; Director, Institute for Policy Research*

Solomon Cytrynbaum (PhD Michigan) *Professor; also Psychiatry*

Mesmin Destin (PhD Michigan) *Assistant Professor*

Matt Easterday (PhD Carnegie Mellon) *Assistant Professor*

David Figlio (PhD Wisconsin) *Orrington Lunt Professor*

Jon Guryan (PhD MIT) *Associate Professor*

Sophie Haroutunian-Gordon (PhD Chicago) *Professor; Director, Master of Science in Education*

Larry V. Hedges (PhD Stanford) *Board of Trustees Professor of Statistics and Social Policy; also Statistics*

Barton J. Hirsch (PhD Oregon) *Professor and Chair, Human Development and Social Policy*

Michael Horn (PhD Tufts) *Assistant Professor*

Kirabo Jackson (PhD Harvard) *Assistant Professor*

Eva Lam (PhD UC Berkeley) *Associate Professor*

Carol D. Lee (PhD Chicago) *Professor; also African American Studies*

Dan A. Lewis (PhD UC Santa Cruz) *Professor*

Jelani Mandara (PhD UC Riverside) *Associate Professor*

Dan P. McAdams (PhD Harvard) *Professor; Director, Foley Center for the Study of Lives; also Psychology*
 Douglas L. Medin (PhD South Dakota) *Professor; Louis W. Menk Professor (Psychology)*
 Paula M. Olszewski-Kubilius (PhD Northwestern) *Professor; Director, Center for Talent Development*
 Andrew Ortony (PhD London) *Professor; also Electrical Engineering and Computer Science, Psychology*
 Penelope L. Peterson (PhD Stanford) *Eleanor R. Baldwin Professor of Education; Dean*
 David Rapp (PhD SUNY Stony Brook) *Associate Professor and Chair, Learning Sciences; also Psychology*
 Michelle Reininger (PhD Stanford) *Assistant Professor*
 Brian J. Reiser (PhD Yale) *Professor*
 James E. Rosenbaum (PhD Harvard) *Professor; also Sociology*
 Kimberly Scott (PhD Ohio State) *Assistant Professor; Director, Master of Science in Learning and Organizational Change*
 Bruce Sherin (PhD UC Berkeley) *Associate Professor*
 Miriam Gamoran Sherin (PhD UC Berkeley) *Associate Professor; Director, Undergraduate Education*
 Sylvia Smith-DeMuth (PhD Chicago) *Assistant Professor; Director, Alternative Teacher Certification*
 James P. Spillane (PhD Michigan State) *Spencer T. and Ann W. Olin Professor in Learning and Organizational Change*
 Reed Stevens (PhD UC Berkeley) *Professor*
 Edd Taylor (PhD UC Berkeley) *Assistant Professor*
 Lois Trautvetter (PhD Michigan) *Assistant Professor*
 David H. Uttal (PhD Michigan) *Associate Professor; also Psychology*
 Uriel J. Wilensky (PhD MIT) *Professor; also Electrical Engineering and Computer Science*

Robert R. McCormick School of Engineering and Applied Science

Administration

Julio M. Ottino, PhD, *Dean, Robert R. McCormick Institute Professor, Walter P. Murphy Professor, and Professor of Chemical and Biological Engineering and of Mechanical Engineering*
 Richard Lueptow, ScD, *Senior Associate Dean for Operations and Research, Codirector of the Master of Product Development Program, and Professor of Mechanical Engineering*
 Ajit C. Tamhane, PhD, *Senior Associate Dean for Planning and Graduate Studies and Professor of Industrial Engineering and Management Sciences; also Statistics*

Stephen H. Carr, PhD, *Associate Dean for Undergraduate Engineering and Professor of Biomedical Engineering, Chemical and Biological Engineering, and Materials Science and Engineering*
 Alice Kelley, *Associate Dean for Administration, Finance, and Planning*
 Joseph L. Schofer, PhD, *Associate Dean for Faculty Affairs and Professor of Civil and Environmental Engineering; Executive Director of the Infrastructure Technology Institute; also Transportation Center*
 Joseph J. Holtgreive, EdM, *Assistant Dean for Undergraduate Engineering*
 Bruce Lindvall, PhD, *Assistant Dean for Graduate Studies*
 Gina Myerson, MA, MBA, *Assistant Dean and Director of Marketing and External Communications*
 Helen C. Oloroso, MA, *Assistant Dean and Director of the Walter P. Murphy Cooperative Engineering Education Program*
 Ellen A. Worsdall, MS, *Assistant Dean for Undergraduate Engineering*
 Elizabeth Adams, *Director of Research Administration*
 Roger J. Williams, *Director of McCormick Development*
 Alan R. Wolff, PhD, *Director of McCormick Information Technology*

Biomedical Engineering

John B. Troy (PhD Sussex) *Professor and Chair*
 Guillermo Ameer (ScD MIT) *Associate Professor*
 Vadim Backman (PhD Harvard) *Professor*
 Joseph A. Caprini (MD Hahnemann, Drexel) *Professor; also Medicine, Surgery*
 Stephen H. Carr (PhD Case Western Reserve) *Professor; also Chemical and Biological Engineering, Materials Science and Engineering; Associate Dean for Undergraduate Engineering*
 Timothy J. Carroll (PhD Illinois) *Associate Professor; also Radiology*
 Peter Dallos (PhD Northwestern) *Professor; John Evans Professor in Neuroscience (Neurobiology and Physiology); also Communication Sciences and Disorders, Otolaryngology*
 Julius P. A. Dewald (PhD Linda Loma) *Associate Professor; also Physical Medicine and Rehabilitation*
 Jerome M. Garden (MD Northwestern) *Associate Professor; also Clinical Medicine*
 Matthew R. Glucksberg (PhD Columbia) *Professor*
 Mitra J. Hartmann (PhD Caltech) *Associate Professor; also Mechanical Engineering*
 Dean Ho (PhD UCLA) *Associate Professor; also Mechanical Engineering*

James C. Houk (PhD Harvard) *Professor; also Physiology*
 Mark A. Johnson (PhD MIT) *Professor*
 David M. Kelso (PhD Northwestern) *Clinical Professor*
 Francis J. Klocke (MD SUNY Buffalo) *Professor*
 Debiao Li (PhD Virginia) *Professor; also Radiology*
 Xu Li (PhD Wisconsin) *Assistant Professor; also Electrical Engineering and Computer Science*
 Robert A. Linsenmeier (PhD Northwestern) *Professor; also Neurobiology and Physiology, Ophthalmology*
 Shu Q. Liu (PhD UC San Diego) *Professor*
 Malcolm A. MacIver (PhD Illinois) *Associate Professor; also Mechanical Engineering, Neurobiology and Physiology*
 Phillip B. Messersmith (PhD Illinois) *Professor; also Materials Science and Engineering*
 Chad A. Mirkin (PhD Penn State) *Professor; also George B. Rathmann Professor of Chemistry (Chemistry), Infectious Diseases, Materials Science and Engineering*
 Ferdinando Mussa-Ivaldi (PhD Politecnico di Milano) *Professor; also Physiology*
 Suzanne A. Olds (PhD Michigan) *Senior Lecturer and Assistant Chair*
 Todd B. Parrish (PhD Minnesota) *Assistant Professor; also Radiology*
 Eric Perreault (PhD Case Western Reserve) *Associate Professor; also Physical Medicine and Rehabilitation*
 Barry W. Peterson (PhD Rockefeller) *Professor; also Physical Medicine and Rehabilitation, Physiology*
 William Z. Rymer (PhD Monash, MD Melbourne) *Professor; also Physical Medicine and Rehabilitation, Physiology*
 Alan V. Sahakian (PhD Wisconsin) *Professor; also Electrical Engineering and Computer Science*
 Lonnie D. Shea (PhD Michigan) *Professor; also Chemical and Biological Engineering*
 Kenneth G. Spears (PhD Chicago) *Professor; also Chemistry*
 Igal Szleifer (PhD Hebrew Jerusalem) *Christina Enroth-Cugell Professor; also Chemistry*
 Matthew Tresch (PhD MIT) *Assistant Professor; also Physical Medicine and Rehabilitation*
 Jeffrey Vender (MD Northwestern) *Professor; also Anesthesiology*
 Joseph T. Walsh Jr. (PhD MIT) *Professor; also Vice President for Research, Northwestern University*
 Tai Te Wu (PhD Harvard) *Professor; also Biochemistry, Molecular Biology, and Cell Biology*
 Hao Zhang (PhD Texas A&M) *Assistant Professor*
 Li-Qun Zhang (PhD Vanderbilt) *Associate Professor; also Orthopaedic Surgery, Physical Medicine and Rehabilitation*

Chemical and Biological Engineering

Linda J. Broadbelt (PhD Delaware) *Sarah Rebecca Roland Professor and Chair*
 Luis A. N. Amaral (PhD Boston) *Professor*
 Wesley R. Burghardt (PhD Stanford) *Professor; also Materials Science and Engineering*
 Stephen H. Carr (PhD Case Western Reserve) *Professor; also Biomedical Engineering, Materials Science and Engineering; Associate Dean for Undergraduate Engineering*
 Kimberly A. Gray (PhD Johns Hopkins) *Professor; also Civil and Environmental Engineering*
 Bartosz A. Grzybowski (PhD Harvard) *Kenneth Burgess Professor; also Chemistry*
 Michael Jewett (PhD Stanford) *Assistant Professor*
 Harold H. Kung (PhD Northwestern) *Professor*
 Joshua Leonard (PhD UC Berkeley) *Assistant Professor*
 William M. Miller (PhD UC Berkeley) *Professor*
 Justin Notestein (PhD UC Berkeley) *Assistant Professor*
 Monica Olvera de la Cruz (PhD Cambridge) *Lawyer Taylor Professor; also Materials Science and Engineering, Chemistry; Director, Materials Research Center*
 Julio M. Ottino (PhD Minnesota) *Robert R. McCormick Institute Professor; Walter P. Murphy Professor; also Mechanical Engineering; Dean*
 Gregory Ryskin (PhD Caltech) *Associate Professor*
 Lonnie D. Shea (PhD Michigan) *Professor; also Biomedical Engineering*
 Randall Q. Snurr (PhD UC Berkeley) *Professor*
 John M. Torkelson (PhD Minnesota) *Walter P. Murphy Professor; Director, Materials Research Institute*

Civil and Environmental Engineering

Jianmin Qu (PhD Northwestern) *Walter P. Murphy Professor and Chair*
 Oluwaseyi Balogun (PhD Boston) *Assistant Professor; also Mechanical Engineering*
 Zdeněk P. Bažant (PhD Czech Academy of Sciences) *McCormick School Professor; Walter P. Murphy Professor; also Materials Science and Engineering*
 Ted B. Belytschko (PhD IIT) *McCormick School Professor and Walter P. Murphy Professor; also Mechanical Engineering*
 Neal Blair (PhD Stanford) *Professor; also Earth and Planetary Sciences*
 Karen Chou (PhD Northwestern) *Clinical Professor and Assistant Chair*
 Mark Clark (PhD Johns Hopkins) *Clinical Professor*
 David Corr (PhD UC Berkeley) *Clinical Associate Professor*
 Isaac M. Daniel (PhD IIT) *Walter P. Murphy Professor; Director, Center for Intelligent Processing of Composites*

Charles H. Dowding (PhD Illinois) *Professor*
 Pablo L. Durango-Cohen (PhD UC Berkeley) *Associate Professor*
 Richard J. Finno (PhD Stanford) *Professor*
 Jean-François Gaillard (DSc Paris) *Professor; also Earth and Planetary Sciences*
 Kimberly A. Gray (PhD Johns Hopkins) *Professor; also Chemical and Biological Engineering*
 Yonggang Huang (PhD Harvard) *Joseph Cummings Professor; also Mechanical Engineering*
 Leon M. Keer (PhD Minnesota) *Walter P. Murphy Professor; also Mechanical Engineering*
 Sinan Keten (PhD MIT) *Assistant Professor; also Mechanical Engineering*
 Raymond J. Krizek (PhD Northwestern) *Stanley F. Pepper Professor in Engineering; Director, Master of Project Management Program*
 Wing Kam Liu (PhD Caltech) *Walter P. Murphy Professor; also Mechanical Engineering*
 Hani Mahmassani (PhD MIT) *William A. Patterson Distinguished Chair in Transportation; Director, Transportation Center*
 Yu (Marco) Nie (PhD UC Davis) *Assistant Professor; also Transportation Center*
 Aaron I. Packman (PhD Caltech) *Professor; also Mechanical Engineering*
 John W. Rudnicki (PhD Brown) *Professor; also Mechanical Engineering*
 Joseph L. Schofer (PhD Northwestern) *Professor; Associate Dean for Faculty Affairs; Executive Director, Infrastructure Technology Institute; also Transportation Center*
 Surendra P. Shah (PhD Cornell) *Walter P. Murphy Professor; Director, Center for Advanced Cement-Based Materials*
 Yun Wang (PhD Johns Hopkins) *Assistant Professor and Louis Berger Junior Professor*

Electrical Engineering and Computer Science

Alok N. Choudhary (PhD Illinois) *Professor and Chair; Director, Center for Ultrascale Computing and Information Security; also Computational Biology and Bioinformatics*
 Alvin Bayliss (PhD NYU) *Professor; also Engineering Sciences and Applied Mathematics*
 Randy A. Berry (PhD MIT) *Associate Professor*
 Lawrence A. Birnbaum (PhD Yale) *Associate Professor; also Education and Social Policy*
 Fabián E. Bustamante (PhD Georgia Tech) *Associate Professor*
 Arthur R. Butz (PhD Minnesota) *Associate Professor*

Robert P. H. Chang (PhD Princeton) *Professor; also Materials Science and Engineering*
 Yan Chen (PhD UC Berkeley) *Associate Professor*
 Peter A. Dinda (PhD Carnegie Mellon) *Associate Professor*
 Douglas Downey (PhD Washington) *Assistant Professor*
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Northwestern on the Web

www.northwestern.edu

The University's home page

www.registrar.northwestern.edu/courses/index.html#undergraduate_catalog

The latest version of the *Undergraduate Catalog*

www.registrar.northwestern.edu

Information about services of the Office of the Registrar

www.northwestern.edu/caesar

CAESAR, students' gateway to web-based registration and personal academic information

www.northwestern.edu/studentaffairs

The Office of Student Affairs, providing programs and services for Northwestern's diverse students

<http://nulink.northwestern.edu>

NULink, the student home page

www.planitpurple.northwestern.edu

The University's online calendar of events

www.ugadm.northwestern.edu

The Office of Undergraduate Admission

www.northwestern.edu/sfs

Student Financial Services, where students access their personal accounts along with general financial information

E-mail webmaster@northwestern.edu with questions about the Northwestern web site.

Northwestern University does not discriminate or permit discrimination by any member of its community against any individual on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, parental status, marital status, age, disability, citizenship, or veteran status in matters of admissions, employment, housing, or services or in the educational programs or activities it operates. Any alleged violations of this policy or questions regarding the law with respect to nondiscrimination should be directed to Director of Equal Employment Opportunity, Affirmative Action, and Labor Relations, 720 University Place, Evanston, Illinois 60208-1147, phone 847-491-7458; Office of the Provost, Rebecca Crown Center, Evanston, Illinois 60208-1101.

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While Northwestern University is committed to the principles of free inquiry and free expression, discrimination and harassment identified in this policy are neither legally protected expression nor the proper exercise of academic freedom.

For More Information

Undergraduate Study

Full-time, freshmen and transfers

Office of Undergraduate Admission
1801 Hinman Avenue
Evanston, Illinois 60208-1260
847-491-7271
www.ugadm.northwestern.edu

Graduate Study

Office of Admissions
Graduate School
633 Clark Street
Evanston, Illinois 60208-1113
847-491-7271
www.tgs.northwestern.edu

Graduate Management Study

Full-time

Office of Admissions
J. L. Kellogg School of Management
2001 Sheridan Road
Evanston, Illinois 60208-2003
847-491-3308
www.kellogg.northwestern.edu

Part-time

Office of Admissions
Part-Time MBA Program
J. L. Kellogg School of Management
340 East Superior Street, 2M
Chicago, Illinois 60611-3008
312-503-8385
www.kellogg.northwestern.edu

Law Study

Office of Admissions
Northwestern University School of Law
357 East Chicago Avenue
Chicago, Illinois 60611-3069
312-503-8465
www.law.northwestern.edu

Medical Study

Office of Admissions
Feinberg School of Medicine
303 East Chicago Avenue
Chicago, Illinois 60611-3008
312-503-8206
www.feinberg.northwestern.edu/admissions

Continuing Education

Part-time, evening and weekend

Office of the Dean
School of Continuing Studies
339 East Chicago Avenue
Chicago, Illinois 60611-3008
312-503-6950
www.scs.northwestern.edu

Summer Study

Office of the Director
Summer Session
405 Church Street
Evanston, Illinois 60208-4220
847-491-5250
www.scs.northwestern.edu/summernu

College Preparation Program

National High School Institute
College Preparation Program
405 Church Street
Evanston, Illinois 60208-2650
847-491-5250
www.scs.northwestern.edu/collegeprep