

# NORTHWESTERN

## Undergraduate Catalog 2007–08

Northwestern  
Undergraduate Catalog 2007–08  
Volume XXX, Number 12, August 2007

Northwestern (USPS 428-790) is published by Northwestern University, 633 Clark Street, Evanston, Illinois 60208-1114, and issued 12 times during the year: once in February, seven times in April, once in June, once in July, and twice in August. Periodicals postage paid at Evanston, Illinois, and additional mailing offices. Postmaster: Send address changes to Northwestern University, 633 Clark Street, Evanston, Illinois 60208-1114.

This catalog for the academic year beginning September 1, 2007, 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 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.

## Contents

<b>Academic Calendar</b>	<b>4</b>		
<b>The University</b>			
<i>The Undergraduate Experience</i>	6	African American Studies	49
<i>Student Demographics</i>	6	African and Asian Languages	52
<i>Graduation Rates</i>	7	African Studies	54
<i>A Historical Overview</i>	7	American Studies	54
<i>Accreditation</i>	7	Anthropology	55
<i>Schools and Divisions</i>	7	Art History	60
<i>University Research Centers</i>	9	Art Theory and Practice	63
<i>Libraries</i>	9	Asian American Studies	64
<i>Information Technology Services</i>	10	Asian and Middle East Studies	65
<i>Student Services</i>	11	Biological Sciences	66
<i>Identification Cards</i>	16	Business Institutions	69
		Chemistry	70
<b>Undergraduate Education</b>		Chicago Field Studies	73
<i>Admission</i>	17	Classics	73
<i>Financial Aid</i>	21	Cognitive Science	76
<i>Financial Regulations</i>	22	Comparative Literary Studies	77
<i>Undergraduate Residence Requirement</i>	23	Computing and Information Systems	79
<i>Academic Regulations</i>	24	Critical Theory	81
<i>Honors and Prizes</i>	30	Drama	81
<i>Academic Options</i>	30	Earth and Planetary Sciences	81
		Economics	84
<b>Undergraduate Schools and Courses</b>		English	87
<i>Key to Course Numbers</i>	35	Environmental Policy and Culture	91
		Environmental Sciences	92
<i>Cross-School Programs</i>	36	European Studies	93
Animate Arts	36	Film and Media Studies	93
Environmental Science, Engineering, and Policy	36	French and Italian	94
Transportation and Logistics	37	Gender Studies	98
Financial Economics and Managerial Analytics	37	Geography	100
Music Theatre	38	German	101
Service Learning	39	Global Health Studies	105
Sound Design	39	History	106
Undergraduate Leadership	40	Humanities	109
International Studies	40	Integrated Science	110
Writing Arts	40	International Studies	111
Military Programs	41	Jewish Studies	112
Field Study	42	Latin American and Caribbean Studies	113
		Legal Studies	114
<i>Weinberg College of Arts and Sciences</i>	44	Linguistics	115
Academic Policies	44	Materials Science	117
Academic Options	48	Mathematical Methods in the Social Sciences	118
General Studies	49	Mathematics	119
		Philosophy	124
		Physics and Astronomy	127
		Political Science	130

Psychology	135	Materials Science and Engineering	219
Religion	137	Mechanical Engineering	222
Science in Human Culture	140		
Slavic Languages and Literatures	140	<i>Medill School of Journalism</i>	226
Sociology	144	Academic Policies	226
Spanish and Portuguese	147	Academic Options	227
Statistics	150	Student Resources	228
Writing Program	152	Academic Program	228
		Courses	230
<i>School of Communication</i>	153		
Academic Policies	153	<i>School of Music</i>	232
Academic Options	154	Academic Policies	232
Introductory and Related Courses	156	Academic Options	234
Communication Sciences and Disorders	156	Resources	236
Communication Studies	160	Music Studies for Nonmajors	237
Interdepartmental Studies	165	Interdepartmental Courses for Music Majors	238
Performance Studies	165	Music Studies	239
Radio/Television/Film	166	Music Composition	239
Theatre	169	Music Education	240
Dance	172	Musicology	241
		Music Technology	242
<i>School of Education and Social Policy</i>	175	Music Theory and Cognition	243
Academic Policies	175	Music Performance	244
Academic Options	177	Conducting and Ensembles	244
Academic Programs	177	Jazz Studies	244
Human Development and Psychological		Piano	245
Services, Learning and Organizational		String Instruments	245
Change, and Social Policy	178	Voice and Opera	247
Secondary Teaching	180	Wind and Percussion Instruments	247
Courses	183		
		<b>Administration and Faculty</b>	
<i>McCormick School of Engineering and Applied Science</i>	187	<i>University Administration</i>	249
Academic Policies	187	<i>Undergraduate Schools</i>	250
Academic Options	188	Weinberg College of Arts and Sciences	250
Student Resources	191	School of Communication	268
Programs of Study	192	School of Education and Social Policy	271
General Engineering Courses	200	McCormick School of Engineering	
Biomedical Engineering	201	and Applied Science	273
Chemical Engineering	203	Medill School of Journalism	279
Civil Engineering	206	School of Music	280
Design Engineering and Applications	209	Naval Science	283
Electrical Engineering and Computer Science	210		
Engineering Sciences and Applied Mathematics	216	<b>Index</b>	<b>284</b>
Environmental Engineering	217		
Industrial Engineering and Management Sciences	217	<b>For More Information</b>	<b>inside back cover</b>

## Academic Calendar

### Academic Year 2007–08

#### Fall Quarter

##### *September 2007*

1	Saturday	Tuition due
18	Tuesday	New Student Orientation
25	Tuesday	Registration for fall quarter Classes for fall quarter begin 8 a.m.

##### *October 2007*

1	Monday	Last day for late registration, adding any course, or changing a section
---	--------	--

##### *November 2007*

2	Friday	Last day for dropping any course Last day to withdraw without academic review
12	Monday	Registration for winter quarter
21	Wednesday	Thanksgiving vacation begins 6 p.m.
22	Thursday	Thanksgiving Day
26	Monday	Classes resume 8 a.m.

##### *December 2007*

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

#### Winter Quarter

##### *January 2008*

1	Tuesday	Tuition due
7	Monday	Registration for winter quarter Classes for winter quarter begin 8 a.m.
11	Friday	Last day for late registration, adding any course, or changing a section
21	Monday	Martin Luther King Jr. Day; no classes

##### *February 2008*

15	Friday	Last day for dropping any course Last day to withdraw without academic review
25	Monday	Registration for spring quarter

##### *March 2008*

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

#### Spring Quarter

##### *March 2008*

31	Monday	Registration for spring quarter Classes for spring quarter begin 8 a.m.
----	--------	--

##### *April 2008*

1	Tuesday	Tuition due
4	Friday	Last day for late registration, adding any course, or changing a section

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 2009 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 2008**

- |    |          |   |
|----|----------|---|
| 1  | Thursday | Last day for current students to file undergraduate financial aid applications for Summer Session and for academic year 2008–09 |
| 9  | Friday   | Last day for dropping any course<br>Last day to withdraw without academic review  |
| 19 | Monday   | Registration for fall quarter 2008–09   |
| 26 | Monday   | Memorial Day; no classes  |

**June 2008**

- |    |          |  |
|----|----------|--|
| 7  | Saturday | Last day of classes for spring quarter     |
| 9  | Monday   | Spring quarter examinations begin          |
| 13 | Friday   | Examinations end 6 p.m.                    |
| 20 | Friday   | Baccalaureate<br>150th annual Commencement |

**Summer Session****June 2008**

- |    |        |  |
|----|--------|--|
| 23 | Monday | Late registration for Summer Session<br>Classes for Summer Session begin 8 a.m.<br>Tuition due |
| 27 | Friday | Last day for late registration, adding any course, or changing a section                       |

**July 2008**

- |   |        |                              |
|---|--------|------------------------------|
| 4 | Friday | Independence Day; no classes |
|---|--------|------------------------------|

**August 2008**

- |    |          |                                       |
|----|----------|---------------------------------------|
| 2  | Saturday | Six-week Summer Session ends 6 p.m.   |
| 16 | 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/calendar](http://www.registrar.northwestern.edu/calendar).

## The University

Northwestern University is committed to excellent teaching, innovative research, and the personal and intellectual growth of its students. Through a combination of close interschool cooperation and a flexible academic calendar, both undergraduate and graduate students and faculty are able to customize education and research across disciplines. Northwestern is a place where faculty work closely with students and each other and where students at all levels interact as part of an innovative and technologically sophisticated learning community.

Northwestern's emphasis on effective communication, regardless of field of study, fosters the ability to think analytically and write and speak clearly and persuasively. The result is that Northwestern graduates are exceptionally well prepared for academic and career success and become leaders in their fields.

The University's locations in Evanston, the first suburb north of Chicago, and in Chicago provide outstanding intellectual, professional, social, and cultural opportunities in beautiful settings on the shore of Lake Michigan.

### THE UNDERGRADUATE EXPERIENCE

Northwestern provides an educational and extracurricular environment that enables students to become accomplished individuals and responsible citizens. Its alumni feel confident exploring a wide range of subjects and experiences, in school and beyond, regardless of their majors. Northwestern believes that students should not invest themselves so fully in one area that they're afraid to risk exploring unfamiliar academic disciplines. About 20 to 25 percent of freshmen enroll with a prospective major of "undecided"; many more change their minds and their majors before they graduate; and 25 percent of them transfer from one of Northwestern's undergraduate schools to another. Students frequently pursue two majors or even two degrees at the same time, and enterprising students, with their deans' permission, occasionally construct their own majors or programs of study.

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. All students in the six undergraduate schools take courses in science, mathematics and technology, individual and social behavior, historical studies, the humanities, and fine and performing arts. In addition to the traditional components of undergraduate education — general requirements and advanced work

in the major — Northwestern prides itself on making unusual academic opportunities available. Students also are encouraged to pursue independent study, internships, research, and study abroad. At least 30 percent of Northwestern's undergraduates engage in internships, practicums, paid cooperative education programs, applied research, and other off-campus experiences, often for academic credit.

Underpinning the breadth of a Northwestern education is the quarter system, which gives students the opportunity to take more courses than they would under a traditional semester system. Undergraduates typically take 4 courses each quarter and 12 courses in an academic year.

In both its academic and extracurricular programs, Northwestern encourages students to obtain a broad understanding of the world in which they live and to cultivate the habits of critical inquiry, creativity, and reflection that characterize the educated person. The University places particular value on being able to communicate effectively, to interpret the developments in science and technology that shape our changing world, and to use the techniques of quantitative analysis that are necessary to effective professional and social life.

One of Northwestern's strongest traditions is the energetic involvement of its undergraduates in campus life, a tradition that often leads them beyond the campus itself. Northwestern is a major force in the economic, social, and cultural life of Evanston, Chicago, and nearby communities. Each year Northwestern students, faculty, and staff provide thousands of hours of volunteer service to the community.

### STUDENT DEMOGRAPHICS

Northwestern recruits students of demonstrated academic achievement from diverse social, ethnic, and economic backgrounds. All 50 states and nearly 50 countries are represented in the undergraduate student body. Forty-three percent of the approximately 7,900 undergraduates are from the Midwest, 20 percent from the East, 20 percent from the West and Southwest, and 10 percent from the South, and 7 percent have overseas addresses. Slightly more than half are female, and 31 percent are members of minority groups. Sixty percent enroll with financial aid.

## GRADUATION RATES

More than 90 percent of Northwestern undergraduates earn baccalaureate degrees within six years, a graduation rate that remains consistent. Of the 1,889 full-time freshmen who entered in 1997, 93.1 percent had graduated at the end of six years. For more information about graduation rates, see [www.registrar.northwestern.edu/statistics/grad/graduation\\_rates.html](http://www.registrar.northwestern.edu/statistics/grad/graduation_rates.html).

## A HISTORICAL OVERVIEW

Excellence has been Northwestern's goal since nine pioneering Chicagoans met in 1850 to establish an educational institution that would rival any in the eastern United States. That group — a physician, three attorneys, two businessmen, and three Methodist clergymen — envisioned a university “of the highest order of excellence” to serve the people of the Northwest Territory. Northwestern University was officially established on January 28, 1851, when its act of incorporation was passed by the Illinois legislature.

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 location so impressed founder Orrington Lunt that he wrote, “I could not rid myself of the fairy visions constantly presenting themselves in fanciful beauties — of the gently waving lake — its pebbly shore — the beautiful oak openings and bluffs beyond.”

The town that grew up around Northwestern was named Evanston in honor of one of the University's most prominent founders, John Evans. A physician and businessman, Evans provided the cash to place a \$1,000 down payment on the land and assumed responsibility for the mortgage covering the balance. Evans was chairman of the board from the University's founding until his death in 1897.

After completing its first building in 1855, Northwestern began classes that fall 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. 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.

Today Northwestern enjoys a position as one of the country's leading private research universities. Approximately 17,750 full-time and part-time students are enrolled in 11 colleges and schools located on lakefront campuses in Evanston and Chicago. Undergraduate education takes place on the Evanston campus in the Judd A. and Marjorie Weinberg College of Arts and Sciences, the School of Communication, the School of Education and Social Policy, the Robert R. McCormick

School of Engineering and Applied Science, the Medill School of Journalism, and the School of Music.

## ACCREDITATION

Northwestern University is accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools. Other professional, college, school, and departmental accreditations are listed under the respective areas in the following section.

## SCHOOLS AND DIVISIONS

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

### 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. 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 School of Music (1895) offers the degrees of bachelor of music and bachelor of arts in music. In its graduate division the School of Music offers the degrees of doctor of music and master of music and a certificate in performance. 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 degree. MBA students may study general management; finance; marketing; entrepreneurship; family business; management strategy; decision sciences; health services; manufacturing; and public and nonprofit, real estate, technology, and biotechnology management. In addition to the full-time MBA, Kellogg offers a part-time evening MBA through its Managers' Program on

Northwestern's Chicago campus, a weekend executive MBA through the Executive Master's Program (EMBA) on the Evanston campus, and international executive MBA (IEMBA) programs in Canada, Europe, the Middle East, and Asia. Kellogg also offers a wide range of nondegree executive education courses at its Allen Center on the Evanston campus. Kellogg is accredited by the American Assembly of Collegiate Schools of Business and the Accrediting Commission on Graduate Education for Hospital Administration.

- 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 engineering management, product development, information technology, biotechnology, and project management and, jointly with the Kellogg School, the master of management in manufacturing. McCormick programs are accredited by the Engineering Accreditation Council of the Accreditation Board for Engineering and Technology.
- The Graduate School (1910) controls 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 procedures for earning those degrees in all schools and departments, is available online at the school's web site, [www.northwestern.edu/graduate](http://www.northwestern.edu/graduate). 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, with the School of Law, dual master's degrees in journalism and legal studies. 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 the Feinberg School 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, and joint degree programs with the Graduate School and Kellogg School offer an MD degree as well as PhD, MPH, and MBA 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) is dedicated to advancing the understanding of law and producing graduates prepared to excel in a rapidly changing world. The curriculum provides a superior foundation in legal reasoning, analysis, and writing as well as a thorough understanding of the structures and policies of the law. Communication, collaboration, and teamwork; cross-training in business; and a blend of a rigorous intellectual environment with a supportive, collegial community are hallmarks of the school. It offers the degrees of juris doctor, master of laws, master of laws in taxation, and doctor of juridical science. 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. A joint degree program with the Medill School of Journalism allows students to earn a master of science degree in journalism and a master of legal studies degree. 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 recently began offering a master of laws degree to executive students in Seoul, South Korea, and Madrid, Spain. 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 to earn a degree or a certificate. In addition, students take



courses for personal enrichment or enroll in credit and noncredit professional development programs. Credit professional development programs include preparation for professional health careers, clinical psychology, and business administration. Classes are offered on the Chicago and Evanston campuses and in the Loop. Undergraduate degrees offered through SCS are conferred by Weinberg College and the School of Communication. In partnership with the Graduate School, SCS offers master of arts degrees in liberal studies, literature, creative writing, and public policy and administration. SCS also offers a master of arts in sports administration and a master of science in computer information systems. In addition, SCS administers Summer Session programs for the University and is the home of the Center for Public Safety and the Institute for Learning in Retirement.

## UNIVERSITY RESEARCH CENTERS

University research centers exemplify Northwestern's long-standing tradition of encouraging faculty to collaborate across the boundaries of traditional disciplines. By bringing together interdisciplinary teams of investigators to seek innovative solutions to some of the world's most challenging problems, these centers have profound implications for undergraduates; such research often alters theory and practice within an academic discipline and results in the development of new curricular programs.

Many University research centers have special research programs for undergraduates. Students also may be involved directly with the centers through lectures or other special events. University research centers include the following:

- Argonne-Northwestern Solar Energy Research Center
- Roberta Buffett Center for International and Comparative Studies
- Center for Applied Psychological and Family Studies
- Center for Catalysis and Surface Science
- Center for Drug Discovery and Chemical Biology
- Center for Functional Genomics
- Center for Reproductive Science
- Center for Sleep and Circadian Biology
- Center for Technology and Social Behavior
- Center of Cancer Nanotechnology Excellence
- Chemistry of Life Processes Institute
- Institute for BioNanotechnology in Medicine
- Institute for Policy Research
- International Institute for Nanotechnology
- Materials Research Center
- Nanoscale Science and Engineering Center
- Northwestern Institute on Complex Systems
- Northwestern Synchrotron Research Center
- Northwestern University Atomic and Nanoscale Characterization Experimental Center

- Program of African Studies
- Spatial Intelligence and Learning Center

For detailed information about these centers, see [www.research.northwestern.edu/research/centers](http://www.research.northwestern.edu/research/centers).

## LIBRARIES

Undergraduates at Northwestern have access to a wealth of library resources and services. With more than 4.6 million volumes in the University Library system, the Galter Health Sciences Library, and the Pritzker Legal Research Center, Northwestern offers its students the 10th largest library collection among private universities in the United States. Undergraduates are encouraged to explore the full range of resources available to them and to develop their skills as information seekers.

Northwestern undergraduates have full access to interlibrary loan services and to materials from libraries worldwide. Through the Infopass program, students can gain admittance to other collections in the Chicago area, including those of the Newberry Library, the Field Museum library, the Art Institute of Chicago library, and other academic and private libraries.

### University Library

"University Library" refers to the main library, which houses the University's major collections in the humanities and social sciences, as well as several specialized research collections; the adjoining Charles Deering Library, which houses fine arts and other specialized collections; the Seeley G. Mudd Library for Science and Engineering; the Geology Library; the Mathematics Library; and the Joseph Schaffner Library, which supports the research needs of students on the Chicago campus.

Northwestern's libraries offer many electronic and textual resources. NUcat, the online catalog of University Library, provides bibliographic, location, and circulation status information for materials from these libraries. NUcat and many other resources and services are available on the web at [www.library.northwestern.edu](http://www.library.northwestern.edu).

### Main Library (Evanston Campus)

The main library building houses collections on levels 3 to 5 of the three research towers. The focus is on the humanities and social sciences, with history materials in the East Tower, humanities in the South Tower, and social sciences in the North Tower.

The main library's Information Commons and Reference Department, both located on level 1, offer students research assistance and support. The Information Commons has staff to answer questions and 56 workstations for electronic access to information. The Reference Department offers in-depth research assistance, online reference services, and instructional services. The reference collection contains 55,000 volumes as well as extensive electronic resources.

Also located on level 1 are the Circulation Services Department, the Periodicals and Newspapers Reading Room, the Interlibrary Loan Department, and the Government and Geographic Information and Data Services Department. Featuring an extensive collection of federal, state, and international documents, the Government and Geographic Information and Data Services Department is a depository for documents of the United States, the United Nations, the state of Illinois, and the European Union, as well as selected publications of other international agencies and state and local governments.

The Periodicals and Newspapers Reading Room contains current periodicals, extensive collections of newspapers, and primary research materials in microform. On the lower level of the library there are computing labs and classrooms run by the Academic Technologies division of Northwestern University Information Technology.

Occupying level 2 are the Marjorie Iglow Mitchell Multimedia Center, Forum Room, and Video Theater (for special programs and video presentations); Core/Reserve Collections; and a student lounge. The Multimedia Center features a videotape collection of classic films, documentaries, and performing arts titles. The Core Collection holds 40,000 books in all disciplines, ensuring easy access and permanent availability of works essential to undergraduates. Core books may be checked out for 24 hours.

Three special units are located on level 5. The Curriculum Collection houses K-12 textbooks and children's literature. The Melville J. Herskovits Library of African Studies (popularly called *Africana*) is known internationally for its comprehensive collection of materials on every aspect of Africa. The Transportation Library, one of the major collections of its kind in the United States, specializes in transportation socioeconomics, law enforcement, police administration, and environmental impact statements.

#### *Charles Deering Library (Evanston Campus)*

The Charles Deering Library, attached to the main library, houses the Art Collection, University Archives, the Charles Deering McCormick Library of Special Collections, and the Music Library and Listening Center/Music Lab. The holdings of Special Collections include 20th-century collections, underground press publications, women's movement literature, and numerous rare books, manuscripts, limited editions, and fine bindings. The Music Library meets the curriculum, research, and performance needs of students and faculty at the School of Music. This library contains 300,000 scores, journals, books, manuscripts, and sound recordings. Students may listen to the extensive collection of recordings in the Music Library's Listening Center/Music Lab.

#### *Seeley G. Mudd Library for Science and Engineering, Geology Library, and Mathematics Library (Evanston Campus)*

The Seeley G. Mudd Library for Science and Engineering houses books and journals in applied mathematics, astronomy, biological sciences, chemistry, computer science, engineering, and physics. Two smaller departmental libraries, the Geology Library in Locy Hall and the Mathematics Library in the Lunt Building, also serve the Evanston campus.

#### *Joseph Schaffner Library (Chicago Campus)*

The Joseph Schaffner Library in Wieboldt Hall serves the School of Continuing Studies, the evening Managers' Program of the J. L. Kellogg School of Management, and Medill School of Journalism graduate programs.

### **Other Libraries**

The Galter Health Sciences Library, which serves the Feinberg School of Medicine, and the Pritzker Legal Research Center, which serves the School of Law, are located on the Chicago campus and are open to all Northwestern students. The collections of these libraries are listed in NUCat, the library's online catalog. Materials may be checked out directly or may be sent to Evanston libraries through online interlibrary loan request forms.

Also open to all Northwestern students are the outstanding collections on religion held in the United Library of Garrett-Evangelical and Seabury Western Theological Seminaries, located on the Evanston campus. The United Library's holdings are listed in NUCat.

## **INFORMATION TECHNOLOGY SERVICES**

Northwestern University Information Technology (NUIT) is the principal campus unit charged with supporting the University community's use of technology. The full range of its services can be found online at [www.it.northwestern.edu](http://www.it.northwestern.edu).

All buildings on the Evanston and Chicago campuses are connected to the internal campus network and to the Internet via high-speed networks. Every student living in the residence halls has a high-speed Internet connection. In addition, the University's more than 600 wireless access points allow students using laptops with wireless cards or wireless personal digital assistants to take advantage of the full range of online services from almost any location on either campus.

Although nearly all undergraduates have one or more personal computers, computing sites are abundant on campus. Some sites offer workstations arranged in a traditional computer lab, where an entire class can meet together and work with critical software programs and datasets. Other sites, such as the new Information Commons in University Library, offer digital collaboration

areas where small groups can work together on projects. A high-tech conference room is also available for student meetings. The MediaWorks studio in the library's lower level offers high-end media production systems with tools to capture and edit video and audio, scan and manipulate photos, and develop web content and animation. Students also may check out video cameras from MediaWorks. For more details on NUIT's computing sites, please see [www.at.northwestern.edu/ctg/labs](http://www.at.northwestern.edu/ctg/labs).

Northwestern offers students a variety of online services for their University needs:

- CAESAR ([www.northwestern.edu/caesar](http://www.northwestern.edu/caesar)), a self-service application, allows students to register for classes, search class schedules and course offerings, obtain unofficial transcripts, view financial aid and student account information, maintain directory and emergency contact information, and much more.
- NUTV ([www.tss.northwestern.edu/nutv/helpguide](http://www.tss.northwestern.edu/nutv/helpguide)) is Northwestern's innovative system for delivering entertainment television and University channels to undergraduate residence halls via the campus data network on students' computers.
- Plan-It Purple ([www.planitpurple.northwestern.edu](http://www.planitpurple.northwestern.edu)) is an online calendar of activities at Northwestern.
- Course Management System ([www.it.northwestern.edu/about/departments/itms/services/cms](http://www.it.northwestern.edu/about/departments/itms/services/cms)) provides an efficient way for instructors to manage and distribute course materials and communicate with students. In addition, students can communicate and share information with each other online.

At the beginning of each academic year, NUIT welcomes new students to Northwestern with the Get Connected newsletter ([www.it.northwestern.edu/connected/2007.pdf](http://www.it.northwestern.edu/connected/2007.pdf)). The newsletter introduces students to the University's electronic environment with helpful tips that include making the right computer and software purchases, understanding Northwestern's electronic identity (NetID), mastering online resources, and preparing to use the wide range of technology opportunities at Northwestern.

NUIT provides technology support through its web site and support center at 1800 Sherman Avenue on the Evanston campus. The center is Northwestern's primary information resource for computing and networking. It provides phone consulting on University-supported hardware, software, operating systems, and computing facilities. Hours during the academic year are Monday through Thursday, 8 a.m. to 8 p.m.; Friday, 8 a.m. to 5 p.m.; Saturday, noon to 5 p.m.; and Sunday, noon to 8 p.m. Laptop support consultants also are available at various sites on campus. Check [www.it.northwestern.edu/laptop](http://www.it.northwestern.edu/laptop) for exact locations, dates, and times.

Residential networking consultants are available to support students in the residential halls.

The NUIT support office on the Chicago campus is available on Monday and Thursday between 8:30 a.m. and 5 p.m. for appointments for e-mail activation and resetting of NetID passwords.

For technology support the NUIT support center may be reached by calling 847-491-HELP (4357) or e-mailing [consultant@northwestern.edu](mailto:consultant@northwestern.edu).

Students are encouraged to review University policies about technology rights and responsibilities at [www.it.northwestern.edu/policies](http://www.it.northwestern.edu/policies).

## STUDENT SERVICES

### Student Affairs

The Office of the Vice President for Student Affairs is responsible for many programs and services available to Northwestern students. Students are encouraged to take advantage of these opportunities and services designed to help them establish and meet personal, academic, and career goals; assist them in acquiring skills to confront problems and issues in their lives; and provide them with essential services as part of a residential community.

In recognition of students as members of the Northwestern University community, the University has adopted a statement on student rights and responsibilities (see the *Student Handbook* for the complete statement).

### Counseling and Psychological Services

Counseling and Psychological Services (CAPS) is the University's primary counseling resource. CAPS counselors, social workers, psychologists, and psychiatrists offer students a variety of academic and personal services, including individual and group counseling and developmental programming. When students have problems, talking with an experienced counselor often can provide relief. Students may talk with a counselor confidentially about specific problems such as managing stress and difficult relationships or about nonspecific feelings of anxiety or loneliness.

CAPS offers group counseling on eating behavior, self-esteem, sexual identity, shyness, grief, stress management, self-exploration, and relationship enhancement. Groups and topics may be added in response to student interests or needs.

While there is a limit of 12 individual CAPS counseling sessions, this office can refer students who will benefit from additional help to other appropriate and affordable counseling providers in the community. Students who participate in group counseling are still eligible for 12 individual sessions.

Counseling is available to full-time students (those registered for at least three courses). Crisis intervention and consultation, assessment, and referral resources are available to part-time students.

### *Health Service*

All students are required to have health-care insurance coverage. For information about the program offered through the University, consult the Health Service insurance office.

The University maintains a health service for students, including a pharmacy, laboratory, radiology suite, and health education program at Searle Hall. Students registered for full-time study (as defined by their program and the registrar) are entitled to the full privileges of this service. Students registered for less than full-time may use the service by paying a clinic-use fee each academic quarter. (This does not apply to School of Continuing Studies students; regardless of academic load, they must pay the clinic-use fee each quarter to use the Health Service.) The Health Service has forms for these options. The fee may be paid by check.

Full-time students must comply with Illinois state and Northwestern University health, immunization, and insurance requirements, which are described in Health Service and insurance office letters sent to them after they are accepted to the University. Medical and insurance forms sent with the letters must be completed and returned at least six weeks before registration. Students who fail to comply will be subject to late fees, and their registration will be withheld until these requirements are met.

### *Multicultural Student Affairs*

The Department of Multicultural Student Affairs (MSA) supports Northwestern's institutional belief in and commitment to racial/ethnic and religious diversity. As the umbrella for the Offices of African American, Asian/Asian American, and Hispanic/Latino Student Affairs and the Multicultural Center, MSA plans and implements activities and programs through which students, faculty, staff, and alumni participate in cross-cultural communication, multicultural education, and outreach activities.

The directors of African American, Asian/Asian American, and Hispanic/Latino Student Affairs oversee support, services, and programs for their respective students.

### *African American Student Affairs*

The services and activities of African American Student Affairs include support and referral on personal, academic, and career issues; tutoring in math, the sciences, economics, and writing; New Student Week activities, lectures, and receptions; and oversight and coordination of publicity for Black History Month events. The African American Student Affairs building is home to a number of student organizations and provides office and meeting space for students as well as staff. The programs of this office are designed to promote academic achievement, provide cultural and social outlets, and give voice to the needs and concerns of the African American student community.

### *Asian/Asian American Student Affairs*

The Office of Asian/Asian American Student Affairs provides support, advocacy, and programs for Asian and Asian American students and student organizations at Northwestern. Its services help to address the needs of Asian and Asian American students as well as to facilitate their academic achievement, professional development, cultural enrichment, and social enhancement.

### *Hispanic/Latino Student Affairs*

The Office of Hispanic/Latino Student Affairs provides support, services, and programs to Hispanic/Latino students and student groups on campus. The staff advocates for the needs of Hispanic/Latino students, identifies problem areas, articulates strategies to address concerns, and provides opportunities for the campus community to learn more about Hispanic/Latino culture, students, needs, and issues.

### *The Multicultural Center*

The Multicultural Center (MCC) organizes cultural groups and activities that enhance and support students' growth in intercultural sensitivity and racial identity formation. Various racial, cultural, and ethnic groups are provided services through the center, and all students are encouraged to attend its program offerings. The services and programs are rooted in a strongly held belief that diversity is a valuable part of the overall educational experience at Northwestern.

### *Norris University Center*

Norris University Center is the community center of the University. It provides programs and services that enhance the quality of campus life for students, faculty, parents, staff, alumni, and guests. Norris Center and Northwestern's many student organizations sponsor a variety of activities that promote social, cultural, and educational interaction outside the classroom. Cultivating a sense of community and a spirit of loyalty, Norris Center serves as a unifying force in the life of the University.

Additionally, Norris Center provides amenities and conveniences that enrich the quality of daily campus life for the University community. These include the campus bookstore, Norris Information Desk, a food court, meeting rooms, a full-service branch bank and multiple ATMs, Dittmar Memorial Art Gallery, a box office, a convenience store, WildCARD office, FedEx, Kinko's Copy Center, Cat's Corner Video, and 34 student organization offices. Special services include a game room, a wide variety of minicourses, the Lesbian, Gay, Bisexual, and Transgender Resource Center, outdoor recreation equipment rental, sound and sight equipment rental, a craft studio, and an interactive information kiosk.

## Organizations and Activities

The Center for Student Involvement at Norris University Center is a resource for all student organizations at Northwestern. The staff members are the primary advisers for student organizations recognized by the Associated Student Government. The office is organized into four areas: programming, leadership development, organizational development, and community service.

*Programming:* Student employees of Norris Center Programming develop and implement social, cultural, and educational programs to support the mission of Norris Center. The wide variety of programs provide opportunities for social interaction and for developing a better understanding and awareness of diverse cultures, religions, and ethnicities. All events are free.

*Leadership development:* Everyone defines leadership differently, and therefore the Center for Student Involvement invites students to participate in a variety of workshops, conferences, and programs in an effort to determine and develop their definition of leadership and their own leadership styles. Programs include CATalyst, Freshman Emerging Leaders Program, Leadership Institute, Women in Leadership Series, and the annual Student Recognition Banquet. Anyone interested in participating in or planning these programs should call the office at 847-491-2350.

*Organizational development:* Central to the mission of the Center for Student Involvement is support and advice for student organizations. The center directly advises diverse student groups, including activist, pre-professional, cultural, theatrical, musical, and political groups. To support these organizations, the center offers an organizational development symposium, Student Organization Symposium (SOS), in the fall; a student organization handbook; and a resource web site, [www.northwestern.edu/norris/sos](http://www.northwestern.edu/norris/sos).

*Community service:* Student Community Service is dedicated to involving Northwestern University students in the improvement of Evanston and Chicago-area communities through service and volunteer activity. Several organizations participate in philanthropic and direct-service activities. Student Community Service coordinates transportation to volunteer sites, one-day service projects, a holiday gift drive, and other service-related activities. To learn more about Student Community Service, see [www.northwestern.edu/norris/community.html](http://www.northwestern.edu/norris/community.html). Individuals and groups also may look for volunteer sites at [www.volunteer.northwestern.edu](http://www.volunteer.northwestern.edu).

## Norris Information Desk

The information desk at Norris Center provides the University with a central location for inquiries regarding general campus and event information. Visitors are welcome to call or drop by when on campus to ask about University services and special events.

## Residence Halls and Food Services

Students at Northwestern have a wide variety of living facilities available to them. Smaller residences accommodate as few as 27 students; larger units house more than 600. Most rooms are doubles, but residences also contain single, triple, quadruple, and suite arrangements. A student may select a residential college, a coeducational residence hall, or a same-sex facility. Some of the houses are older, ivy-covered residences; others are modern, recently built halls. Each building has its own character and spirit and its own distinct advantages.

Approximately 4,200 undergraduate students live in the University's residence halls; another 900 students have chosen to live in fraternity and sorority houses. The approximately 2,700 remaining undergraduates commute from home or live off campus.

The residence halls bring together individual students with diverse backgrounds and various interests. Each residence hall is free to set its own norms of behavior within the general guidelines of the law and University policy. Students adopt constitutions and elect their own hall officers. Living in a residence hall makes a student a member of its government, with the rights, privileges, and responsibilities of membership.

Residence hall activities are planned by the elected officers and developed by the residents to provide social, academic, and cultural experiences. These programs are financially supported through voluntary social fees.

Students take their meals at any of the six dining facilities located in the larger residence halls. Twenty meals are available each week: breakfast, lunch, and dinner, Monday through Saturday, and brunch and dinner on Sunday. Both traditional and block meal plans are available. Both types of plans include a quarterly allocation of points, which may be used for guest meal purchases and at the retail food services on campus. The traditional plans offer a fixed number of meals per week and may be used only in the residence halls food services. Block meal plans provide a fixed number of meals per quarter and a greater allocation of points than the traditional meal plans. Residents are required to sign a contract for a minimum of 13 traditional meals per week, selecting whichever 13 meals meet their individual needs and schedules.

Complete information about Northwestern's residences, including rental rates, is e-mailed to applicants after they have been admitted to the University and paid the required tuition deposit.

## Student Affairs Office

The Office of Student Affairs in Scott Hall is a source of information and assistance for students, parents, and faculty and staff. The dean of students/associate vice president for student affairs serves students who have personal and academic concerns and counsels students who believe they have

been victims of sexual harassment and discrimination by other students. The judicial affairs officer oversees the University Hearing and Appeals System (UHAS) and the Sexual Assault Hearing and Appeals System (SHAS). The coordinator of orientation and student transitions plans and implements orientation and other transition programs for students, organizes family weekend, and produces publications for parents of undergraduates. See [www.northwestern.edu/studentaffairs](http://www.northwestern.edu/studentaffairs) for links to all Student Affairs departments.

### *University Career Services*

University Career Services (UCS) is a centralized career center, providing a full spectrum of career counseling and advising services, workshops, programming, and special events for undergraduate and graduate students and alumni. It aims to help students translate their superb Northwestern education into excellent professional opportunities, including successful job and internship searches and graduate work. Services include

- walk-in services as well as individual appointments for confidential career counseling, career assessments, and preparation for job and internship searches and graduate studies
- internship services, including individualized help, programs, and vacancy listing
- help with the job search process, including strategizing, resume review, and advice on interviewing and salary negotiations
- outreach programming to the campus community
- CareerCat, a career management system that offers access to on-campus interviews for students, easy online registration, and other features
- campus recruiting visits and information sessions by hundreds of employers seeking interns and full-time employees
- credential, dossier, and recommendation files services for students and alumni

Annual special events include fall and winter job fairs, Martin Luther King Jr. Public Interest Job Fair, Internship Forum, and, in the spring, Career Conversations.

The Career Information Center offers current resources and publications on industries and occupations, internship opportunities, employer contacts, salary information, and graduate and professional school preparation. An outreach office is located in the main library.

Students are encouraged to register with UCS at 620 Lincoln Street, Evanston. For more information call 847-491-3700 or see [www.northwestern.edu/careers](http://www.northwestern.edu/careers).

### *University Chaplains*

The Office of the University Chaplains provides support for religious life at Northwestern. The Alice S. Millar Chapel and Religious Center, which includes Parkes Hall and the Jeanne Vail Meditation Chapel, has facilities for

religious programs and services such as lectures, study groups, discussions on faith and life, weddings, baptisms, and other special events. The facilities are available to recognized religious groups. Events may be scheduled through the chaplains' office.

The University chaplains also work closely with denominational religious centers on campus sponsored by Protestant denominations, the Roman Catholic Church, and the Jewish community. University chaplains and campus ministers and rabbis are available to meet with individuals and groups as counselors, teachers, and resource persons.

Student religious organizations are recognized through the Office of the University Chaplains. The chaplains serve as the University's liaison with all student religious groups. For information about the recognition process, contact the office to make an appointment (847-491-7256).

Information about campus religious organizations is published on the Office of the University Chaplains' web site, [www.northwestern.edu/chaplain](http://www.northwestern.edu/chaplain).

### *Services for Students with Disabilities*

The Office of Services for Students with Disabilities (SSD) provides services and referrals for Northwestern students with disabilities. Students with disabilities should contact the office for assistance and guidance in meeting their academic obligations.

It is Northwestern University policy to ensure that no qualified student with a disability is denied the benefits of, excluded from participation in, or otherwise subjected to discrimination in any University program or activity. In response to a request made by a qualified student with a documented disability, the University will arrange, at no cost to the student, for the provision of educational auxiliary aids and reasonable academic accommodations that the University determines necessary to afford such student the opportunity for full participation in University programs.

Northwestern University's programs and activities are accessible for full participation to all its students, including those with mobility impairments and with difficulties such as learning disabilities or auditory, visual, or other special conditions.

A brochure, "Services for Students with Disabilities," describing various support services for students with disabilities, is available in University admission offices and in the Office of Services for Students with Disabilities. Additional information is available on the SSD web site ([www.northwestern.edu/disability](http://www.northwestern.edu/disability)).

### **International Office**

International students, visiting scholars, and staff will find assistance for themselves and their families at the International Office. Although the main focus is immigration

related, the office provides a variety of programs and services that enhance the educational experience of the international population. Students and scholars have an opportunity to explore Chicago and the surrounding communities; deal with cultural adjustment issues; and attend workshops on immigration issues and career and employment seminars. The office also coordinates new student orientation for international students and scholars and serves as an information center for locating services and activities available both on and off campus.

A volunteer organization, the Community Council for International Students, works effectively with the office to provide international visitors such services as English language tutoring, the International-American Women's group, and a play group for children.

More information on the office's services can be found at [www.northwestern.edu/international](http://www.northwestern.edu/international).

### **Women's Center**

The Women's Center is a gathering place for all students, staff, and faculty where the achievements of women are celebrated. It serves the needs of all University women across lines of race, class, and sexual orientation, with the goal of achieving gender equity. The center provides educational programming with a particular emphasis on women's health, women and leadership, career and professional development, safety and self-defense, stress management, and issues of balancing work and family or other work/life concerns. The center provides advocacy services for women and men who have experienced sexual harassment, sexual assault, relationship violence, and discrimination. Many of its goals are achieved through outreach and coalition building. Counseling services are provided through individual appointments and support groups. Additional services include a referral service and resource library. Students can call 847-491-7360 or 312-503-3400 for information on programs or services, or they can check out the web site [www.northwestern.edu/womencenter](http://www.northwestern.edu/womencenter).

### **Fitness and Recreation**

All students at Northwestern are strongly encouraged to participate in University-sponsored sports, fitness, and recreation activities, which include intramural, club, informal, and instructional sport and fitness programs.

Intramural competition is conducted in a variety of individual and team sports. League play and tournaments are provided for men and women, both separately and corecreationally. Competition is organized for individuals and teams, by independent groups, living units, fraternities, sororities, and University departments and organizations.

Sport clubs offer competitive and noncompetitive sports experiences. Extramural competition, with outside institutions and sports groups, is available in baseball,

basketball, crew, cycling, equestrianism, fencing, ice hockey, lacrosse, roller hockey, rugby, running, sailing, ski racing, soccer, squash, tennis, Ultimate Frisbee, volleyball, and water polo. Noncompetitive special-interest clubs include aikido, karate, tae kwon do, and jujitsu. Clubs are student directed.

Drop-in recreation periods are scheduled throughout the day and evening at Blomquist Recreation Center, Patten Gymnasium, and the Henry Crown Sports Pavilion, Norris Aquatics Center, and Combe Tennis Center. Included are facilities for badminton, basketball, cardiovascular activities, floor hockey, group fitness programs, jogging, racquetball, squash, swimming, tennis, volleyball, and weight training.

Noncredit instructional sports classes are offered in a variety of areas. Students can register for sports and fitness classes by visiting the recreation registration office in the sports pavilion and paying a nominal fee. Courses for each quarter are listed in the "Programs and Services" guide and on the Fitness and Recreation web site ([www.fitness.northwestern.edu](http://www.fitness.northwestern.edu)).

The Sailing Center offers instructional and informal sailing programs for beginning and novice sailors. The fleet consists of 420 class and laser sailboats as well as Windsurfers.

### **University Police**

The University Police Department is responsible for crime prevention, law enforcement, parking control, special events, and emergency management on both the Evanston and Chicago campuses. University Police officers are on duty 24 hours a day, seven days a week. All officers are police academy graduates with full police authority; many have bachelor's degrees.

The police division on the Evanston campus provides a number of services, including customized crime prevention programs. Specialty training programs include rape aggression defense and CPR. Other services provide unlocking of vehicles, residence hall security checks, sale of bicycle locks (at cost), and loan of battery jumper cables. Emergency phones on campus, located in yellow boxes with blue lights above, automatically connect with University Police when a person lifts the receiver or pushes the button.

Additional information about campus crime and crime prevention programs is available on the University Police web site ([www.northwestern.edu/up](http://www.northwestern.edu/up)) or by requesting a copy of "Campus Safety: A Shared Responsibility" from the University Police Department, 1819 Hinman Avenue, Evanston, Illinois 60208-1320.

### **Motor Vehicles**

Regulations governing the possession, operation, and parking of motor vehicles on the Evanston campus are described in the parking regulations handout available at

the Parking Office, 1819 Hinman Avenue, or online at [www.northwestern.edu/up/parking](http://www.northwestern.edu/up/parking).

Parking permits are required in campus lots from 7:30 a.m. to 4 p.m. Monday through Friday (official holidays excluded), except in lots that are designated in the regulations as 24-hour enforced. Parking on campus is available only to seniors living on campus and to students living outside the designated walking zone. Ryan Field remote parking is available to sophomores, juniors, and seniors who reside on campus and to all students residing off campus. Exceptions to these rules may be granted only by the Parking Committee.

### *Personal Losses*

The University is not responsible for the loss of or damage to personal property belonging to students in any building it owns, whether the loss or damage occurs by theft, fire, or an unknown cause.

## **IDENTIFICATION CARDS**

The University identification card (WildCARD) identifies registered students and should be carried at all times. The WildCARD is the property of the University and is not transferable; its privileges may be canceled at any time the card is misused. Students are required to surrender their WildCARD to University officials upon request.

The student's ID number is encoded on the card and indicates whether the student is currently registered and if the card is valid. The card identifies the holder for admission to the library during hours of limited access and is needed at all times to borrow books. If a student has a meal plan, the WildCARD admits the student to residence hall dining facilities. It also identifies the holder at the Health Service, Norris University Center, student functions and elections, and University athletic events.

Lost or stolen cards should be reported to the WildCARD office, where replacement cards are issued. For the cost of replacing an ID card, see Service Fees under Tuition and Fees in the next section of this catalog.



# 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 compete successfully 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 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 School of Music candidates)
- the candidate's statements on the application and other evidence of special skills, such as writing, art, music, mathematics, and science, or of 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 Regular Programs*

- Weinberg College of Arts and Sciences, School of Communication, School of Education and Social Policy, Medill School of Journalism, and School of Music: three of 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 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, the Medill School of Journalism, and the Schools of Communication, Education and Social Policy, and Music require 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. Unlike other selective universities, Northwestern does not defer Early Decision applicants into its Regular Decision pool.

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:

- File a completed application form. This can be obtained from the Office of Undergraduate Admission, Northwestern University, 1801 Hinman Avenue, P.O. Box 3060, Evanston, Illinois 60204-3060. The application can also be downloaded or completed online at [www.ugadm.northwestern.edu](http://www.ugadm.northwestern.edu). 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 17 and 19.
- If applying for admission to the School of Music, present a music audition in person or a taped recording. (Audition guidelines will be furnished on request.)

### 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.

#### *Admission Procedure*

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

- File a completed application form, available from the Office of Undergraduate Admission, Northwestern University, 1801 Hinman Avenue, P.O. Box 3060, Evanston, Illinois 60204-3060.
- The application can also be downloaded or completed online at [www.ugadm.northwestern.edu](http://www.ugadm.northwestern.edu).

## 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.

	<b>Early Decision</b>	<b>Regular Decision</b>
Apply by	November 1	January 1
Take SAT Reasoning Test or ACT with Writing by	October test	December test
If taking SAT Subject Tests, take by	October test	December test
To apply for financial aid, file CSS Profile by	December 1	February 1
and file FAFSA by	February 1	February 1
Northwestern mails decision letter by	December 15	April 15
Reply by	February 1	May 1

### Honors Program in Medical Education

	<b>Regular Decision</b>
HPME preapplication deadline	December 1
HPME application deadline	January 1
Freshman application to Northwestern by	January 1
Take SAT Reasoning Test (or ACT with Writing) and two SAT Subject Tests by	December test
To apply for financial aid, file FAFSA and CSS Profile by	February 1
Northwestern mails decision letter by	April 15
Reply by	May 1

### Transfer Students for Any Quarter of Matriculation

	<b>Fall</b>	<b>Winter</b>	<b>Spring</b>	<b>Summer</b>
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 with Writing; scores from previous academic years are acceptable)				
Apply for financial aid by	May 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 three weeks.				

- 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 American College Test (ACT) with 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 taped recording) if applying for admission to the School of Music (audition guidelines will be furnished on request).
- Submit application for admission before the deadline of June 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/student\\_info/coll\\_credit.html](http://www.registrar.northwestern.edu/student_info/coll_credit.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, returning adult students apply as freshman 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 the 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](http://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.

### **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 to Students. 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 to Students.

During the 2006–07 academic year, undergraduate students at Northwestern received more than \$74 million in grant assistance: \$63.1 million from Northwestern, \$6.8 million from federal and state governments, and \$4.7 million from outside sources. The average Northwestern grant for the 3,260 students receiving aid was \$24,100. In addition, \$19.3 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 "Making It Possible — Financial Aid at Northwestern University," distributed by the Office of Undergraduate Admission. For more information consult [www.ugadm.northwestern.edu/freshman/financing](http://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. Transfer students must obtain transfer financial aid application materials from the Office of Undergraduate Admission. 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 to Students cannot make a decision until the University has admitted the applicant. Candidates should do the following:

- Complete and submit the Application for Admission, which provides a place to request financial aid.
- File the Free Application for Federal Student Aid (FAFSA) and the Financial Aid Profile of the College Scholarship Service (CSS) 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 19).

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

Students are expected to consult their CAESAR accounts 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.

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 section 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. During the probation quarter the student must complete at least three units and earn a C or better in each class. If the student fails to meet these requirements and loses eligibility, he or she may reestablish eligibility by successfully completing a full-time quarter of enrollment at Northwestern.

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. An extension of one quarter of probation may be given for an incomplete grade if the student intends to complete the class within the probationary quarter.

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 a full-time quarter with a minimum 2.0 grade point average, 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 to Students 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 2007–08 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. Full-time registration for all undergraduate degree-seeking students is three or more units of credit.

Tuition: each quarter \$11,688

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 \$2,922

#### *Undergraduate Tuition:*

##### *Nondegree-Seeking Students and Exceptions*

Full-time tuition: three or four courses  
each quarter \$11,688

Registration exceptions (less than full-time or more than four units): each course, each quarter \$4,160

#### *Service Fees*

Student Hospitalization Plan  
Required for all students unless they have equivalent hospitalization coverage. \$2,088

Study abroad administrative fee (not refundable)  
Non-Northwestern summer 2007 study abroad \$700  
Term fee (semester or quarter) \$2,125  
Annual fee (academic or calendar year) \$3,500

Tuition deposit fee \$400  
Required for each new undergraduate student; applied on the first tuition bill and not refundable.

Application fee (not refundable) \$65  
Returned check service fee \$35  
Replacement WildCARD fee \$15  
Transcript fee \$5  
Makeup laboratory time, breakage fee varies

#### *Other Fees*

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

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

Housing deposit fee \$200  
Late payment penalty fee \$100  
Associated Student Government \$44  
Activity fee, each quarter

Athletic events fee \$33  
Student Health fee \$67  
For new students

Dependent Hospitalization Plan  
Contact Student Health Office.

Field trip fee varies  
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](http://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, Rebecca Crown Center. 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 in University housing. 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 \$100. 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](http://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 is 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 study abroad of any type or co-op in the McCormick School.

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:

- A student entering as a freshman is required to be in residence for 12 quarters in a four-year degree program and 15 quarters in a combined degree program (or two bachelor's degrees) involving two schools. Refer to the second bulleted point under Satisfactory Academic Progress and Financial Aid on page 21 for limitations on financial aid for students in combined degree (15-quarter) programs.
- A student entering as a freshman may gain exemption from the required residency by up to three quarters 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.
- 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.
- A student who receives Northwestern credit for study abroad must be in residence for either the final three quarters or 4 of the last 6 quarters before the awarding of the degree.
- 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 allowed in the second and the fourth exemption provisions above, at graduation total less than 12 for a single-degree program or less than 15 for two bachelor's degree programs involving two schools.)
- 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 URR, once established, is not subject to the exemption possibilities listed above.

- Students may appeal for URR variances to the Residence Requirement Appeals Committee, which consists of the associate provost of University enrollment, the associate provost for undergraduate education, the University registrar, and two associate deans from different undergraduate schools. The deans 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 Undergraduate Residence Requirement.

## Transfer Students

Students who transfer to Northwestern from another institution will be informed of the extent to which their previous work reduces the 12-quarter Undergraduate Residence Requirement. All transfer students have a 6-quarter minimum URR. Those entering as transfer students from another institution may not apply any additional work taken outside the University toward the URR. Such courses beyond the maximum may be useful in meeting academic requirements but may not be used toward the URR.

# ACADEMIC REGULATIONS

## Registration for All Students

- 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](http://www.northwestern.edu/caesar).
- A quarterly reference copy may be downloaded from [www.registrar.northwestern.edu/registration](http://www.registrar.northwestern.edu/registration). Failure to read the registration information at [www.registrar.northwestern.edu/registration](http://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, and students not registered by the end of the period are subject to a fee for late registration. This fee is not intended as a penalty but is assessed to partly cover the cost of registration at other than the scheduled time. 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 (Saturday is not a 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 a course that is a prerequisite for a more advanced course if that 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 chair of the department in which the course is offered.
- Undergraduate students may not enroll in fewer than three quarter-courses except by permission of the dean of their school. Permission is given only in extraordinary circumstances.
- In Weinberg College and the Medill School of Journalism, undergraduate students may not enroll for more than four quarter-courses except by permission of the dean's office. This regulation applies to total credit for courses taken in 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. No special consent is required.
- Changes in ungraded sections (laboratory or discussion) are made in the departments 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 is regarded as a failure and is 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. Students enrolled in an undergraduate school may take courses in the School of Continuing Studies 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. Such work is counted as a regular part of a student's registration.

Students enrolled in undergraduate schools are not guaranteed a place in SCS courses.

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 pick up a Dual Registration Form from the Office of the Registrar, secure approval from the office of their dean, and return the form to the Office of the Registrar.

### 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 may be found at [www.registrar.northwestern.edu/student\\_info/transfer.html](http://www.registrar.northwestern.edu/student_info/transfer.html). Consult the academic calendar at [www.registrar.northwestern.edu/calendar](http://www.registrar.northwestern.edu/calendar) 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/student\\_info/coll\\_credit.html](http://www.registrar.northwestern.edu/student_info/coll_credit.html). The McCormick School Academic Services Office also has forms available for engineering students, and the Medill Office of Student Records and Services has forms available for journalism students. Students in Weinberg College should secure the appropriate Weinberg College 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.

### Application for a Degree

Undergraduates must file a degree application one calendar year before anticipated graduation. Students in Weinberg College, the Medill School of Journalism, and the Schools of Communication, Education and Social Policy, and Music must file their applications with the Office of the Registrar. McCormick School students must file with that school's Academic Services Office.

### 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 preseniors 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

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 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.

Northwestern University does not rank its students.

### 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](http://www.northwestern.edu/caesar)).

### Grade Reports

Quarterly grades are not mailed but are delivered through CAESAR ([www.northwestern.edu/caesar](http://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 order from the Office of the

Registrar. 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. Because of the confidential nature of a student's record, telephone or e-mail requests for transcripts will not be accepted. Written requests should be submitted to the Office of the Registrar.

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. Complete information about obtaining an official transcript may be found at [www.registrar.northwestern.edu/transcripts/index.html](http://www.registrar.northwestern.edu/transcripts/index.html).

Northwestern University does not release or certify copies of transcripts received from other schools or institutions. Students needing official transcripts from study abroad experiences must request such transcripts from the institution or program attended.

In addition, Northwestern University does not provide unofficial transcripts.

### 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 on the web at [www.registrar.northwestern.edu/ferpa](http://www.registrar.northwestern.edu/ferpa).

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 [northwestern.edu](http://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 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.

## 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](http://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 credit is forfeited. In no case may such a grade be made up after a lapse of one year.

## Makeup 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 may apply for a makeup examination. All such grades, however, must be made up within one year after the course was taken, or credit is forfeited. 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/calendar](http://www.registrar.northwestern.edu/calendar) for exact dates the applications are due.)

## 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.

## 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, from the dean's office of their school, and — for issues that transcend school boundaries — through the University-wide Academic Advising Center. For specialized academic advice — such as study abroad or field studies opportunities — consult the appropriate sources listed in the index.

## HONORS AND PRIZES

### Academic Honors

Degrees with honors are awarded to the top 16 percent of the graduating class of each undergraduate school, as determined by grades in all work at Northwestern University. Students in the highest 3 percent of the class are awarded degrees *summa cum laude*; those in the next 5 percent, *magna cum laude*; and those in the next 8 percent, *cum laude*.

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.

### Prizes

Prizes established through gifts and endowments are awarded to undergraduate students at Northwestern. Some are all-University prizes, and others are available only to students registered in the school, department, or program that administers the awards.

### Honorary Organizations

Students who qualify by reason of superior scholarship or outstanding achievement are eligible for membership in certain honorary societies. New members of the following organizations are announced in the annual Commencement program:

- Arts and Sciences: Phi Beta Kappa
- Communication: Lambda Phi Eta
- Continuing Studies: Alpha Sigma Lambda
- Engineering: Eta Kappa Nu, Kappa Theta Epsilon, Omega Chi Epsilon, Tau Beta Pi

- Journalism: Kappa Tau Alpha
- Music: Pi Kappa Lambda

Other honorary organizations in various fields include Alpha Kappa Delta, Alpha Lambda Delta, Deru, Mortar Board, Norleggama, Orchesis, Phi Delta Kappa, Phi Eta Sigma, Pi Mu Epsilon, Sextant, and Shi-Ai.

## ACADEMIC OPTIONS

For more information about the following programs, see the relevant school sections 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. 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.

The first three or four years of the program are spent in undergraduate programs, during which students must complete 36 courses that meet HPME requirements and satisfy an Undergraduate Residence Requirement of 9 full-time quarters. Only courses taken at Northwestern or an approved study abroad program may be used to satisfy this enrollment policy.

During the years in Weinberg College, students take required courses in chemistry, physics, and the biological sciences. In addition, they take elective courses in the humanities, social sciences, and arts.

The third year is usually devoted to completing the requirements for a BA degree in Weinberg College by doing advanced course work in the major and/or studying abroad in a Northwestern-affiliated program. Students may also take an additional undergraduate year at Northwestern or elsewhere.

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.

School of Communication students spend three or four years in communication sciences and disorders, studying the anatomy and physiology of hearing, speech, and the central nervous system as it relates to cognition and memory. They have opportunities to learn how people of all ages hear, speak, and learn — both normally and in the

presence of disabling conditions. They also take courses in chemistry, physics, the biological sciences, the social sciences, and the humanities.

After completing the first three or four years, HPME students move to the Chicago campus as members of the first-year Feinberg School of Medicine class, which includes students who have completed the traditional four years of premedical education. 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.

Students who wish to be considered candidates for the HPME must indicate their interest by completing the HPME form included in the undergraduate application before December 1, reporting their test scores, and requesting an HPME application. If the request is approved, the student must complete the special HPME application, in addition to the regular Application for Admission to Weinberg College, the School of Communication, or the McCormick School, by the appropriate deadlines (see the Application and Testing Deadlines table on page 19).

### *Integrated Science Program*

Northwestern University offers a highly selective undergraduate program of integrated science studies within Weinberg College. The Integrated Science Program (ISP) is designed for students with superior high school records and strong motivation in science and mathematics. Its special 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. Graduates of the program are well prepared for professional and graduate study leading to careers in science, medicine, and business.

Enrollment in ISP is limited to ensure small class sizes. Selection is made on the basis of scholastic record, test scores, and recommendations. Background requirements are a year of calculus, a year of chemistry, and a year of physics. To be considered for ISP at the time of their admission to Northwestern, students request the special ISP application and brochure in addition to the regular application from the Office of Undergraduate Admission (see Integrated Science Program in the Weinberg College section of this catalog).

### *Accelerated Master's Programs*

Combined bachelor's/master's degree programs enable exceptional undergraduates in Weinberg College and the McCormick School 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.

In the McCormick School, a BS/MS program in engineering allows advanced students who are able to complete the BS requirements early (usually through Advanced Placement/International Baccalaureate or transfer credit) to accelerate study toward a master's degree. See Concurrent BS/MS in the McCormick School section of this catalog.

In Weinberg College, students receive a double count of 9 credits that are applied toward both bachelor's and master's degrees, which can be completed in four years. The following departments and programs in Weinberg College have combined degree programs approved by the Graduate School:

- chemistry
- economics
- French
- geological sciences
- linguistics
- sociology
- statistics

The approved departmental programs vary, but they share a common goal: the selection and training of exceptional students. The programs also share several underlying premises. First, each department invites students to participate in the program. Students do not select themselves, though they may, of course, inquire about their eligibility. Second, selection by a department is a recommendation 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.

For these reasons, students should be aware of guidelines used by the dean of the Graduate School and other guidelines affecting the operation of the program:

- No particular grade point average, however high, automatically entitles a student to participate in a combined degree 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.
- A combined degree 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 a combined degree program must receive separate approval by the department and the dean of the Graduate School.

#### *Accelerated Master's Program in Journalism*

Students who exhibit exceptional ability in undergraduate work in the Medill School of Journalism 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. Students apply for this program during their junior year; however, interested students are encouraged to begin planning for this option early in their undergraduate careers. Information and admissions materials are available from the Medill Office of Graduate Admissions and Financial Aid (see Accelerated Master's Program in the Medill School section of this catalog).

#### *Music Bachelor's and Journalism Master's*

Northwestern offers extremely talented students the opportunity to earn in five years both a bachelor of music or bachelor of arts in music degree from the School of Music and a master of science degree in journalism from the Medill School of Journalism.

The joint program is intended to prepare exceptional students for journalism careers emphasizing music and arts reporting. Some journalism courses are required at the undergraduate level before students enter the graduate program. Prospective students apply to this joint program while applying for undergraduate admission to Northwestern.

### **Combined Bachelor's Programs**

#### *Combined Liberal Arts and Engineering Program*

Qualified students may undertake a program to earn both a bachelor of arts in a liberal arts discipline from Weinberg College and a bachelor of science in an engineering field from the McCormick School. Students in this BA/BS program, which takes five years, must complete all requirements

of both schools as well as the Undergraduate Residence Requirement. To do the necessary planning, interested students should consult with the Weinberg Office of Undergraduate Studies and Advising and the McCormick undergraduate engineering dean's office as soon as possible after enrolling at Northwestern (see Five-Year BA/BS in the McCormick School section of this catalog).

#### *Combined Liberal Arts and Music Program*

Students accepted into the combined Weinberg College–School of Music program may simultaneously earn a bachelor of arts degree from Weinberg College and a bachelor of music degree from the School of Music. They must complete all Weinberg College degree requirements, including at least 30 Weinberg College courses, as well as all School of Music bachelor of music degree requirements, including at least 30 music courses. Fulfilling both music and Weinberg College requirements takes five years of full-time study, and an Undergraduate Residence Requirement of 15 quarters is obligatory (see Undergraduate Education section of this catalog).

Participants in this combined program must be accepted by both the School of Music and Weinberg College. Interested students should consult with the associate dean for undergraduate studies in Weinberg College and the assistant dean for admission and student affairs in the School of Music.

#### *Combined Music and Engineering Program*

Students accepted into the combined McCormick School–School of Music 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 School of Music. They must complete all McCormick School degree requirements, including at least 36 McCormick courses, as well as all School of Music degree requirements, including at least 30 music courses. Fulfilling both music and engineering requirements usually takes five years of full-time study, and an Undergraduate Residence Requirement of 15 quarters is obligatory (see Undergraduate Education).

Participants in this combined program must be accepted by both the McCormick School and the School of Music. Interested students should consult with the undergraduate engineering dean's office in the McCormick School and the assistant dean for admission and student affairs in the School of Music.

### **Interdisciplinary Study**

#### *Mathematical Methods in the Social Sciences Program*

The Program in Mathematical Methods in the Social Sciences (MMSS) in Weinberg College enables students to combine the study of social sciences with training in formal analytical methods. The program is intended for



students with high mathematical aptitude and strong interest in social problems and issues, including policy and research implications.

Admission to the MMSS is very selective; it is limited to entering freshmen and students beginning their sophomore year who have earned superior academic records and demonstrated strong aptitude in mathematics. Prerequisite for admission consideration is a full-year course in calculus. (See Mathematical Methods in the Social Sciences in the Weinberg College section of this catalog.)

### *Integrated Science Program*

See Accelerated Degree Programs.

### *Cross-School Programs*

Students in any undergraduate school may enroll in the Undergraduate Leadership Program and the Service Learning Certificate Program. All undergraduates may enroll in the International Studies and Legal Studies Programs as adjunct majors. All undergraduates may apply for admission to the Certificate Program in Financial Economics and the Certificate Program in Managerial Analytics. The Music Theatre Program is open by audition to School of Music voice majors and School of Communication theater majors.

Undergraduates in any school may earn an adjunct major in animate arts or a minor in transportation and logistics. Majors in the School of Communication and School of Music may earn a certificate in sound design; majors in the Weinberg College may earn a minor in sound design. (See the Cross-School Programs section for descriptions of these programs.)

Undergraduates in schools other than Weinberg College may enroll in that college's minor programs. (See Minors under Special Opportunities in the Weinberg College section of this catalog.)

### *Center for the Writing Arts*

Northwestern's Center for the Writing Arts sponsors a number of programs as well as courses designed to highlight the University's commitment to excellence in writing. Several of the courses are taught by visiting professional writers. (See the Cross-School Programs section of this catalog.)

## **McCormick School Honors Programs**

### *Honors Program in Undergraduate Research*

The Honors Program in Undergraduate Research in the McCormick School provides an unusual opportunity for prospective freshmen with superior motivation and scholastic credentials to be admitted to work with an engineering faculty mentor/adviser in a challenging research project beginning in the first year and continuing throughout the undergraduate years.

Students may request the names and current research interests of participating faculty, enabling them to apply to a project of their choice. With the participation of a faculty sponsor, students will be selected for the program based on their high school records; SAT Reasoning Test or ACT, SAT Subject Tests, and Advanced Placement test scores; and, usually, an interview. Interested students may request an application and additional information from the undergraduate engineering dean's office in the McCormick School. (See Honors Program in Undergraduate Research in the McCormick School section of this catalog.)

### *Honors Program in Engineering and Journalism*

The Honors Program in Engineering and Journalism is intended to prepare exceptional students for journalism careers emphasizing engineering, science, and technology. This joint program with the Medill School of Journalism involves completing a BS in engineering and an MS in journalism. Some journalism courses are required at the undergraduate level before students enter the graduate program. Prospective students apply for this joint program while applying for undergraduate admission to Northwestern. (See Honors Program in Engineering and Journalism in the McCormick section of this catalog.)

### *Honors Program in Engineering and Law*

The Honors Program in Engineering and Law combines a Northwestern engineering degree, on-the-job work through the McCormick School co-op program, and provisional admission to Northwestern University School of Law. Among the careers for which the program is unusually valuable are those in technology-intensive businesses and intellectual property, including patents. The undergraduate portion of the program is four years, including five academic quarters of co-op work. Students must maintain a 3.25 undergraduate GPA. They take the LSAT at the beginning of their junior year and are expected to score at or above the median of the previous year's entering law class. Their admission to the law school is reviewed late in the junior year.

## **Weinberg College Honors Programs**

The Honors Program in Medical Education, the Integrated Science Program, and the Program in Mathematical Methods in the Social Sciences are described above. Several Weinberg College majors, e.g., American studies and the English major in writing, are special-admission majors. See the Weinberg College section of this catalog for full descriptions of Weinberg honors opportunities.

## **Formal Options**

### *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 section in this catalog.

#### *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 up 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.

#### *Double Major*

A double major is available to all students who complete the full major program in two departments.

#### *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, the interdepartmental studies major in the School of Communication, and the Combined Studies Program in the McCormick School.

#### *Departmental Honors Programs*

Departmental honors programs are available to students through most departments of Weinberg College, most departments in the School of Communication, and all departments of the McCormick School and the School of Education and Social Policy. They involve advanced study through special undergraduate seminars or graduate courses and/or independent work under faculty supervision.

### **Teaching Certification**

Weinberg College students also 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 section.)

### **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 in one of Northwestern's summer programs or on an approved outside 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 to have their programs preapproved by the Study Abroad Office. No financial aid is available from the University for students in 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 regular 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](http://www.northwestern.edu/studyabroad).

## Undergraduate Schools and Courses

### KEY TO COURSE NUMBERS

Although the course numbers 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 is issued for each quarter at [www.northwestern.edu/caesar](http://www.northwestern.edu/caesar) and contains a complete and updated listing of courses for that quarter. The University reserves the right to cancel courses 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 may identify certain groups of courses. 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) = 1.5 units of credit.

## Cross-School Programs

Each of Northwestern's six undergraduate schools has its own unique curriculum. In most of the schools, many majors and minors are open to all students, regardless of what school they are enrolled in. Several of the schools also have field studies opportunities open to all students. In addition, all six schools, as well as the graduate and professional schools and departments and programs within the schools, are continually developing new programs that build pedagogical and intellectual bridges between disciplines and across schools to create interdisciplinary opportunities for undergraduates.

Northwestern currently offers five kinds of cross-school programs:

- Interschool majors or minors
- Interschool certificates
- A center offering undergraduate courses
- Military programs
- Field study

## INTERSCHOOL MAJORS OR MINORS

### Animate Arts

Open to all Northwestern undergraduates, the adjunct major in animate arts provides an interdisciplinary approach to studying and creating new digital media. Its curriculum tightly integrates education in the arts and in technology, particularly computer programming. The program's flagship 4-quarter course sequence in computer-based art and new media introduces students to 2-D and 3-D design and visual literacy, acoustic theory, sound processing, and narrative theory, as well as computer science and cognitive science. A primary focus of this sequence is to provide students with multiple opportunities to actively integrate various art forms with technology in developing creative projects. Pieces are critiqued both as works of art and as engineering. The interaction between art practice and art theory is addressed through discussions, critiques, and readings, examining issues in the interpretation, understanding, and production of art and visual culture.

The goal of this major is to create a community of creative thinkers and makers that transcends cultural barriers between and among disciplines.

For courses taken for the adjunct major,

- No course may be taken P/N
- A grade of C or above is required in all courses used to fulfill major requirements

- Students may double-count 2 courses toward another or from another major or minor, provided that the rules of that major/minor allow the double-counting.

### *Requirements for the Adjunct Major (10 units)*

- 4 core courses: ANIM ARTS 101, 201, 301, 302
- 2-quarter senior project: ANIM ARTS 396-1,2
- 4 electives chosen from a list published on the animate arts web site every academic year; other courses may be allowed upon petition by the student.

### *Courses*

#### **ANIM ARTS 101 Perceptual and Mathematical Spaces**

Emphasis on developing basic seeing, listening, and critiquing skills as well as the fundamentals of software design. Topics include visual design and sound design, functional programming and 2-D graphics, art theory and cultural theory, basic photography, and audio editing.

#### **ANIM ARTS 201 Perception and Programming in Time**

Introduction to the basic principles and practice of time-based media. Topics include narrative theory, rhythm, composition of moving images, film and video editing, imperative programming, and computer game design.

#### **ANIM ARTS 301 Interaction and Interactivity**

Introduction to the design of interactive 2-D and 3-D graphical systems. Topics include dynamical systems theory, animation, sculptural design, and 3-D modeling.

#### **ANIM ARTS 302 Culture and Connectivity**

Seminar course in contemporary issues in culture and new media. Topics include mass culture and the avant-garde, the role of the market in art and media, computer networking protocols and technologies, web development, and C-style programming languages. Emphasis on projects and in-class discussion of readings.

#### **ANIM ARTS 396-1,2 Senior Design Project**

A capstone course in which students develop a large-scale group or individual work over two quarters. Emphasis on outside project work. Class meetings involve group and individual critiques as well as issues in project planning and management. Prerequisite: 302 or consent of instructor.

### **Environmental Science, Engineering, and Policy**

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 the Weinberg College of Arts and Sciences and the McCormick School of Engineering and Applied Science. It offers two majors:

- Environmental sciences (see the Weinberg College of Arts and Sciences section of this catalog for a detailed description)
- Environmental engineering (see the McCormick School of Engineering and Applied Science section of this catalog for a detailed description)

### Transportation and Logistics

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 of Engineering and Applied Science and the Department of Economics and other social science departments in the Weinberg College of Arts and Sciences. 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 of Engineering and Applied Science 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.

#### Requirements for Minor in Transportation and Logistics

- **Required course:** TRANS 310
- **Core courses:** ECON 310-1, 355; CIV ENG 371, 376, 382; IEMS 310 or 313, 381, 383. No substitutions will be allowed for core courses.
- **Elective courses:** TRANS 390; 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 ENG 304, 338, 360; IEMS 315, 317; either IEMS 326 or ECON 360; IEMS 382; 1 unit of approved independent study. Other courses will be considered for credit toward the minor if appropriate to the student's program of study and approved by the program committee. A full list of approved elective courses is available from the program office.

#### 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 will receive 1 credit in the spring quarter of their senior year.

**TRANS 390-0 Perspectives in Transportation** The industrial structure of transportation and its associated logistics activities. The effects of government regulation, globalization, and other contemporary challenges on carriers and their customers.

**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.

## INTERSCHOOL CERTIFICATES

### Financial Economics and Managerial Analytics

The Kellogg School of Management offers two business-related undergraduate certificate programs in cooperation with the Weinberg College of Arts and Sciences and the McCormick School of Engineering and Applied Science. Both certificate programs consist of 4 courses taught at an advanced level by Kellogg professors. The programs build

on students' existing analytical skills and prepare them for careers in the financial services and consulting industries and/or for continuing their education in doctoral or professional school programs.

Acceptance to the certificate programs is through a competitive application process. To apply, students must be enrolled at Northwestern University and must meet a set of rigorous course prerequisite requirements in advanced calculus and linear algebra, intermediate probability and statistics, advanced econometrics, and microeconomics. Each program will accept about 50 students annually. Students may apply at the end of their sophomore or junior year for participation during the following school year. Applications are due at the end of the spring quarter.

In addition to taking the 4 certificate program courses, participating students who start the program during their junior year may spend the summer before their senior year conducting a research project with a Kellogg faculty member or completing an internship at a company. A dedicated career services professional helps certificate students with career planning and preparation and securing a summer internship.

#### *Certificate Program in Financial Economics*

This certificate program is offered in cooperation with the Weinberg College of Arts and Sciences, although all Northwestern students who meet the prerequisite requirements are eligible to apply; for the prerequisite requirements, see [www.kellogg.northwestern.edu/certificate](http://www.kellogg.northwestern.edu/certificate). All financial economics certificate students take the following 4 courses.

**KELLG FE 310 Principles of Finance** Foundation course for the program; 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; 2007–08 focus is on “value investing.” Empirical support for the value approach to investing; quantitative methods for searching

for value; balance sheet and earnings power approaches to assessing fundamental value; risk management; construction of portfolios using the value approach.

#### *Certificate Program in Managerial Analytics*

This certificate program is offered in cooperation with the McCormick School of Engineering and Applied Science, although all Northwestern students who meet the prerequisite requirements are eligible to apply; for the prerequisite requirements, see [www.kellogg.northwestern.edu/certificate](http://www.kellogg.northwestern.edu/certificate). *The program will first be offered in fall 2008.* All managerial analytics certificate students take the following 4 courses.

#### **KELLG MA 320 Analytical Decision Modeling on Spreadsheets**

Foundation course for the program; 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 Program 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.

#### **Music Theatre**

The Certificate in Music Theatre provides the opportunity for 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.

#### *Certificate Requirements for Theatre Majors (9 units)*

- VOICE 102 Beginning Voice (1.5 units)
- MUSIC 127 Keyboard Skills (1 unit)
- VOICE 202 Intermediate Voice (1.5 units)
- THEATRE 352-1,2 Music Theatre Techniques (2 units)
- THEATRE 367 History of the Lyric Theatre (1 unit)
- 6 dance classes (.33 unit each; 2 units total)

It is also recommended that sophomores enroll in THEATRE 272 Special Topics: Music Theatre.

### **Service Learning**

The Service Learning Certificate Program (SLCP) is a two-year, five-academic-quarter program open to all undergraduate students. The program not only allows students to earn credit for their interest in community service but also provides a structured and effective approach for fostering continued civic engagement. The certificate program requires students to complete five credits of course work:

- SESP 202 Introduction to Community Development
- COMM ST 395 Topics in Communication Studies or SESP 351 Leadership and Community Decision Making
- 1 additional elective course that reflects the principles of the Service Learning Certificate
- SESP 299-1 Capstone Research and SESP 299-2 Capstone Project, independent study courses leading to completion of a capstone project

Students are required to perform 100 hours of community service and attend five quarters of biweekly facilitated reflection seminars. The certificate is awarded upon completion of a capstone project that requires both challenging scholarship and relevance to a community organization. For more information and an application, contact the Office of Student Affairs in the School of Education and Social Policy.

### **Sound Design**

Funded by a cross-school initiative and involving faculty from the School of Communication, the School of Music, and Weinberg College of Arts and Sciences, the Program in Sound Design offers a certificate in sound design to School of Communication and School of Music students and a minor to Weinberg students who are accepted and who complete the required 7 courses (see below).

Among the visiting artists recently hosted by the program are Andre Pluess (*Eleven Rooms of Proust, I Am My Own Wife*), Midge Costin (*Broken Arrow*), Shawn Decker (professor of sound at the School of the Art Institute of Chicago), James O'Brien (*The Good Girl* and the BMW film series), Steven Streibig (president, iontank.com, and creative director of a schizophrenia VR environment featured on NPR), John Corbett (sound artist, critic, radio personality, and professor of sound at the School of the Art Institute of Chicago), and Mike Knobloch (vice president of film music for Fox). Additional information, an application, course listings, and samples of student work can be found at [www.sounddesign.northwestern.edu](http://www.sounddesign.northwestern.edu). Applications may be submitted in November and May. The program is open to students of sophomore rank or higher. Up to 12 students per year are accepted.

Students are required to take 3 core courses to acquire a broad foundation in theory, production, and practice. Electives then allow them to specialize in a particular domain (sound design for film, sound design for theatre, sound design for radio, sound design for new media, sound design for installations), but students may opt to continue studying sound as it relates to a broad range of media.

Under the guidance of a faculty mentor, students may receive credit for designing the sound for film/video, new media, installation/exhibition, radio, and theatre projects. Pending faculty approval, students may receive credit for designing sound for Niteskool and Studio 22 film/video projects. Mentors are drawn from faculty listed as participating in the program or other interested faculty.

Practicums might also involve faculty-led research projects or artistic collaborations between a faculty member and student(s). Students may also participate in sound-oriented internships at a sound house, a theater company, a production house, a radio station, or another appropriate venue. With the approval of the program director, a practicum or internship or series of practicums or internships may be counted as one of the required electives.

#### *Certificate Requirements (7 units)*

- RTVF 384-0 Foundations of Sound Design
- 2 of the following courses in basic audio production and processing techniques:  
MUS TECH 321 Producing in the Virtual Studio  
MUS TECH 322 Recording and Basic Audio  
MUS TECH 340 Composing with Computers

MUS TECH 342-1,2 Computer Sound Synthesis  
RTVF 383 Sound Production

- 4 electives (300 level or above); possible electives include (but are not limited to) production courses listed above that are not selected as part of the core sequence as well as ART 340, 390-1; CSD 306; EECS 330, 351; MUS TECH 337, 338, 343, 345, 348; RTVF 330, 341, 360, 379, 398; THEATRE 353, 363

## Undergraduate Leadership

The Undergraduate Leadership Program (ULP) is an interschool certificate program open to first- and second-year undergraduates. Initially supported by the W. K. Kellogg Foundation, the program helps students understand the nature of leadership and prepares them to become leaders on campus, in the community, and in their professions. Through course work, retreats, and self-study, participants learn the theories of leadership, experience the challenge of leading others, and create a sense of community with each other and members of participating organizations.

### *Certificate Requirements*

Students are required to take the first ULP course, *Paradigms and Strategies of Leadership*, during their first or second year as undergraduates. Following that introductory course, a second macro-level course is required; this class complements *Paradigms and Strategies of Leadership*, providing students with a macro-level exploration of leadership. Students may choose from a preapproved list of courses that touch on macro-level leadership issues or may petition to take a related course of their choosing. The program also requires 2 quarters of the zero-credit Leadership Education Seminar.

In addition, students attend two retreats as part of the program. The first, an outdoor adventure education retreat, takes place during the *Paradigms and Strategies of Leadership* course. The second, a retreat in Chicago neighborhoods, takes place the following fall quarter. Finally, students engage in self-study consisting of two externships and a self-interview. This is designed so that students can reflect on their learning during the program and explore possible career opportunities. The program offers additional courses and opportunities to further explore leadership beyond the certificate.

### *Courses*

#### **GEN CMN 204-0 Paradigms and Strategies of Leadership**

This course introduces students to theoretical models of leadership and to research on related topics such as group vision, creative problem solving, and decision making. In addition to weekly lectures, students work in a lab group with six peers. Students are videotaped taking turns facilitating lab meetings, discussing leadership concepts, and

working to produce a final project. Students also attend an experiential education retreat. Extensive personal and group feedback is provided throughout the quarter.

**GEN CMN 206-1,2 Leadership Education Seminar (0)** Presents students with a number of experiences during fall and winter quarters from which they may draw whatever leadership lessons they choose. Students have the option of attending weekly lectures led by leaders from school, community, and corporate sectors; attending various workshops; or attending lectures by other speakers on campus and beyond.

## CENTER OFFERING UNDERGRADUATE COURSES

### Center for the 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 advanced 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 a visiting writer-in-residence. Consult with a member of the Center for the Writing Arts 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** Writing as a fundamental skill in a particular field such as science, law, journalism, literature, or political commentary. 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

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 (PNS) chairs Northwestern's Department of Naval Science. Department faculty members are commissioned officers serving on active duty in the United States 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*

The Naval Reserve Officers Training Corps offers young men and women the opportunity to obtain leadership and management experience as commissioned officers in the United States Navy (Navy option) or Marine Corps (Marine Corps option) after graduation from Northwestern, through either the Scholarship Program or the non-scholarship 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, although 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 for summer training at sea or ashore. NROTC students are required to abide by the Midshipmen Regulations issued by the unit. Under certain conditions, 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, 230, 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 will gain a fundamental understanding of the formal and informal structures of the main warfare communities and how each contributes to attaining the U.S. Navy and Marine Corps mission.

**NAV SCI 120-0 Seapower and Maritime Affairs** A survey of U.S. naval and maritime history in the context of world maritime development, including the historical evolution of American sea power and the role of U.S. naval forces in an era of geopolitical change.

**\*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** One 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 officer-instructor on projects related to professional development. Prerequisite: permission 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 [www.iit.edu/admission/undergrad/programs/pdf/courses\\_ug.pdf](http://www.iit.edu/admission/undergrad/programs/pdf/courses_ug.pdf).

## 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.

## FIELD STUDY

Many off-campus field studies, internships, and research opportunities sponsored by various schools and departments are available to Northwestern students. The programs vary greatly: Some carry academic credit; some are undertaken in conjunction with a class or seminar; some make provision for a stipend; some entail living away from campus.

Following is a representative list of field studies programs with their sponsoring school, department, or program:

- Business Institutions Program (arts and sciences)
- Chicago Field Studies Internship (arts and sciences, business, law, and social justice)
- Communication Studies Field Studies Program (communication studies)
- Education and Social Policy Practicum (education and social policy)
- Internships in the Arts (art history)
- Internships in Business Institutions (business institutions)
- Internships in Environmental Sciences (environmental sciences)
- Internships in the Humanities (Alice Kaplan Institute for the Humanities)
- Internships in Media Production (radio/television/film)

- 
- Internship in Women's Services (gender studies)
  - Journalism Residency (journalism)
  - Los Angeles Internship Program (communication)
  - New York Internship Program (communication)
  - Northwestern Archaeological Field School (anthropology)
  - Performance Studies Field Studies (performance studies)
  - Political Campaigning (political science)
  - Professional Apprenticeship in Music Education (music)
  - Field study in San Francisco or Washington, D.C. (education and social policy; open to all majors)
  - Teaching Practicum (education and social policy)
  - Theatre Field Studies (theater)
  - Walter P. Murphy Cooperative Engineering Education Program (engineering)

## Judd A. and Marjorie Weinberg College of Arts and Sciences

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 1851. 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 college faculty of approximately 500 women and men 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 consisting of more than 2,000 courses as well as tutorials, laboratory rotations, internships, and other individualized forms of instruction. The 3,800 undergraduates and 900 graduate students in arts and sciences enjoy a great deal of choice, with access to 25 departments and 28 programs offering 36 majors, 8 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 another culture, while intensive course work in a required major or 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 professional linkage and honors seminars, junior research seminars, laboratory experiences, internships, 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 leading to a special concentration or certification. The University's outstanding libraries and its research centers further support and enrich the educational pursuits of liberal arts undergraduates.

### ACADEMIC POLICIES

#### Program of Study 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 the framework of general education and major requirements specified in the following section. Guidance in planning a coherent personal curriculum is available in several places.

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 selection, majors and minors, and career opportunities in their particular area.

#### Requirements for the Degree of Bachelor of Arts

Candidates for the bachelor of arts degree must complete 45 quarter-courses and fulfill the residence and grade requirements described below. First-year students must

take 2 freshman seminars. Before graduation, all students must demonstrate proficiency in writing and competence in a classical or a modern foreign language. They must satisfy distribution requirements in six major areas of intellectual inquiry and complete the requirements of a major in one of the departments or programs of Weinberg College.

### *Freshman Seminar Requirement*

Freshman seminars, offered by nearly all departments in Weinberg College, 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 15 or 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 departmental program.

Every Weinberg freshman is required to complete 2 freshman seminars. 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. Beginning in fall 2007 freshmen 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 quarter-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 in the Office of Undergraduate Studies and Advising.

- 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 and historical relationships in cultural, social, political, economic, and military affairs in a broad temporal perspective.
- 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 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.

### *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 may elect a major from among the following options:

- **Departmental major**

Each department offers one or more programs of specialization, which are described in detail preceding the departmental course offerings in this catalog.

- **Area or interdisciplinary major**

The college offers a number of interdisciplinary majors that apply the approaches of several departments to certain scientific, cultural, and political areas. These programs, described in the corresponding entries, are American studies, Asian and Middle East studies, cognitive science, comparative literary studies, computing and information systems, drama, European studies, environmental sciences, gender studies, geography, integrated science, international studies, legal studies, materials science, mathematical methods in the social sciences, and science in human culture. 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. Gender studies, geography, international studies, legal studies, mathematical methods in the social sciences, and science in human culture are available only as adjunct majors in conjunction with a second major.

- **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 African studies or computational chemistry, 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 quarter-courses, 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 section 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 upperclass (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.

*Registration in Courses in Other Undergraduate Schools of the University and at Other Universities*  
Weinberg students may take advantage of Northwestern's undergraduate preprofessional schools to take as many as 11 of their required quarter-courses; 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-course 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 shop work, individual instruction in speech, correspondence courses, or course work in music education or physical education.

No more than 4 of the required 45 quarter-courses may come from the military studies programs.

With the prior approval of the University Study Abroad Committee or the faculty, qualified students may study abroad.

Students should consult with the Office of Undergraduate Studies and Advising concerning limitations on the amount of non-Northwestern credit that may be used toward the BA degree and with the Office of the Registrar concerning limitations on the amount of such credit that may be used toward the Undergraduate Residence Requirement.

## Special Opportunities

### *Junior Research Seminars*

Junior Research Seminars draw students from diverse academic backgrounds. Each seminar's topic or theme is focused, allowing for in-depth study, yet open to research directions that vary in substance and methodology. Seminars may be taught by one instructor or by a faculty team, and enrollment is limited to 16 students. Recent Junior Research Seminars include *The Periodical Press* and *American Cultural Life*, *Museums and Exhibiting*, *Text and Image in East Asian Buddhism*, and *The Car*.

### *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 asylum issues in U.S. immigration law. Linkage seminars are announced to Weinberg College students before registration each quarter.

### *Undergraduate Seminars and Independent Study*

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

Students may also register for 399 Independent Study 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 also 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 also must submit an abstract of the completed work to the department, where the description and the abstract are filed.

Students may not register for more than 2 credits 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*

Each major in Weinberg College offers an honors program leading to the award, at graduation, of departmental honors to seniors with outstanding achievement in connection with a research project or other integrative type of work. Although the detailed criteria vary somewhat by major (as shown in the listings of individual departments and programs), all share certain features.

Students recommended for departmental honors must have completed with distinction such regular courses as may be required of them by 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 Superior Students and Honors. 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. 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. Approved nominations are forwarded to the Committee on Superior Students and Honors for final review.

### *Minors*

Students may choose from approximately 50 minors offered by departments and programs; among these are interschool minors (see Cross-School Programs section). Minor requirements are listed under the appropriate headings in this catalog. Completion of a minor is optional and not a degree requirement, and no more than one minor may be pursued and listed on a student's transcript. Except as explicitly stated and in the case of related courses, courses used to fulfill requirements for the student's major(s) may not be used to fulfill the requirements for the minor.

### *Concentration in the School of Music*

Students in Weinberg College may elect to pursue a special concentration in music studies offered by the School of Music. The concentration has limited enrollment and is available only to Weinberg College students. More information is available at the Weinberg College Office of Undergraduate Studies and Advising.

### *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 included in the student's course of study. 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.

## **ACADEMIC OPTIONS**

### **Combined Bachelor's and Master's Degree Programs**

Exceptional undergraduates may be able to earn both a bachelor's degree and a master's degree in four years of study in the following departments: chemistry, economics, French, geological sciences, linguistics, political science, sociology, and statistics. Students are admitted to these programs only by invitation of the department and with the approval of the Graduate School. (See Academic Options in the Undergraduate Education section of this catalog.)

### **Combined Weinberg College–Feinberg School of Medicine Program**

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 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 in HPME must successfully complete 36 quarter-courses while in Weinberg College and complete an Undergraduate Residence Requirement of 9 quarters. The course requirements include 11 prescribed science courses. Selection of the remaining 25 courses depends on the curriculum chosen by the student. Options include completion of a BA degree or a full year of study abroad in a Northwestern-affiliated or other program approved by the University Study Abroad Committee. Students must maintain designated grade point averages both in required science courses and overall.

### **Combined Weinberg College–School of Music Program**

Students accepted into the combined Weinberg College–School of Music program may simultaneously earn a BA degree from the college and a BMus degree from the School of Music. They must complete all Weinberg College degree requirements, including at least 30 Weinberg College courses, as well as all requirements for the bachelor of music degree in the School of Music, including at least 30 music courses. Fulfilling both Weinberg College and School of Music requirements takes five years of full-time study, and an Undergraduate Residence Requirement of 15 quarters is obligatory.

Participants in this combined program must be accepted by both the School of Music and Weinberg College. Interested students should consult with the associate dean for undergraduate studies in Weinberg College and the director of admissions in the School of Music for current information.

### **Other Cross-School Programs**

Weinberg College students may enroll in courses offered by the interschool Undergraduate Leadership Program as well as those offered by several other interschool programs administered by the college, including the Center for the Writing Arts and the Transportation Center (see the Cross-School Programs section of this catalog).

### **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 section of this catalog. Application should be made with the Office of Student Affairs in the School of Education and Social Policy.

### 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. 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.

### GENERAL STUDIES

These interdivisional courses are open to all qualified students.

**GEN LA 280-7 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. 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 associate dean for undergraduate academic affairs 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

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 and, through such study, for 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 African American 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 institutions such as the family; 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

### Departmental courses

*Core courses:* 210-1,2, 236-1,2, 245

*Major courses:* In addition to the core sequence, 6 courses in the department are required, including at least 4 at the 300 level. Students should select courses in consultation with the director of undergraduate studies.

*Senior course:* The major requires a senior-level course (390, 396, or 399).

**Related courses:** Subject to approval of the department adviser, majors must take 5 200- or 300-level courses outside the department, including at least 3 at the 300 level. Students are expected to choose related 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 African American experience.

### Minor course requirements (8 units)

- 4 foundation courses chosen from 210-1,2, 236-1,2, 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 for honors to the Office of the Dean.

## 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 236-1,2 Introduction to African American

**Studies** Key texts and concepts in African American studies from a range of disciplinary perspectives. Both quarters' themes will be connected to historical and contemporary liberation struggles. **1.** Africa, slavery, rural and urban life, class divisions, and the constructs of "race," "racism," and "blackness." **2.** The institutional development of politics, church, education, culture, women/family, and the social conditions that give rise to such formations, featuring guest lectures by department faculty members.

### 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 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.

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

**States** Problems and experiences of racialized minorities: blacks, Native Americans, Asian Americans, and Hispanic Americans. 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 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 316-0 African American Folklore** African American folklore in a variety of genres and forms of presentation, from both rural and urban communities. Includes folk narratives, folksongs, the dozens, toasts, jokes and humor, folk beliefs, preachers, folk heroes, and the literary transformation of folk materials.

**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 321-0 Researching Black Communities** Introduction to the methodology and findings of qualitative research on black communities in the United States. Topics include black migration, urban geography, black culture, class and gender stratification, racial identity.

**AF AM ST 325-0 Race, Poverty, and Public Policy in America** Examination of the scope of poverty in America, competing theories about its causes, and how racial stratification creates and perpetuates economic marginalization. Public-policy responses to the plight of the poor; debates about the future of antipoverty policy, with emphasis on the relationship between racial and economic stratification. Prerequisite: 236-1 or SOCIOL 110.

**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. Prerequisite: 236-1 or 236-2.

**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 anti-lynching, 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 340-0 Slavery and Abolitionist Discourse**

Investigation of the rise of abolitionist discourse in the West, including the evolution of the debates over slavery from the latter part of the 18th century to the late 19th century.

**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 Politics of Afro-Latin America** Introduction to the racial politics of African American communities outside the United States; exploration of relationships between racial and social inequality, racial difference, and political development in selected Latin American nations.

**AF AM ST 348-0 Africans in Colonial Latin America** Explores the history of African-descended people throughout Latin America from 1492 to 1800, emphasizing the varied experiences of slavery and freedom, the emergence of race and colonial categories of difference, and the gendered lives of racialized colonial subjects.

### **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 355-0 20th-Century Intellectual and Popular**

**Culture** Examination of the rise and persistence of the notion of black cultural/racial authenticity in the 20th century through the lens of various forms of intellectual and popular culture.

### **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 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. Du Bois, 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 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, multi-genre 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.

**AF AM ST 381-0 Topics in Transnational Black Culture** Examination of middle-passage 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.

**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.

**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.

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

### Sample Related 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 section 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 School of Music section 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 section 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 section of this catalog)

## AFRICAN AND ASIAN LANGUAGES

The Program of African and Asian Languages (PAAL) offers opportunities to explore through language study some of the fascinating cultures that are vital for Americans to understand: 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. Other African languages can be made available. 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.

### 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 course requirements (8 units)

##### Option A

- Language (5 units)
  - 3 quarter-courses of 200-level Chinese or Japanese
  - 2 quarter-courses of 300-level Chinese or Japanese
- Literature/culture (3 units)
  - 2 quarter-courses of Chinese or Japanese literature in translation (COMP LIT 271-1,2,3 or 274-1,2,3,4)
  - 1 quarter-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

- Language (5 units)
  - 3 quarter-courses of 200-level Chinese or Japanese

taken either partly or entirely in China or Japan (remainder taken upon return)

2 quarter-courses of 300-level Chinese or Japanese taken upon return

- Literature/culture (3 units)

Any 3 disciplinary courses taken in China or Japan

### African Language Courses

**AAL 105-1,2,3 Elementary Arabic** Three-course introduction to modern standard Arabic. Speaking, reading, and listening comprehension skills developed.

**AAL 106-1,2,3 Intermediate Arabic** Grammar, reading of Arabic texts, oral communication in Arabic. Prerequisite: 105-3 or equivalent.

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

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

**AAL 207-1,2,3 Arabic III** Reading and discussion of Arabic writings relevant to students' interests and needs. Emphasis on writing skills. Prerequisite: 106-3 or equivalent.

**AAL 223-1,2,3 Introduction to Swahili Literature** Overview of Swahili oral verbal arts, classical literature, and modern writing. In Swahili. Need not be taken in sequence. Prerequisite: 122-3 or equivalent.

**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. Prerequisite: 207-3 or equivalent.

### Asian Language Courses

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

For courses in Arabic, see African language courses.

**AAL 111-1,2,3 Elementary Chinese** Speaking, aural comprehension, reading, writing of basic vernacular Chinese. Both standard and simplified characters involving about 1,500 compounds. Accelerated section available for students with some oral proficiency but no literacy.

**AAL 112-1,2,3 Intermediate Chinese** Conversation, aural comprehension, writing based on reading Chinese stories, poems, stories of ballets, historical and cultural texts. Accelerated section available for students with some oral proficiency but no literacy. Prerequisite: 111-3 or equivalent.

**AAL 115-1,2,3 Japanese I** Conversation, grammar, reading, and writing for beginners. Issues of United States-Japan cross-cultural communication. Five class meetings a week plus language laboratory.

**AAL 116-1,2,3 Japanese II** A comprehensive approach to

conversation, grammar, reading, and writing. Four class meetings a week. Prerequisite: 115-3 or equivalent.

**AAL 118-1,2,3 Turkish I** Sequential three-course introduction to basic literacy and oral proficiency. Offered every other academic year.

**AAL 119-1,2,3 Turkish II** Intermediate Turkish. Prerequisite: 118-3 or equivalent.

**AAL 125-1,2,3 Korean I** Three-course introduction to basic literacy and oral proficiency. Accelerated section available for students with some oral proficiency but no literacy.

**AAL 126-1,2,3 Korean II** Development of literacy and interactive proficiency skills. Prerequisite: 125-3 or equivalent. Accelerated section available for students with some oral proficiency but no literacy.

**AAL 127-1,2,3 Accelerated Korean** Years 1 and 2 combined.

**AAL 128-1,2,3 Hindi I** Three-course introduction to basic literacy and oral proficiency. Accelerated section available for students with some oral proficiency but no literacy.

**AAL 129-1,2,3 Hindi II** Three-course sequence developing literacy and interactive oral proficiency skills. Prerequisite: 128-3 or equivalent. Accelerated section available for students with some oral proficiency but no literacy.

**AAL 131-1,2,3 Persian I** Sequential three-course introduction to basic literacy and oral proficiency. Offered every other academic year.

**AAL 132-1,2,3 Persian II** Intermediate Persian. Prerequisite: 131-3 or equivalent.

**AAL 213-1,2,3 Advanced Chinese** Readings from the works of contemporary Chinese writers. Discussion and writing based on the reading materials. Prerequisite: 112-3 or equivalent.

**AAL 217-1,2,3 Japanese III** Advanced readings in modern colloquial Japanese; prose essay, literary, and newspaper styles. Prerequisite: 116-3 or equivalent.

**AAL 318-1,2,3,4 Japanese IV** A series of 4 quarterlong Japanese IV courses at the upper-intermediate level.

1. Contemporary Japanese literary works for reading and discussion. 2. Writing for various purposes. 3. Newspaper reading and news listening. 4. Reading Japanese literature in Japanese. To enroll in any 318, students must complete 217-3 or take a placement test.

**AAL 319-1,2,3 Chinese IV** Advanced reading and writing skills and Chinese literature in the language. Prerequisite: 213-3 or equivalent.

### Hebrew Courses

**AAL 101-1,2,3 Elementary Hebrew** Understanding, speaking, reading, and writing of mainly conversational Hebrew. Hebrew used as language of instruction. Drill in language laboratory.

**AAL 102-1,2,3 Intermediate Hebrew** From language to literature: review of grammar; reading and discussing Hebrew literary works (prose and poetry) and newspaper articles. Compositions and oral presentations. Prerequisite: 101-3 or equivalent.

**AAL 203-1,2,3 Advanced Hebrew** Reading Hebrew literature, some biblical but mostly modern prose. Compositions and oral presentations. Prerequisite: 102-3 or equivalent.

### All PAAL Languages

**AAL 399-0 Independent Study** For undergraduate students of any of the above languages who have advanced beyond the regular course offerings.

## 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.

### 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 course requirements (6 units)

- 6 courses with African content from at least two departments. At least 2 of the 6 courses must be from the HISTORY 255-1,2,3 sequence, and 1 must be ANTHRO 255. Students are encouraged to develop full-length research papers on African topics, supervised by faculty with African interests. They may write these papers as part of regularly offered classes, independent study courses, or senior honors programs.

- Minimum of an overall B average in these courses. Courses taken for P/N do not count toward the minor.
- 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. Students applying for the minor in African studies, conferred at the end of each spring quarter, must present records showing a minimum of 5 courses not double-counted in their major. Program staff encourage students to meet with them to initiate and monitor progress toward meeting the requirements.

### Courses

**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** Two-course sequence required for recipients of the Herskovits Undergraduate Research Award.

**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

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:* All sophomore and junior majors must complete 301-1,2,3. Seniors must complete 390-1,2,3.

*Related courses:* 10 quarters at the 200 or 300 level from the general curricula in American studies from throughout the University. These courses will be apportioned in a way that satisfies the interdisciplinary purpose of a major in American studies and expresses each student's explicit intellectual goals, but every major is required to take HISTORY 210-1,2 or an approved equivalent as early as possible in his or her academic career.

## Courses Primarily for Freshmen and Sophomores

**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.

## Courses Primarily for Juniors and Seniors

**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.

## ANIMATE ARTS

An adjunct major in animate arts is open to students in all undergraduate schools. Please see Animate Arts in the Cross-School Programs section of this catalog.

## ANTHROPOLOGY

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 who plan 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; 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 Belize, 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 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.

### Departmental courses

- 211, 213, 214, and 215. Students with previous background in anthropology may petition to substitute a 300-level course for a 200-level requirement.
- 370
- 5 additional 300-level courses selected in consultation with an adviser. Normally, these courses are chosen from one of the subfields listed below, but students may, with the consent of their advisers, 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, 303, 311, 321 (offered in summer), 325, 328, 339, 362,

381, 382, 383, 384, 390, 391, 396 (offered in summer)

- o *Biological anthropology*: 5 courses chosen from 306, 310, 312, 313, 314, 315, 317, 362, 383, 390
- o *Cultural/linguistic anthropology*: 389 and 4 courses chosen from 310, 311, 320, 330, 332, 339, 341, 347, 350, 354, 355, 360, 361, 362, 363, 364, 372, 373, 374, 376, 377, 383, 390, 395; CFS 393-1,2, 394-1,2, 395-1,2
- o *Human biology*: See Concentration in Human Biology for requirements.
- 398 (senior year)

**Related courses:** Subject to the department adviser's approval, 4 courses from other departments and programs. One of these courses must be in formal or statistical methods, and at least 2 of these courses 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.

### **Departmental courses**

- 211, 213, 214, 215
- 370, 386
- 4 courses chosen from 306, 310, 312, 313, 314, 315, 317, 362, 383, 390
- 398 (senior year)

### **Related courses**

*Foundational courses (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, STAT 202, or equivalent
- PHYSICS 130-1,2,3 or 135-1,2,3

*Advanced courses:* Subject to the approval of the departmental adviser, 3 additional related courses at the 300 level from other departments. See the departmental adviser for 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 course requirements (7 units)**

- 211 or 215
- 213 or 214
- a coherent combination of 5 300-level courses in anthropology 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. In order to be eligible for honors, students must have a grade point average of 3.5 or above in anthropology courses. Enrollment is required in one quarter of 399 Independent Study or an appropriate graduate-level course in addition to 398 Senior Seminar (required for all majors). 399 should be taken before enrolling in 398. Students who meet these requirements and prepare an outstanding senior thesis will be nominated 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 under Academic Policies earlier in this section of the catalog.

### 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 67 and at [www.wcas.northwestern.edu/evolution](http://www.wcas.northwestern.edu/evolution).

### Courses Primarily for Freshmen and Sophomores

**ANTHRO 105-0 Fundamentals of Anthropology** 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 Culture Origins** 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 220-0 Evolution of Moral Systems** Critical examination of evolutionary theories of the origin and development of the human propensity to make moral judgments. Prerequisite: 105.

**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.

### Courses Primarily for Juniors and Seniors

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 301-0 Hunter-Gatherer Archaeology** Evolution and cultural history during the Pleistocene epoch. Interrelationship 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 303-0 Origins of Civilization** Comparative survey of prehistoric civilizations and systematic examination of the formative factors in their evolution. Prerequisite: 214 or equivalent.

**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 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 363-0 Language Variation and Change** Introduction to the study of language in its social context, with focus on quantitative sociolinguistics and the frameworks and methods of analysis developed by sociolinguists at work in this area. Prerequisite: consent of instructor.

**ANTHRO 364-0 Pidgins, Creoles, and Language in Contact** Introduction to the study of Pidgin and Creole languages such as Tok Pisin, Bislama, Hawaiian Creole English, Guyanese Creole English, and Haitian Creole. Prerequisite: consent of instructor.

**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 384-0 Introduction to Zooarchaeology** Introduction to the study of animal bones from archaeological

sites. Identification, sampling, quantification, hunting economies, domestication, and herding systems in complex societies. Prerequisites: 214; 301 or 302; or consent of instructor.

**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 (e.g., the Southwest) 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. Prerequisite: 388.

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

**Related Courses in the School of Music**

MUSICOL 323, 326-1,2

**Summer Field Schools**

*Ethnographic Field School in Cultural and Linguistic Anthropology:* 395

*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.

## ART HISTORY

Art history is committed to exploring the historical meaning of art, architecture, photography, and film. It addresses works of art from all places and times and attends to their form, technique, iconography, and historical function. Art history may also be concerned with philosophical aesthetics, artists' lives, art institutions, traditions, and audiences.

Art history offers opportunities to explore and understand the richness and diversity of visual arts from the past and present. It enables students to develop acute visual sensibilities and finely honed skills of critical looking, thinking, speaking, and writing. Art history thus offers students a solid basis for a lifelong understanding of art as well as a foundation for further research in other academic and professional disciplines, including history, literature, philosophy, music, politics, and law.

Undergraduate degrees in art history may be preparation for careers in the arts, education, or business. Art historians with a BA degree may teach in elementary, junior, and high schools. They may find jobs in libraries, art galleries, and auction houses or in journalism, book publishing, public relations, marketing, or advertising. They may elect to pursue professional degrees in architecture, art conservation, law, and medicine or attain MA or PhD degrees in art history itself or other fields of humanistic study.

Careers in museums generally require at least a master's degree. Careers in college and university teaching and research require a PhD. For more information about careers in art history, contact the department undergraduate adviser at 847-491-3230 or [art-history@northwestern.edu](mailto:art-history@northwestern.edu).

The art history curriculum is developmental and critical. Students are expected to acquire a broad knowledge of world artistic traditions and expertise about particular areas, forms, and practices. They begin in a large class and quickly proceed into smaller classes, seminars, and tutorials. During their first and second years art history majors are highly dependent upon ideas and information contained in secondary sources; as juniors and seniors, they begin to conduct primary research and acquire the skills to think, criticize, and research on their own.

100-level freshman seminars treat a wide variety of art historical topics from the ancient to modern periods and from Africa and Asia to North America. The specific courses vary from year to year and are intended to introduce students to the discipline of art history and help them develop or improve their basic writing and research skills. These courses are not required for art history majors.

200-level courses offer broad introductions to African, Asian, ancient, American, Latin American, and European art and the history of architecture. They expose students to the richness and variety of visual art throughout history and across the globe. 200-level courses are taught in rotation, usually with three subject areas offered annually.

The courses consist of two or three lectures and a single discussion class each week and provide students with the factual and methodological foundation for more advanced courses. 300-level classes often require prior course work at the 200 level.

300-level courses are the backbone of the curriculum. They provide detailed explorations of important fields and issues in art history, including Gothic art and architecture, the Renaissance, Impressionism, and African American art. Students may choose from a large number of 300-level courses, and enrollments are limited to facilitate discussion. In these classes students discover the special expertise of their professor and are introduced to advanced research in art history.

Undergraduate seminars (390) are available to art history majors only, except with special consent of the faculty. Seminars meet once a week for instruction, discussion, and debate. In these classes majors hone their seeing, speaking, and writing skills and have the opportunity to work both cooperatively and individually. Seminar topics generally reflect the advanced research interests of the professor. Field trips to museums, private collections, and architectural monuments are often integrated into the class. Majors are required to take at least 1 seminar prior to graduation and may take as many as 3.

Internships (396) at museums, galleries, or other suitable institutions often may be arranged. Students wishing to take an internship are strongly encouraged to consult first with the undergraduate adviser.

Independent study (399) outside the academic curriculum may be arranged in exceptional circumstances. In these cases students must get the consent of their academic adviser prior to the term in which they intend to pursue their independent research.

Scholarly resources at Northwestern include the University art collection, housed at the Mary and Leigh Block Museum of Art, and the fine arts collection in Deering Library, both on the Evanston campus. The slide collection in the art history department includes approximately 275,000 slides. Resources in the area include the Art Institute of Chicago, the Chicago History Museum, the Newberry Library, the Field Museum, the Museum of Contemporary Art, the David and Alfred Smart Museum and the Oriental Institute at the University of Chicago, the Evanston Art Center, and other institutions. Research libraries that students may use with consent include the Ryerson Library at the Art Institute, the Newberry Library, and the Regenstein Library at the University of Chicago.

The undergraduate adviser is the key liaison between students and the rest of the faculty, college, and University. Students are encouraged to consult early and often with the adviser, especially prior to each period of registration.

## Major in Art History

### Departmental courses

- at least 3 200-level courses
- 9 courses at the 300 level, with at least 1 each in ancient-medieval; Renaissance-Baroque; modern; and Asian or African. The remaining courses are to be distributed at the student's discretion in consultation with the undergraduate adviser but must include at least 1 undergraduate seminar (390).
- 1 art theory and practice course

**Related courses:** At least 4 additional courses from one or more of the following departments or programs with the consent of the undergraduate adviser: anthropology, art theory and practice, classics, comparative literary studies, English, French and Italian, gender studies, German, history, music history, philosophy, radio/television/film, religion, Slavic languages and literatures, and Spanish and Portuguese.

## Minor in Art History

### Minor course requirements (8 units)

- a maximum of 2 of the 8 required courses at the 200 level
- at least 2 of the remaining courses in an Asian, African, or Latin 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 in art history must meet the following prerequisites:

- achievement of a distinguished record in the major by maintaining a grade point average of 3.5 or better in departmental and related courses
- successful completion of 2 preparation courses with a thesis adviser: either 2 independent study courses (399, taken in the fall and winter quarters of senior year) or 1 senior seminar on a topic relevant to the senior thesis (390, taken in junior or senior year) and 1 independent study course (taken in the winter quarter of senior year)

Completed senior theses are submitted by the end of April prior to graduation and evaluated by a departmental honors committee. For further information, please contact the undergraduate adviser. See also Honors and Prizes in the Undergraduate Education section of this catalog.

## Courses Primarily for Freshmen and Sophomores

**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 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 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** The theory and history of architecture in relation to cities and landscape.

**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** Art of India, China, and Japan; major themes include development of Buddhist art in India and its transformation in East Asia, cult of the dead and early bronze culture of China, ink painting in China and Japan, and entertainment culture and printmaking in 18th-century Edo Japan.

**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 260-0 Introduction to Art History** Conceptual introduction to the problems and methods of art historical investigation. Content varies with instructor.

## Courses Primarily for Juniors and Seniors

**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 Medieval Art** Art and architecture in Europe during the Middle Ages. **1.** Late Antique and Byzantine. **2.** Carolingian and Romanesque. Prerequisite: 1 200-level art history course.

**ART HIST 330-1,2,3 Renaissance Art** Painting, sculpture, and allied 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 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 allied arts in Europe from the late 16th through the 17th centuries. **1.** Art and science in early modern Europe. **2.** Art in the age of Rembrandt. Prerequisite: 250 or consent of instructor.

**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**

The artist and the environment: survey of European

painting, sculpture, architecture, and design from the 1890s to the 1960s. **1.** Symbolism to constructivism. **2.** Berlin Dada to the Situationist International. Prerequisite: 1 200-level art history course.

**ART HIST 365-1,2 American Art** Survey of the arts and other visual phenomena in the United States, encompassing architecture, painting, sculpture, photography, prints, film, and popular culture. **1.** Colonial times to 1900. **2.** The 20th century. Prerequisite: 1 200-level art history course.

**ART HIST 366-0 Postmodern Art** Survey of art in the United States since 1945 seen from a global perspective. Prerequisites: 360-1 or -2; 365-1 or -2; or consent of instructor.

**ART HIST 370-1,2 Modern Architecture** **1.** The 19th century. **2.** The 20th and 21st centuries. Prerequisite: 1 200-level art history course.

**ART HIST 372-1 Early Japanese Art** Arts of Japan pre-Meiji Restoration (1868). Course topic varies. Focus on important periods, including 10th–12th century Japanese hand scrolls (Heian and Kamakara), 7th–15th century Japanese temple architecture, and 17th–19th century Japanese prints (Edo).

**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 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.

**ART HIST 386-0 Art of Africa** Thematic and historical survey of the arts and architecture of Africa from the ancient period (Nubian Egypt) 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, the art of three cultures. 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; the encounter of Old and New World cultures. 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; prints, maps, and books of the Dutch republic. 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 Modern Art and Performance** Study of the interrelated histories of visual and performance arts in the 20th century. Content varies — for example, American painting and dance; postmodern art and performance from the Judson Church to Pina Bausch. Prerequisite: 1 200-level art history course.

**ART HIST 369-0 Special Topics in 20th-Century Art** Content varies — for example, videospectres in the West (1995–2001); Latin American art and the Cold War; Paul Klee and the social history of modern art in the Europe of his time (Blue Rider, Bauhaus, Surrealism); totalitarian art. Prerequisite: 1 200-level art history course.

**ART HIST 379-0 Special Topics in Modern 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. Prerequisite: 1 200-level art history course.

## Courses Primarily for Majors

**ART HIST 390-0 Undergraduate Seminar** Content varies — for example, the methods of art history; video's first decade; readings in medieval art; Frank Lloyd Wright and Mies Van der Rohe, 1937–50; Bosch and Brueghel; Japanese prints; Jerusalem. Prerequisite: 1 200-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: 1 200-level art history course.

**ART HIST 396-0 Internship in the Arts** Direct participation under the supervision of a faculty member in the regular

activities of an established arts organization in Evanston and the Chicago area. By petition, on a limited basis, may be taken only once. Prerequisite: 1 200-level art history course.

**ART HIST 399-0 Independent Study** Special projects in art history involving reading and conferences with a supervising professor. Required for students writing a senior thesis in art history. Prerequisite: 1 200-level art history course.

## ART THEORY AND PRACTICE

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. The major comprises a total of 19 departmental and related courses.

#### Departmental courses

*Introductory courses (3):* 3 courses chosen from 120, 125, 140, or 150

*Intermediate and advanced courses (8):* 4 300-level courses including 380 (399 may be used only once to fulfill major requirements); 4 other studio courses at any level

*Art history and criticism courses (3):* 270, 272, and any art history department course other than freshman seminars

*Related courses (5):* 5 courses chosen from 200- and 300-level courses in one or more of the following departments with the approval of the adviser: African American studies, anthropology, art history, classics, comparative literary studies, English, French and Italian, gender studies, German, history, music, philosophy, Slavic languages and literatures, and Spanish and Portuguese

### Honors in Art Theory and Practice

Outstanding students may qualify for departmental honors in their senior year by taking 2 courses — 399 in the

winter quarter and 380 in the spring quarter — in which they complete an approved studio project and related essay under department faculty supervision. See Honors under Academic Policies earlier in this section of the catalog.

### 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 section 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 Basic Painting** Introduction to problems in oil painting and visual thinking. Includes surface preparation, color mixing, and composition. No previous experience necessary.

**ART 125-0 Basic 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 135-0 Basic Calligraphy** Chinese and Japanese calligraphy from ancient pictographs to modern-day Chinese Kanji, using a calligraphy brush with sumi ink. No previous experience necessary.

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

**ART 150-0 Basic Photography** Extensive darkroom 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 224-0 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. Prerequisite: 1 100-level course in the department.

**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 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 333-0 Lithography** Design and production of prints in lithographic processes. Prerequisite: 120 or 125.

**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 the 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

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 course requirements (7 units)

- 5 courses in Asian American studies, usually consisting of 1 survey in Asian American history or literature (ASIAN AM 214/HISTORY 214 or ASIAN AM 275/ENGLISH 275) in addition to topics courses (courses with significant coverage of Asian American issues may be approved at the discretion of the director; no more than 2 courses may be approved by petition)
- 1 course in Asian and Middle East studies
- 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 courses 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 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. This course is the same as HISTORY 214.



**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 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. This course is the same as ENGLISH 275.

**ASIAN AM 360-0 Asian American Women and Gender** Exploration of the intersections of gender, race, and ethnicity in the historical experiences of Asian American women.

**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.

## ASIAN AND MIDDLE EAST STUDIES

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. Most 100- and 200-level courses as well as many 300-level courses are designed for students with no background in Asian and Middle East studies. Students may take such courses for elective credit or to meet specific requirements of their programs of study.

There are two Asian and Middle East studies majors. Students doing either major or the minor are encouraged to complete at least 1 quarter of research in their area of interest. Courses taken while enrolled in study abroad in Asia or the Middle East generally count toward the major or minor.

### Major in Asian and Middle East Languages and Civilizations

The major consists of 17 quarter-courses chosen in consultation with the program director from the list of

approved courses. The student and adviser will identify an appropriate geographic or other focus and typically select at least 3 courses in each of three disciplinary categories: social sciences, history, and humanities. In most cases the focus will be on one of the four culturally differentiated areas into which Asia and the Middle East are conventionally divided: East Asia, Southeast Asia, South Asia, and West Asia/Middle East. The 17 quarter-courses must include 6 quarter-courses of language study beyond the first year in Arabic, Chinese, Hebrew, Hindi, Japanese, Korean, Persian, or Turkish. (Native-speaker proficiency does not count for course credit.) Two units of the major must involve related research. These could be seminars, independent study, or a senior thesis.

A list of approved courses for the major is available on the Asian and Middle East studies web site at [www.wcas.northwestern.edu/asianandmiddleeast](http://www.wcas.northwestern.edu/asianandmiddleeast). The major also requires a study abroad experience in Asia or the Middle East, although students may petition for a waiver of this requirement. Students should see the program director for further information about major requirements. Up to 2 courses may double-count toward a second major.

### Adjunct Major in Asian and Middle East Studies

The adjunct major in Asian and Middle East studies must be done in conjunction with another major. It requires completion of 11 quarter-courses but does not require an Asian or Middle Eastern language. A minimum of 5 of the 11 courses must be taken in a chosen concentration. In most cases the concentration will focus on one of the four culturally differentiated areas into which Asia and the Middle East are conventionally divided (see above). The approved courses for the adjunct major are the same as for the major.

### Minor in Asian and Middle East Studies

Students qualify for a minor in Asian and Middle East studies by satisfactorily completing 8 quarter-courses chosen in consultation with the program director from the approved list of Asian and Middle East courses. The student and adviser will identify an appropriate geographic or other focus. Typically at least 2 courses are selected in each of three disciplinary categories: social sciences, history, and humanities. In most cases the focus will be on one of the four culturally differentiated areas into which Asia and the Middle East are conventionally divided (see above under the major). If the student satisfactorily completes two years of language study in Arabic, Chinese, Hebrew, Hindi, Japanese, Korean, Persian, or Turkish, then 6 disciplinary courses will suffice to qualify for the minor. (Native-speaker proficiency does not count for course credit.) All students applying for minors in Weinberg College must present records that show a minimum of 5 courses not double-counted in their majors. Graduating seniors who have completed the requirements for a minor should request the application form from the program director.

## ASTRONOMY

See Physics and Astronomy.

## BIOCHEMISTRY, MOLECULAR BIOLOGY, AND CELL BIOLOGY

The Department of Biochemistry, Molecular Biology, and Cell Biology does not offer an undergraduate degree. See the following section for a description of the major in biological sciences.

## BIOLOGICAL SCIENCES

The science of biology is the study of living organisms at all levels of complexity and in all their diversity. The Program in Biological Sciences draws particularly on two departments: biochemistry, molecular biology, and cell biology, and neurobiology and physiology. Additional opportunities in life sciences are available for students in other departments: anthropology, biomedical engineering, chemistry, earth and planetary sciences, philosophy, psychology, and communication sciences and disorders. The curriculum is intended to maximize students' access to offerings from these departments. The baccalaureate degree offered by Weinberg College through the Program in Biological Sciences is the bachelor of arts with a major in biological sciences.

### Major in Biological Sciences

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. Physics courses should be completed by the end of the junior year.

*Core curriculum:* To set the stage for study in biological sciences at the advanced level, each major must complete 210-1,2,3. These 3 courses taken in sequence address the central topics in contemporary biology with the goal of preparing students for further study in either the biological sciences or professional school. This core sequence includes laboratories that provide students with an appreciation of the discipline as an experimental science.

*Advanced courses:* 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. In addition to the 3 courses specifically required for each concentration, each student is required to take 309 (or 301) and 315, plus 3 300-level life science elective courses.

The concentration will be noted on the transcript; only one concentration can be noted. Following are the six concentrations and their respective requirements.

- Biochemistry: 321, 361, CHEM 210-3
- Evolutionary and developmental biology: 342, 344, 391
- Genetics and molecular biology: 353, 390, 395
- Human biology: 327, 359, ANTHRO 306
- Neurobiology: 302, 305, 306
- Physiology: 325, 356, 358

*Related courses (required for all concentrations)*

- CHEM 101, 102, and 103 (or 171 and 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)

### Advising

Sophomores with declared biological sciences majors are assigned specific faculty advisers. Juniors and seniors pursuing independent research also have research supervisors.

### Independent Research: Honors Program

The Program in Biological Sciences offers students the opportunity to work on a research project in a faculty sponsor's laboratory. Lists of participating faculty are available at [www.biosci.northwestern.edu](http://www.biosci.northwestern.edu). Students meet with faculty members whose research interests align with their own to explore research possibilities. Together they design a plan of study to be undertaken in a particular laboratory for at least nine months. The student's first quarter of independent research must be taken as 398 and graded P/N. Thereafter the student may register for 399.

Students engaged in independent research are encouraged to also submit an honors thesis abstract early in their senior year. Students complete laboratory work, data analysis, and writing of the thesis according to an established timetable. Upon satisfactory completion of the thesis, a student may receive program honors on the recommendation of a faculty committee and become eligible to compete for one of four awards given yearly for superior research. Completion of the thesis during the spring quarter enables students to treat a year of 398/399 as a 300-level elective to be counted toward the major. In general, a research project leading to honors may not be pursued outside the 398/399 framework. For additional information, see Honors under Academic Policies earlier in the catalog.

## 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 core courses for the relevant concentration in biological sciences

## Honors Program in Medical Education

The 300-level biological sciences course requirements for students also in the HPME program consist of 301, 315, the 2 nonlaboratory core courses appropriate for the chosen concentration (the lab course constitutes an HPME waiver), and 3 300-level electives. If a second HPME waiver is applied to this major, it must be applied to a 300-level elective.

## Premedical, Predental, and Preveterinary Students Majoring in Other Departments

Biological sciences requirements for most U.S. schools offering degrees in medicine, dentistry, and veterinary medicine are satisfied by either 110-1,2,3 or 210-1,2,3.

## 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 section 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 course requirements (8 units)

#### Core courses (4 units)

- 1 introductory course in genetics and evolution (110-1, 210-1, or ANTHRO 213)
- introduction to earth systems and history (EARTH 203)
- upper-level course on evolution (342)
- capstone seminar (397)

### Elective courses (4 units)

At least 1 must be an approved collection, field, or laboratory course. See [www.wcas.northwestern.edu/evolution/minor/courses.htm](http://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, using current events as illustrations. 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.

**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 210-3.

**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 124-0 Biological Clocks** Daily and annual biological rhythms, their mechanisms, and their effects on health, performance, and 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 220, 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 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: 110-1,2,3 or 210-1,2,3; 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. Prerequisite: 302.

**BIOL SCI 305-0 Neurobiology Laboratory** Hands-on experience in the performance of classical 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 307-0 Learning and Teaching Human Biology** The pedagogy of biological science. Prerequisite: some experience with computer technology.

**BIOL SCI 309-0 Principles of Biochemistry** Biochemistry with focus on macromolecular structure and function, relevant gene expression, and photosynthesis. Use of current literature. 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 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; 330.

**BIOL SCI 332-0 Plant Conservation Genetics** Critical issues in the management and understanding of endangered plant populations. Prerequisites: 210-1,2,3; 330.

**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 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: 210-1,2; 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 Systematics** Determination of plant phylogenetic relationships. 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 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 Undergraduate Research Seminar** Advanced work for superior students. May consist of either supervised reading and discussion or the first quarter of a research project. Prerequisite: consent of instructor.

**BIOL SCI 399-0 Independent Research** Supervised individual research open only to students meeting specified requirements. Prerequisite: 1 quarter of 398 relevant to the project.

## BUSINESS INSTITUTIONS

The 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 8 courses: 3 required core courses and 5 electives. The program director may approve a course offered in a particular year as a substitution for an elective course when the syllabus demonstrates a business institutions emphasis.

Students interested in the minor in business institutions should consult with a program adviser. Information is available in the Weinberg College Office of Studies and the program office, University Hall, room 001. Students applying for the minor in business institutions must present records showing that a minimum of 5 out of the 8 courses required for the minor are not double-counted in their major. Additionally, no more than 5 of the 8 courses may be taken in the same department. Credits for the minor may include 1 internship-related credit and up to 2 professional linkage seminar credits. Grades of P/N are not accepted.

**Minor course requirements (8 units)****Core courses**

- ECON 201 and 202 (which together count as 1 business institutions core requirement) or ECON 310-1
- ECON 250 or 350 or POLI SCI 375
- SOCIOL 302

**Electives: 5 courses chosen from**

- 239, 390, 392, 394
- ANTHRO 341
- CFS (Chicago Field Studies) or other internship-related course (at most 1 credit may be counted)
- ECON 260, 305, 307, 308, 309, 315, 322, 323-1,2, 324, 325, 326, 330, 331, 337, 339, 349, 350, 351, 354, 355, 360, 361, 362, 370
- HISTORY 322-1,2, 367
- IMC 303, 304 (Integrated Marketing Communications; see the Medill School of Journalism)
- PHIL 260, 261, 262, 263, 268, 269
- POLI SCI 329, 348, 349, 352, 353, 354, 361, 371, 372, 374
- SOCIOL 215, 312, 315, 316, 321, 331, 332, 335, 350, 355

**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 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.

**CHEMISTRY**

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 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.

**Core curriculum:** All majors are expected to complete the following courses in order to gain 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

**Related courses:** Since mathematics and physics are essential tools in chemistry, majors are required to take

- 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

**Areas of concentration:** Areas of concentration draw upon courses within the department as well as in other departments. A chemistry major completes 3 courses in the selected concentration, typically during the final year of undergraduate study. The concentration areas, along with eligible courses, are

- Biochemistry: 304, 314, 316, 329, 435; BIOL SCI 301, 309, 321
- Environmental chemistry: 306, 329, 393; CIV ENG 267, 360, 365, 367
- Inorganic chemistry: 302, 329, 418, 433, 434, 435
- Organic chemistry: 301, 314, 316, 329, 410, 411, 412, 413-1,2, 418
- Physical chemistry: 303, 329, 442-1,2, 443, 444, 445, 448
- Materials/nanotechnology: 250, 307, 329; 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.

## 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.

*Basic course:* 103 or 172 or equivalent

*Minor course requirements (6 units):* 6 200- or 300-level courses exclusive of 201 or 399. Chemistry courses at the 300 level may have additional chemistry, physics, and/or mathematics prerequisites.

*Sample programs:* 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 could 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.

## 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 Four-Year Master's Programs in the Undergraduate Education section of this catalog.

## 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

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.

## 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 under Academic Policies in this catalog.

## 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 section 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).

## 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) or consent of department.

**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) or consent of department; 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.

**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 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 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.

**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. Advanced instrumental analysis: mass spectrometry, chromatography, NMR spectroscopy, X-ray crystallography. Inorganic and organic synthesis techniques. Prerequisites: 220 or 329 and 212-1,2,3 or equivalent; 333 corequisite.

**CHEM 350-2 Advanced Laboratory 2** Advanced laboratory techniques in synthetic and analytical chemistry and spectroscopy. Advanced analytical techniques: gel permeation chromatography and other polymer characterization methods. Advanced spectroscopy: atomic spectroscopy. Advanced organic and inorganic synthesis techniques. Prerequisites: 220 or 329 and 350-1; 342-2 corequisite.

**CHEM 350-3 Advanced Laboratory 3** Advanced laboratory techniques in synthetic and analytical chemistry and spectroscopy. Advanced spectroscopy: infrared and Raman vibrational and rotational spectroscopy, electronic spectroscopy, kinetics of fast reactions using spectroscopic techniques. Organic and inorganic synthesis techniques in a self-guided project. Prerequisites: 342-2 or equivalent and 350-2; 342-3 or 348 corequisite.

**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.

**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. Prerequisite: consent of department.

## CHICAGO FIELD STUDIES

Affiliated with the Departments of Anthropology and Sociology, Chicago Field Studies (CFS) offers programs that combine Northwestern seminars with internships at Chicago area organizations. For almost 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, business, and organizational behavior. Depending on the program, students intern up to 32 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](http://www.wcas.northwestern.edu/cfs).

### Major/Minor Credit

A number of departments and programs — including anthropology, sociology, and business institutions — 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 (workplace culture). Students intern 24 to 32 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 credits 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 32 hours a week in legal organizations. It is offered one or two quarters a year. The program has 2 required courses worth 2 credits each: 394-1,2.

#### *Business Field Studies*

This full-time program focuses on contemporary issues and workplace culture in business. Students intern 24 to 32 hours a week in business organizations (primarily finance and marketing). It is offered one or two quarters a year.

The program has 2 required courses worth 2 credits each: 395-1,2.

#### *Field Studies in Social Justice*

This part-time program focuses on the social justice field. Topics vary by quarter (e.g., immigration, affordable housing, homelessness, poverty, etc.). Students intern 10 to 15 hours per week in social justice organizations. It is offered 1 or 2 quarters per year. The program has 1 required course, 293, worth 2 credits.

#### *Other Programs*

CFS periodically develops new programs focusing on different fields and topics, some of which are part-time and carry 1 to 2 credits. These programs are described on the CFS web site.

### Courses

**CFS 293-0 Field Studies in Social Justice** (2 units)

**CFS 393-1 Organizational Behavior: Modern Workplace** (2 units)

**CFS 393-2 Qualitative Research Methods** (2 units)

**CFS 394-1 Organizational Behavior: Law** (2 units)

**CFS 394-2 Contemporary Issues in Law** (2 units)

**CFS 395-1 Organizational Behavior: Business** (2 units)

**CFS 395-2 Contemporary Issues in Business** (2 units)

## CLASSICS

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's web site at [www.wcas.northwestern.edu/classics](http://www.wcas.northwestern.edu/classics) 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.

#### *Major Concentration in Greek and Latin*

**Prerequisite:** Either GREEK 201-2 and LATIN 101-3 or LATIN 201-2 and GREEK 101-3 (or equivalent placements — see next page)

#### **Major course requirements (12 units)**

- First language foundation (3): 3 courses in Greek or Latin at the 201-3 level or above
- Second language foundation (3): 3 courses in the second language, at the 200 or 300 level
- Additional courses (6):
  - CLASSICS 211, 212, 395
  - 3 additional Greek, Latin, or classics courses, 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 Concentration in Latin*

**Prerequisite:** LATIN 201-2 or equivalent placement (see next page)

#### **Major course requirements (12 units)**

- Latin foundation: 3 courses in Latin at the 201-3 level or above
- Additional courses (9):
  - CLASSICS 211, 212, 395
  - 6 additional Latin, Greek, or classics courses, 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 Concentration in Greek*

**Prerequisite:** GREEK 201-2 or equivalent placement (see next page)

#### **Major course requirements (12 units)**

- Greek foundation: 3 courses in Greek at the 201-3 level or above
- Additional courses (9):
  - CLASSICS 211, 212, 395
  - 6 additional courses, 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 in Latin*

**Prerequisite:** LATIN 101-3 or equivalent placement (see next page)

#### **Minor course requirements (6 units)**

- 3 Latin courses at the 200 and 300 level
- 3 additional Latin and/or classics courses, 1 of which must be at the 300 level (may include 1 classical traditions course with consent of the director of undergraduate studies)

#### *Minor in Greek*

**Prerequisite:** GREEK 101-3 or equivalent placement (see below)

#### **Minor course requirements (6 units)**

- 3 Greek courses at the 200 and 300 level
- 3 additional Greek and/or classics courses, 1 of which must be at the 300 level (may include 1 classical traditions course with consent of the director of undergraduate studies)

#### *Minor in Classical Studies*

- 2 courses from the following: 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)

## 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 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.

## Research Requirement

The department requires all majors 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.

## 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.

## Senior Thesis and Honors

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 honors thesis under the direction of a faculty member. 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.

## 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.

## Departmental 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 equivalent. 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 equivalent. 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 U.S.

**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; 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. 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. 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 course requirements. Recently offered courses include ART HIST 224 Introduction to Ancient Art  
ART HIST 310-1 Ancient Art: Greek Art and

Archaeology

COMP LIT 390 Topics in Comparative Literature

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

HUMANITIES 201 Thinking through and across

Traditions: Epic Literature and Orature

ITALIAN 265 Body and Soul from Rome to the Renaissance

PHIL 310 Studies in Ancient Philosophy

POLI SCI 301 Ancient Political Thought

## COGNITIVE SCIENCE

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

*Required introductory courses (3):* 207, 210, 211

*Basic methodology requirements (3):* EECS 110 or 111; PSYCH 201, 205

*Core course requirements (3):* 1 course from three of the following five areas:

- Artificial intelligence: EECS 348
- Cognitive neuroscience: PSYCH 212, 361
- Cognitive psychology: PSYCH 228
- Learning sciences: LOC 212, 301
- Linguistics: LING 250, 260, 270

*Advanced proseminar requirement (1):* 366 (should be taken in the junior year)

*Advanced electives (6):* 6 courses, with at least 3 in one area (major emphasis) and at least 2 outside that area

*Advanced proseminar requirement (1):* 366 (should be taken in the junior year)

*Advanced electives (6):* 6 courses, with at least 3 in one area (major emphasis) and at least 2 outside that area, chosen from

- Anthropology: ANTHRO 360; 389; 390; 395 or 595; 471
- Artificial intelligence: EECS 325, 337, 338, 348, 349, 432, 435 (certain sections of EECS 395 may also count

toward this area; contact the cognitive science program for an approved list)

- Cognitive neuroscience: PSYCH 312-2, 321, 324, 342, 358, 363, 364, 460, 470; CSD 303; 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 301 (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, 426

Other 300- and 400-level courses may be counted as advanced electives with consent of the cognitive science adviser. It is strongly recommended that students pursue independent study (399) in cognitive science or in one of the departments listed above, and it 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.

Cognitive science majors who wish to double major must show a minimum of 11 courses not counted in any other major(s). Courses used to meet the major requirements may not be double-counted toward a minor in another discipline.

### 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 course requirements (8 units)

- *Introductory courses*: 2 courses chosen from 207, 210, 211
- *Basic methodology courses*: 2 courses (at least 1 from outside a student's major area) chosen from PSYCH 201, 205; EECS 110, 111
- *Electives*: 4 courses chosen from at least two areas, at least 3 at the 300 level and at least 3 outside the major (for available areas, see the advanced electives for the major; at least 1 course must be from the courses listed below)  
Artificial intelligence: EECS 348  
Cognitive neuroscience: PSYCH 212, 361  
Cognitive psychology: PSYCH 228  
Learning sciences: LOC 301  
Linguistics: LING 250, 260, 270

### 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 Honors 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

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 the Western tradition, Northwestern's CLS program strongly encourages students to explore less traditional but equally crucial areas of research such as women's writing, the literatures of excluded or marginalized groups, and the texts of Asian, African, and other literatures outside the European and American canon.

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 in the CLS major pursue broadly based programs of literary study that may include work in a wide range of related disciplines. As part of their concentration, students are required to take at least 2 courses in a language other than English (exceptions to this rule are noted below).

Seven courses are required of all majors. They are meant to introduce students to the major texts and genres of the Western tradition from the ancient Greeks to the present; to make sure that students are acquainted with certain non-Western literatures and cultures; and to provide students with a range of theoretical approaches to literary texts in particular and the study of culture in general. The required senior seminar focuses on the writing of a substantial essay.

Majors in CLS declare a concentration by the spring of their junior year in consultation with an undergraduate program adviser. Students may concentrate, for example, on particular periods such as 18th-century literature or romanticism. They may combine their study of literature with interests in other disciplines such as philosophy or political theory. They may concentrate on the relationship between literature and other media — film or music, for example. A concentration should not focus on a single national literature or simply duplicate concentrations already available in other departments at Northwestern.

Students are encouraged but not required to write a senior honors thesis. The senior seminar, which is required of all majors, aims to help students write a major research paper, regardless of whether they pursue honors. Students who wish to qualify for honors should identify an honors adviser by the spring of the junior year. In addition to the senior seminar, honors students must enroll in at least 1 quarter of independent study, preferably during the winter. Senior theses are evaluated by the student's adviser and by at least one outside reader from the CLS faculty.

As of fall 2007, there is no application process for admission to the major.

### Requirements for all majors (14 units)

- 3 approaches to literature and culture courses (among the courses that may be used to fulfill

this requirement are 205, 206, 207, 280, and 281)

- 2 courses on literary genres (among the courses that may fulfill this requirement are 201, 202, 203, 204, and 210)
- 1 course in a non-Western literature
- 398
- 7 courses in a concentration; these must include
  - 2 or more 200- or 300-level courses on a nonanglophone literature taught in the original language. This requirement may be modified with the approval of the CLS director of undergraduate studies if the chosen major language does not offer instruction in literary texts at the 200 level (for example, Chinese and Arabic).
  - 4 or more courses at or above the 300 level in literature or in disciplines related to literary studies (for example, art history, film studies, gender studies, history, philosophy)

Examples of individual concentrations:

- Genres (novel, lyric, epic, etc.)
- Literature and related disciplines (literature and philosophy, literature and art history, literature and political theory)
- Literature in the context of other arts and media (such as film or music)
- Periods (Renaissance, romanticism, modernism, postmodernism, etc.)

### Double Major

Majors in comparative literary studies must show a minimum of 12 courses not double-counted in any other major(s).

### Study Abroad

The Program in Comparative Literary Studies encourages all majors who qualify to consider a year of study abroad as juniors.

### Courses Primarily for Freshmen and Sophomores

#### COMP LIT 201-0 The Epic in Cross-Cultural Perspective

Introduction to selected classics of the Western European literary tradition from Homer and Genesis to works from less distant time periods, with modern transformations of traditional themes.

#### COMP LIT 202-0 Introduction to the Novel: Theory and Practice

Exploration of what is particularly novelistic about novels, specifically how they conceive of the human personality, society, ethics, and life's meaning.

**COMP LIT 203-0 Introduction to Lyric Poetry** Understanding the basic lyric impulse. How lyric is related to music, visual art, and other literary forms. Comparative study of lyrics from a variety of national traditions and time periods.

**COMP LIT 204-0 Dramatic Practice** Introduction to forms, principles, and practices of the theater.

#### COMP LIT 205-0 Diaspora/Transnational Literatures and Cultures

Exploration of narratives produced by diasporic groups — displaced groups of people who retain a collective

sense of identity — and theories of diaspora in relation to other notions of identity (e.g., nation, race, etc.).

**COMP LIT 206-0 Literature and Media** Examination of the relationship between “literature” and “media” within Western culture, from Plato to the present, with particular focus on strategies of writing and representation and their relationship to problems of authority and power; material changes to the production of literature and technologies of transmission; and the impact of computer writing and imaging technologies 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. How critical theory grounds criticism systematically, disclosing the full range of the crisis to which any critical impulse responds. Investigation of various aspects of critical theory, from abstract concepts and particular works of art to concrete social conditions and current political forms.

**COMP LIT 210-0 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.

**COMP LIT 271-1,2,3,4 Japanese Literature in Translation** A set of four courses surveying Japanese literature from the eighth century to the present.

**COMP LIT 274-1,2,3 Introduction to Chinese Literature** Survey of Chinese poetry and fiction from the fifth century B.C. to the present.

**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.

**COMP LIT 276-0 African Literature in Translation** Continental African literature. Content varies. May be repeated for credit with different topic.

**COMP LIT 278-0 Modern Hebrew Literature in Translation** Introduction to the main works of contemporary Israeli writers.

**COMP LIT 279-0 Modern Jewish Literature** A study of modern European, American, and Israeli Jewish literature in its historical context.

**COMP LIT 280-0 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 281-0 From Modernism to Postmodernism in Literature, Theater, and Film** This course follows the trajectory of 20th-century literature, theater, and film from the various modernisms that held sway in Europe up to World War II to the postmodernism that pervades contemporary culture in Europe, the United States, and beyond.

### Courses Primarily for Juniors and Seniors

Comparative literary studies and language majors read the texts and are tested in their language or area of expertise whenever the course material allows.

**COMP LIT 301-0 Writing in Society** Studies in relations between literature and society through a series of theoretical readings in the sociology of literature, juxtaposed with literary examples from different societies.

**COMP LIT 303-0 Literature and History** Studies in the historicity of literature, with attention to the development of literary forms over time and to the historical circumstances in which literature is produced.

**COMP LIT 310-0 Studies in Literary Genres** Selected genres, such as epic, pastoral, autobiography, comedy, satire, the essay. May be repeated for credit with different topic.

**COMP LIT 312-0 Studies in Drama** Content varies. May be repeated for credit with different topic.

**COMP LIT 313-0 Studies in Fiction** Content varies. May be repeated for credit with different topic.

**COMP LIT 362-1,2,3 Modern Drama** 1. Major developments from the late 19th century to the end of World War I.

2. 1920s–1950s. 3. From absurdist theater to the present.

**COMP LIT 365-0 The Avant-Garde** Nature, origins, and development of the avant-garde movements in Europe, North America, and Latin America since the early 20th century.

**COMP LIT 375-0 Literature and the Arts** Differences and similarities between literature and the visual arts and/or music. 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)

### Related Courses in Other Departments

For descriptions of the following courses in literature in translation, consult the relevant department listings.

CLASSICS 244, 245, 340, 345

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

### COMPUTING AND INFORMATION SYSTEMS

The Program in Computing and Information Systems offers students in Weinberg College the opportunity to study computer science within the context of the college's

focus on liberal arts and sciences, as distinct from the engineering context offered by the Department of Electrical Engineering and Computer Science in the McCormick School of Engineering and Applied Science. Faculty and courses for the program are drawn from the McCormick department. Courses and research address the underlying theories, enabling technologies, and applications of modern computer science. There is a strong focus on the design, implementation, and evaluation of software systems, including interactive distributed multimedia, artificial intelligence, robotics, and database systems. Research is highly interdisciplinary, including important links with the Cognitive Science Program and the Department of Psychology in Weinberg College, the Department of Learning Sciences in the School of Education and Social Policy, and the Departments of Communication Studies and Radio/Television/Film in the School of Communication. Undergraduates are encouraged to join the department's ongoing research projects. For more information on the Department of Electrical Engineering and Computer Science and its course offerings, see the McCormick School section of this catalog.

The major in computing and information systems is highly flexible, emphasizing the interdisciplinary study and project work that are critical in a field as rapidly changing as computer science. The specific courses to be taken are largely determined by the goals and interests of individual students. The major includes a 2-quarter capstone project that helps integrate the skills and knowledge acquired in course work.

The excellent computing facilities available to students are linked to the Northwestern network's high-speed Internet connection. The Wilkinson Computing Lab includes several powerful Sun and Red Hat Enterprise Linux servers, 28 high-performance Sun Solaris workstations, and 15 Windows XP PCs. Software packages for graphics, CAD, circuit design and simulation, database, and other purposes are available. The Teaching Lab (TLab) has 16 high-end PCs connected to a storage server on a private network. The PCs dual boot Linux and Windows XP and have a wide range of software. With powerful graphics cards attached to large LCD displays, they are used in many courses. As an adjunct to the TLab, WiFi and camera-enabled Pocket PC handheld computers may be checked out with faculty approval. Finally, the Virtual Lab (VLab) is a cluster of computers that support virtual machine-based computing for use in classes and independent student projects on experimental computer systems.

## Major in Computing and Information Systems

### Program courses

- *Introductory sequence:* EECS 111, 211, 213, 311; students without prior programming experience may wish to take 110 before 111
- *Intermediate and advanced courses:* 7 EECS courses at or above the 200 level (excluding 317)

- *Additional advanced technical courses:* 2 courses chosen from the advanced computer science list, the computer science mathematics list, and/or the computer science external technical elective list (see the program director for up-to-date information on suitable courses in this category)
- *Advanced electives:* 2 courses chosen with the consent of the student's adviser (examples of appropriate courses include advanced courses in computer science; social sciences such as psychology, economics, and learning science; mathematics; natural sciences such as biological sciences, chemistry, and physics; and other disciplines such as radio/television/film, journalism, and music)
- *Project courses:* 2 courses requiring substantial project work — e.g., EECS 394 or 399 (the project or projects developed in these courses must be approved by the student's adviser as well as the course instructor in order to fulfill the program requirements)

### Required related courses

MATH 220 and 224 *or* 212, 213, and 214

MATH 230, 240, and 310-1 or equivalent

## Computing and Information Systems 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 computing and information systems through a curriculum tailored specifically to their needs.

### Program courses

- *Introductory sequence:* EECS 111, 211, 213, 311
- *Intermediate and advanced courses:* 6 EECS courses at or above the 200 level (excluding 317)
- *Project courses:* 2 quarters of ISP 398 or 2 quarters of EECS 399 (projects developed in these courses must be approved by the student's advisers in both ISP and the Computing and Information Systems Program in order to fulfill the program requirements)

## Minor in Computing and Information Systems

The program offers a minor in computing and information systems for students who wish to develop a strong competence in computer science while majoring in another area. Students choosing this minor are expected to have completed MATH 220 and 224 (or 212, 213, and 214), 230, and 240, which are prerequisites for most computer science courses.

### Minor course requirements (9 units)

- *Introductory sequence:* EECS 111, 211, 213, 311; students without prior programming experience may wish to take 110 before 111
- *Intermediate and advanced courses:* 5 EECS courses at or above the 200 level (excluding 317)



## CRITICAL THEORY

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 course 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; and 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 at [www.wcas.northwestern.edu/complit](http://www.wcas.northwestern.edu/complit); examples from this list include PHIL 390, FRENCH 396, GERMAN 314, and POLI SCI 390)

## DRAMA

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 the program’s director.

### Major in Drama

#### Program courses

*Introductory courses:* 2 units from the following sets of courses, 1 from Weinberg College and 1 from the School of Communication:

- Weinberg College: ENGLISH 212, 234
- Communication: GEN CMN 103, PERF ST 210-3, THEATRE 140-1,2, 143

*Major courses:* 12 courses, with a minimum of 9 300-level courses; to maintain a balance between literary and theatrical approaches to the study of drama, no more than 7 courses should be from one school

- At least 6 units must be in the history and criticism of drama, including 3 units in drama before 1850 (but not all in Shakespeare) and 2 units in drama after 1850. Eligible courses include the following:  
AF AM ST 259, 379  
CLASSICS 345  
COMP LIT 362-1,2,3  
ENGLISH 312, 332, 334-1,2, 339, 342  
FRENCH 272, 279  
GERMAN 324  
ITALIAN 202  
SLAVIC 318, 369  
SPANISH 321  
THEATRE 307, 345-1,2,3, 354, 365-1,2, 366, 367, 368, 374
  - At least 3 units must be in performance practices:  
PERF ST 216, 224, 307-1,2, 309-1,2,3, 318, 324-1,2, 326-1,2, 330  
THEATRE 241-1,2,3, 243-1,2, 312, 340-1,2, 341-1,2,3, 346-1,2, 347-1,2, 348-1,2
  - 1 unit must be an advanced seminar, normally a 400-level course approved by the program director.
- Related courses:** 4 units at the 200 or 300 level in subjects related to the study of drama; must be approved by the program director; applicable areas include aesthetics, art history, criticism, film, history, humanities, music, literature, and sociology of culture

### Honors in Drama

Seniors with distinguished records in major courses who wish to be candidates for honors in the program 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 under Academic Policies earlier in this section of this catalog.

### 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 (formerly Geological Sciences)

The earth and planetary sciences study the complex interacting physical, chemical, and biological processes that have shaped the earth and other planets throughout history and will control their environmental conditions into

the future. They therefore address fundamental scientific questions with crucial importance 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, as well as time periods from the early history of the earth and solar system to present-day processes to predictions of future events. Upper-level courses address both internal processes of the earth and other planets (such as earthquakes and volcanoes) and surface processes that regulate environmental conditions in the oceans, on land, and in the atmosphere.

The goal of the Department of Earth and Planetary Sciences is to train scientists who will 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. The earth system science track is designed to provide a structured overview of the discipline. The geological science track 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: Earth System Science*

##### **Prerequisites**

- CHEM 101, 102, and 103 or 171 and 172
- MATH 220 and 224 (or 212, 213, and 214) and 230
- PHYSICS 135-1,2,3
- 2 additional courses in math, science, or social science, 1 of which may be 326

##### **Core courses**

- 3 200-level courses: 201, 202, and 203
- 5 300-level courses: 300, 310, 320, 330, and 340

##### **Research**

- 1 quarter of 398 or 399

#### *Track 2: Geological Science*

##### **Prerequisites**

- 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

##### **Core courses**

- 3 200-level courses: 201, 202, and 203
- 4 300-level courses, chosen from 300, 310, 320, 330, and 340

##### **Research**

- 1 quarter of 398 or 399

### Minor in Earth and Planetary Sciences

The minor in earth and planetary sciences 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 course requirements (6 units)**

- 201 and 202
- 4 300-level courses in the department; 398 and 399 will not be credited toward the minor

### 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 only recommends students for this program; final acceptance is made 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)

See Accelerated Master's Programs in the Undergraduate Education section of this catalog and consult with a department adviser.

### Honors in Earth and Planetary Sciences

Graduation with honors in earth and planetary sciences requires completion of a research project. For more information, consult the director of undergraduate studies. See also Honors under Academic Policies earlier in this section of the catalog.

## 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.

## 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 67 and at [www.wcas.northwestern.edu/evolution](http://www.wcas.northwestern.edu/evolution).

With the change in the departmental name, course codes have been changed from GEOL SCI to EARTH, and upper-level courses have been renumbered. Previous designations are in parentheses in the course listings.

## Courses Primarily for Freshmen and Sophomores

**EARTH 101-0 Earth Systems Revealed** Minerals, rocks, and structures of the earth's crust; processes that modify the earth's surface; techniques used to reconstruct and interpret geologic history. Lectures, laboratory, weekend field trip.

**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 Introduction to the Solar System** Origin of the solar system, accretion and differentiation of the earth, early history of the moon, abundance of elements, geologic time. Lectures and discussion.

**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 Surface Processes** Introduction to fundamental earth processes and their products, with emphasis on surface processes and the climate system. Field trip. Prerequisites: CHEM 103 and MATH 220 or equivalents.

**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 103 or equivalents.

**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 or equivalent.

## Courses Primarily for Juniors and Seniors

**EARTH 300-0 (GEOL SCI 302-0) Mineralogy and Petrology** Origin, composition, and properties of earth materials from the crust to the core. Mineralogy from the atomic level to tectonic settings. Evolution of the igneous and metamorphic rocks. Rock textures, compositions, mineral assemblages, phase diagrams, and analytical techniques. Prerequisites: 201 or CHEM 103, MATH 220, and PHYSICS 135-1.

**EARTH 301-0 (GEOL SCI 350-0) 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. Prerequisites: CHEM 103, MATH 230, and PHYSICS 135-1.

**EARTH 310-0 Introductory Aqueous Geochemistry** The geochemistry of rivers, groundwater, lakes, and seawater. Topics include the hydrologic cycle and water resources, acids and bases, pH and alkalinity, carbonate equilibria, redox chemistry, sorption processes and surface reactions, mineral solubility and weathering, and reaction kinetics. Prerequisites: CHEM 103 or equivalent.

**EARTH 311-0 (GEOL SCI 316-0) Sedimentary Geochemistry** Formation and diagenesis of carbonates; geochemistry of organic matter; petroleum formation; evaporite precipitation; paleoenvironmental reconstruction; isotope, organic, and trace and major element geochemistry. Prerequisites: 201, 330, and CHEM 103 or equivalents.

**EARTH 312-0 (GEOL SCI 318-0) 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. Prerequisites: 201, 311, and 315.

**EARTH 313-0 (GEOL SCI 327-0) 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. Prerequisites: 202 and CHEM 103 or consent of instructor.

**EARTH 314-0 Organic Geochemistry** The origin, modification, and preservation of organic matter in the sedimentary record; the role of organic matter in the global carbon cycle; implications of carbon cycling for climate change. Prerequisites: 201, 202, and 1 quarter of chemistry.

**EARTH 315-0 (GEOL SCI 301-0) 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.

**EARTH 320-0 (GEOL SCI 325-0) 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.

**EARTH 321-0 (GEOL SCI 309-0) Reflection Seismology** Acquisition, processing, and interpretation of reflection data. Hydrocarbon prospecting, structural geology, tectonics, stratigraphy, and deep continental reflection profiling. Prerequisites: 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: MATH 250 and PHYSICS 135-2.

**EARTH 324-0 Earthquakes and Tectonics** Earthquakes: location, characteristics, origin, mechanism, and relation to plate motions; seismic hazard. Prerequisites: MATH 250 and PHYSICS 135-2.

**EARTH 325-0 (GEOL SCI 329-0) 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 (GEOL SCI 328-0) 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. Prerequisite: MATH 250.

**EARTH 328-0 (GEOL SCI 307-0) 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 equivalents.

**EARTH 330-0 (GEOL SCI 313-0) 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 equivalent.

**EARTH 331-0 (GEOL SCI 319-0) Field Problems in Sedimentary Geology** Field methods in stratigraphy and sedimentology; interpretation of depositional systems and development of facies models based on field observations. Continuation of 330; 2½-week field trip to Colorado and Utah in early to mid-September, returning in time for beginning of fall classes. Prerequisite: 330.

**EARTH 340-0 (GEOL SCI 317-0) 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: 101, 106, 111, BIOL SCI 103, 210-1, or consent of instructor.

**EARTH 350-0 (GEOL SCI 315-0) 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 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.

## ECONOMICS

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, 230, or 232, all of which majors are strongly urged to take. 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.

## Departmental courses

*Introductory courses:* 201, 202, 281

*Intermediate theory courses:* 310-1,2, 311

*Field courses:* 6 additional 300-level courses

**Related courses:** MATH 220 (or 212 and 213), STAT 210, and 3 additional courses in the social sciences, mathematics, or statistics, no more than 1 at the 100 level; 260 may be taken in partial fulfillment of this requirement

## 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 course requirements (8 units)

*Introductory courses (3):* 201, 202, 281

*Intermediate theory courses (2):* 310-1; 310-2 or 311

*Field courses (3):* 3 additional 300-level courses

## 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 and should see Accelerated Master's Programs in the Undergraduate Education section of this catalog.

## 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 under Academic Policies earlier in this section of the catalog.

## 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 section 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 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: 201, 202, or consent of instructor.

**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 or 232.

**ECON 317-0 Topics in Economic Demography** The economics of fertility, migration, population growth, and demographic changes. Topics may include immigration, illegal migration, the baby boom, aging, retirement, and female labor force participation. Prerequisites: 281, 310-1, 311.

**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 321-0 African American Economic History** Economic experiences of African Americans as slaves and free people in the pre-Civil War period and in post-Civil War agriculture. South-North migration, urbanization, civil rights movements, and global economic competition. Prerequisites: 281, 310-1, 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 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 macroeconomic 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 Introduction to Mathematical Economics**

1. Noncooperative game theory, with applications to industrial organization, auctions, and theories of the firm. Prerequisites: 310-1,2; 311; MATH 224 and 230 or 232.

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: STAT 210 or equivalent, 310-1, 311; MATH 224 and 230 or 232. **2.** Hypothesis testing, estimation with deficient data, distributed lags, panel data, simultaneous equation systems, limited dependent variables. Prerequisite: 381-1.

**ECON 383-0 Economic Forecasting** Techniques for making and evaluating economic and business forecasts, including univariate regressions, autoregressive and ARMA models, vector autoregressive models, and structural econometric models. Prerequisites: 281, 310-1, 311.

**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 or 232.

**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 or 232; at least four 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

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 medicine, law, and

business as well as in 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 and drama, comparative literature, and American, African American, Asian American, 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 also notable holdings in African literature. English majors also often profit from the University's study abroad programs, particularly at the University of Sussex in England. 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's web site at [www.english.northwestern.edu](http://www.english.northwestern.edu). 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's 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*

#### Departmental courses

*Introductory courses (2):* any 1 of 210-1, 210-2, 270-1, or 270-2, followed by 298

#### *Major courses (11)*

- the remaining part of introductory series 210 or 270 (210-1, 210-2, 270-1, or 270-2, as appropriate)
- 10 courses other than the second half of the introductory series
- 9 of the 10 courses at the 300 level or above
- at least 8 of the 10 courses in the English department, 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 of the 10 courses must deal substantially with texts written before 1798, and at least 3 with texts written after 1798
- at least 1 of the 10 courses in American literature

- at least 1 of the 10 courses in literary criticism or theory
- Related courses (2):** 2 courses in fields outside of literature but still related to the student's demonstrated interests within the major (specific listings are available in the department office and on the department's web page)

### *English Major in Writing*

Students in English 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 and fiction within a context of general literacy.

Students may apply for admission to the writing major through the department in early spring of each year.

## Departmental courses

*Introductory courses (2):* 206 (required) and 207 or 208

#### *Major courses (11):*

- 1 yearlong theory and practice sequence: 393-F,W,T,S, 394-F,W,T,S, or 395-F,W,T,S
- 392
- 207 (if the student has already taken 208) or 208 (if the student has already taken 207)
- 6 300-level English department literature courses, including at least 2 that deal with works written before 1798, and at least 2 with works written after 1798

**Related courses (2):** 2 courses in fields outside of literature selected with the advice and consent of the student's writing major adviser; courses that provide a broad historical background for the study of literature are recommended

## Minors in English

The department offers both a minor in literature and a minor in writing; both offer experience in reading literary texts and writing critical analysis. Students pursuing either minor will be permitted to preregister in the department after declared English majors do so.

### Minor in literature (7 units)

- 3 200-level courses: either 210-1,2 or 270-1,2, followed by 298
- 4 300-level courses, 2 of which must deal with pre-1798 literature and 2 with post-1798 literature; 1 of these 4 courses may be in comparative literary studies

### Minor in writing (7 units)

- 206 and 207 or 208
- 1 advanced writing sequence, either 393, 394, or 395 (counting as 3 units); and 2 300-level English



department literature courses, 1 on literature before 1798 and the other on literature after 1798 (admission by application only to advanced writing sequences)

## 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 under Academic Policies earlier in this section.

All literature majors are encouraged to write at least one 12- to 15-page essay in their upper-division course work. Weinberg College's interdisciplinary junior research seminars and independent study courses, as well as designated 300-level English courses, offer the opportunity to complete substantive research papers.

### *Honors in Writing*

Writing majors who complete the yearlong writing sequence and wish to pursue honors may apply to the 2-quarter senior honors program (398-1 and 399). All students admitted are expected to produce an honors-level creative writing project in poetry, fiction, creative nonfiction, or literary translation. A member of the writing major faculty directs the honors seminar, while individual students work directly with a writing faculty member assigned to them.

Admission to the honors program in writing is competitive. Eligible students must have a minimum 3.5 GPA in English department course work and must have demonstrated the seriousness, dedication, and discipline needed to complete an ambitious and sustained project.

## 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 section 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 writing arts program.

## 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.

**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.

**AF AM ST 210-1,2 Survey of African American Literature**  
See African American Studies.

**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.

**AF AM ST 259-0 Introduction to African American Drama**

See African American Studies.

**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.

**ENGLISH 298-0 Introductory Seminar in Reading and Interpretation** Close reading of literary works in the light of various perspectives in literary study. Prerequisites: 210-1,2 or 270-1,2; students may take 298 concurrently with 210-2 or 270-2.

## 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 307-0 Advanced Creative Writing** For nonwriting majors with previous formal training in creative writing. May be repeated for credit with different topic. Admission is by consent of department.

**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.

**COMP LIT 362-1,2,3 Modern Drama** See Comparative Literary Studies.

**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 378-0 Studies in American Literature** Content varies.

**COMP LIT 383-0 Special Topics in Theory** See Comparative Literary Studies.

**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 392-0 The Situation of Writing** The sociology of writers, writing, publication, dissemination of literature, and reading.

**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 form 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 Senior Honors Seminar** (writing major)

Fall quarter. For seniors preparing an honors manuscript in the writing major. Students pursue individual projects under the direction of a faculty adviser and the writing major honors coordinator. Admission by application.

**ENGLISH 398-1,2 Senior Honors 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**

The Environmental Policy and Culture Program 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 that fulfill the minor's requirements come from many different departments and 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.

Weinberg College requirements do not generally allow a student to count the same course toward both a major and a minor requirement. Students declaring a minor in environmental policy and culture should discuss the double-counting rule with the program director.

**Minor in Environmental Policy and Culture**

A list of courses counting toward the minor in environmental policy and culture is available from the program. Minors may choose to concentrate in the humanities or the social sciences. The 7 courses counted toward the minor may include any mix of courses from these different categories, subject to the restrictions listed below.

- At least 2 courses chosen from the following:

HISTORY 215

PHIL 268

RELIGION 261

POLI SCI 367

GEOG 211

- At least 1 natural sciences course chosen from the following:

BIOL SCI 204, 345, 346, 347

CIV ENG 206, 360 (see the McCormick School section of this catalog)

EARTH 111

GEOG 235

- At least 4 of the 7 courses at the 300 level
- Because the minor is meant to include a focus on the humanities and social sciences, no more than 2 courses from the natural sciences list will be automatically approved for the minor. Exceptions to any of the above restrictions must be approved by the program director.

## ENVIRONMENTAL SCIENCES

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 coadministered 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.

### 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.

#### Foundations in science and math (9 or 10 units)

- CHEM 101, 102, and 103 *or* CHEM 171 and 172
- MATH 220 and 224 *or* 212, 213, and 214
- 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

#### Core curriculum (3 units)

- 201, 202, 203

#### Senior-year research (2 units)

- 398-1,2 *or* CIV ENG 398-1,2

#### Advanced studies (6 units)

- 6 courses including 4 at the 300 level

Course selections vary depending on the track: 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 ENG 358, 359, 360, 361, 363, 364, 366, 367, 370  
 EARTH 201, 311, 312, 315, 330, 331, 340  
 GEOG 211, 235, 341, 343  
 PHYSICS 301

#### Environment and society list

390  
 ANTHRO 306, 310, 383  
 ECON 370  
 GEOG 328  
 HISTORY 215  
 PHIL 268  
 POLI SCI 349, 367, 371  
 SOCIOL 312

### Second Major in Environmental Sciences for Integrated Science Program 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

### Advising and Course Selection

As soon as students have declared a major in environmental sciences, they should consult with the environmental sciences adviser to plan their 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.

## 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.

**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.

**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.

## 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.

## EUROPEAN STUDIES

The origins of Europe as a geopolitical and cultural entity are not easy to define. Did a distinctively European culture and identity first come into being with the coronation of Charlemagne in 800? With the conversion of the Slavic and Scandinavian peoples to Christianity? Or, conversely, with the shattering of Christendom in the wake of the 16th-century Reformation? In our own day, particularly since the collapse of the Soviet empire in 1989, the rapidly accelerating economic and political unification of Europe has cast a new light on such questions. The major in European studies is an interdisciplinary program that gives attention to both humanities and social sciences and can readily accommodate a focus on history, politics, economics, literature, philosophy, or art. Students normally apply for the major in the spring quarter of their freshman or sophomore year. The European studies major culminates in the writing of a senior thesis.

### Major in European Studies

The history of European civilization sequence HISTORY 201-1,2 is prerequisite for all European studies majors. Majors also are expected to achieve proficiency in a European language other than English. To this end, requirements for the major include 2 300-level courses in a foreign language or its literature taught in the foreign language. These courses may be taken during study abroad. Students who demonstrate exceptional linguistic competence may take the courses in two different languages.

Those who also complete a major or minor in a language department will automatically have met this requirement.

Students who enter the major as freshmen will be encouraged to spend either their whole junior year or the full term of that year in the European country of their choice. In cooperation with the Institut d'Etudes Politiques de Paris (Sciences Po), Northwestern sponsors a study abroad program on the European Union in Paris. This is only one of several study abroad programs appropriate for European studies majors. Those who enter the major at the end of their sophomore year will be encouraged to complete a summer study abroad program between their junior and senior years. Ideally, majors study in non-English-speaking countries, though selected programs in Great Britain (e.g., at the London School of Economics or the University of Edinburgh) are also appropriate.

### Major course requirements

- 301-1,2,3; 390-1,2,3
- HISTORY 201-1,2
- 6 additional courses dealing with Europe, at least 4 at the 300 level
- 2 300-level language/literature courses taught in a continental European language
- With the exception of the 2 300-level language courses, none of the above courses may be double-counted toward the European studies major and another major.

## Courses

**EUR ST 301-1,2,3 Sequence for Majors** A yearlong sequence of seminars focused on a broad theme. The seminars integrate methods and materials from different disciplines. Limited to 15 students.

**EUR ST 390-1,2,3 Senior Thesis Seminar** Guided independent research and the writing of a senior thesis under the direction of a faculty adviser and honors coordinator. K grade given pending thesis completion.

## FILM AND 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.

### Minor in Film and Media Studies

Students must formally apply to minor in film and media studies in the School of Communication's Department of

Radio/Television/Film. Applications may be submitted as early as spring quarter of freshman year.

### Minor course requirements (7 units)

- RTVF 220 (see the School of Communication section of this catalog)
- COMP LIT 206
- 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 web site at [www.communication.northwestern.edu/rtf/programs/undergraduate/fms](http://www.communication.northwestern.edu/rtf/programs/undergraduate/fms). Other courses also may be counted toward the minor with the approval of a film and media studies adviser.

## FINANCIAL ECONOMICS

See Financial Economics in the Cross-School Programs section of this catalog for description of the new Kellogg School of Management certificate program.

## FRENCH AND ITALIAN

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

The program for majors in French studies consists of 15 quarter-courses; at least 11 must be at the 300 level. Courses at a level lower than 202 do not count toward the major. Students may count up to 4 200-level courses toward the major. Of the 15 courses, up to 2 may be French department courses taught in English. All majors must take 2 courses in 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. All majors must take 396 and 397 during their senior year.

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 2 units of senior seminar.

### 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. Except for a possible course at the 300 level, all courses are conducted in French, with class discussion and papers also in French.

Students choosing to minor in French are assumed to have completed 201 or the equivalent.

### Minor course requirements (9 units)

- up to 4 200-level courses: 2 chosen from 202, 203; 210 or 211; 271 or 272
- at least 5 300-level courses: 2 or 3 chosen from 301, 302, 303, 305, 309, or 391-1,2; 2 or 3 other courses in literature or civilization, 1 of which may be a French department course taught in English (309 may be counted either as a language course or as a literature/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 consult with the department chair and should refer to Accelerated Master's Programs in the Undergraduate Education section of this catalog.

### 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 or, with consent of the instructor, in a graduate seminar. These courses will count toward the 15 required credits for the major. See Honors under Academic Policies earlier in this section of the catalog.

### 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 section 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 Undergraduates

**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 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 210-0 Introduction to French and Francophone**

**Literature** Study of texts illustrating various genres from the Middle Ages to the present such as poetry, drama, fairy tale, novel, and autobiography. Prerequisite: 202, AP score of 5, or consent of instructor.

### **FRENCH 211-0 Introduction to French and Francophone**

**Cultures** Introduction to French and/or francophone cultures through study and analysis of major themes, issues, and debates. Prerequisite: 202, AP score of 5, or consent of instructor.

### **FRENCH 271-0 Introduction to the French and Francophone**

**Novel** Fundamental concepts and significant achievements of the novel in French. Prerequisite: 210, 211, AP score of 5 in literature, or consent of instructor.

### **FRENCH 272-0 Introduction to French and Francophone**

**Theater** Basic concepts and representative works of French and/or francophone theater. Principles of tragedy and comedy; contemporary developments. Prerequisite: 210, 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 277-0 Literature of Existentialism** Existentialism in its literary, philosophical, and cultural manifestations.

### **FRENCH 278-0 Introduction to the French and Francophone**

**Novel** 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 Introduction to French and Francophone**

**Theater** 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 375-0 French and Francophone Film**

Topics in French cinema: for example, French classical cinema, the New Wave, postcolonial French film, the cinema of Marguerite Duras.

**FRENCH 376-0 Topics in Gender and Sexuality** Major trends and perspectives in gender studies such as first- and second-wave feminisms, lesbian writers, AIDS literature, and queer theory. Content varies; topics covered previously include gender and orientalism, cross-cultural feminisms.

**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 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 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 consent of instructor.

**FRENCH 316-0 The Contemporary Francophone World** Study of literary texts from the 20th and 21st centuries with emphasis on their philosophical, literary, and cultural contexts. Prerequisite: 271, 272, 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 consent of instructor.

**FRENCH 322-0 Medieval French Narratives** Major narrative works of the French Middle Ages in historical context. Content varies; topics covered previously 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 consent of instructor.

**FRENCH 335-0 Topics in 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 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 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 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 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 consent of instructor.

**FRENCH 350-0 The Novel in French** Content varies. Topics covered previously include the novel of the ancien régime, the psychological novel, and the Bildungsroman in France. Prerequisite: 271, 272, 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 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 consent of instructor.

**FRENCH 362-0 Popular Fictions** Popular genres such as the detective novel, fairy tales, utopian novels, science fiction, and *la bande dessinée* considered in historical context. Prerequisite: 271, 272, or consent of instructor.

**FRENCH 364-0 African Literatures and Cultures** Major issues, trends, and authors from francophone Africa, including North African and sub-Saharan African writers. Content varies; topics covered previously include Shahrazade, narratives of gender relations in francophone African fiction, and mysticism and francophone African fiction. Prerequisite: 271, 272, or consent of instructor.

**FRENCH 365-0 Caribbean/African Literatures and Cultures** Major issues, trends, and authors from the francophone Caribbean and its diasporas. Content varies; topics covered previously include creolization in Caribbean women writers; slavery, history, and memory; Caribbean identities. Prerequisite: 271, 272, or consent of instructor.

**FRENCH 366-0 Southeast Asian Literatures and Cultures** Major issues, trends, and authors from francophone Southeast Asia and its diasporas. Content varies; topics covered



previously include francophone Vietnamese literature and Vietnam/Indochine in fiction and film. Prerequisite: 271, 272, or consent of instructor.

**FRENCH 367-0 French and Francophone Theater** Major figures and movements in French and francophone theater. Prerequisite: 271, 272, 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 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 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 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 consent of instructor.

**FRENCH 390-0 Topics in Culture** Topics, issues, and questions in French and francophone culture. Content varies — for example, French and francophone cinema, the intellectual in France. May be repeated for credit with different topic. Prerequisite: 271, 272, or consent of instructor.

**FRENCH 391-1,2 Theory and Practice of Translation** Intensive, advanced, 2-quarter course integrates previously acquired skills through the comparative study and translation of English and French. Culminates in individual translation project in second half of second quarter. Prerequisite: 301, 302, study abroad, or consent of instructor.

**FRENCH 396-0 Contemporary French and Francophone Thought** 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**

The program for majors in Italian literature and culture consists of 14 courses, of which at least 10 must be offered by the Italian department; up to 4 others may be courses dealing with Italian culture offered by other departments, including 1 or more courses on literary theory. Courses taken outside the department must be approved by the director of undergraduate studies. Of the 10 courses taken

in the Italian department, no more than 5 may be courses taught in English. Of the 14 courses required for the major, at least 8 must be at the 300 level; 100-level courses do not count toward the major.

Students returning from a study abroad program in Italy may receive up to 8 credits (depending on program length) if the content of the courses taken abroad relates in a substantive way to some aspect of Italian culture. All returning students must take 2 300-level courses in Italian in their senior year.

### **Minor in Italian**

The minor in Italian consists of 7 courses, of which at least 4 are at the 300 level. No more than 3 courses may be Italian courses taught in English. 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 to do honors work no later than the spring quarter of their junior year. They should also 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 under Academic Policies earlier in this section of the catalog.

### **Courses Taught in Italian**

Prerequisites for all 300-level courses taught in Italian: 2 200-level courses in Italian or equivalent.

**ITALIAN 101-1,2,3 Elementary Italian** Pronunciation, grammar, composition, reading, and conversation. Drill in language laboratory. Five class meetings a week.

**ITALIAN 102-1,2,3 Intermediate Italian** Grammar review, conversation, composition, and readings in modern prose and drama. Four class meetings a week. Prerequisite: 101-1,2,3 or equivalent.

**ITALIAN 133-1,2,3/134-1,2,3 Intensive Italian** This 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.

**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** Practice in spoken Italian through a survey of various performance arts in Italian culture. Content may vary: for example,

Italian theater, Italian opera, 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 for students who have completed the Weinberg College language requirement. Course content may vary, focusing on reading, comprehension, and interpretive skills. Prerequisites: 102-3 or equivalent proficiency.

**ITALIAN 301-0 Italian through Cinema** An analytic approach to the language of cinema through a detailed reading of selected films and their scripts. Emphasis on colloquial and dialectal Italian. Students produce script or film treatment at the end of the quarter.

**ITALIAN 302-0 Italian through Translation** An intensive workshop meant to improve spoken and written Italian through the practice of translation.

**ITALIAN 303-0 Reading Italian Cities** An approach to Italian culture and civilization through an exploration of representative Italian cities.

**ITALIAN 304-0 Modern Italian Cultural Studies** Culture of Italy from World War II to the present. Novels, films, popular culture.

**ITALIAN 305-0 The Future of Tradition** Italian cultural traditions as seen in major works from the Middle Ages to the present.

**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. Prerequisite: 102-3 or equivalent proficiency.

**ITALIAN 399-0 Independent Study** Independent reading under supervision. Consult the director of undergraduate studies.

## Courses with Reading and Discussion in English

No prerequisites in Italian.

**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.

**ITALIAN 270-0 The Arts in Renaissance Italian Culture** A multidisciplinary survey exploring the development of a wide variety of artistic traditions in Italian culture, including painting, sculpture, architecture, music, opera, fashion, and design.

**ITALIAN 275-0 Dante's *Divine Comedy*** Introduction to the *Divine Comedy*, its artistic and intellectual achievement, and its cultural and historical context.

**ITALIAN 290-0 Memory, Exile, and the Italian Diaspora** The theme of exile in Italian culture; the memory of Italy as it survives in the Italian diaspora, inside and outside Italy.

**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, intellectuals and politics from D'Annunzio to Pasolini, feminist Italian fiction, Calvino, Eco, and the postmodern.

**ITALIAN 370-0 Mapping Italian Literature** Major texts of Italian literature read in the context of European and world literature. Content varies — for example, Leopardi and European romanticism; Calvino, Borges, and Pynchon; the Theater of Memory; Svevo and Joyce; futurism.

**ITALIAN 375-0 Topics in Italian Culture** Content varies — for example, perspectives in the Renaissance, Leonardo's method, the Baroque imagination, body and sexuality in Italian culture, Italian women writers, fascism and culture, philosophy and literature.

**ITALIAN 380-0 Topics in Italian Cinema** Introduction to major Italian filmmakers and cinematic trends.

## GENDER STUDIES

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 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

Since the gender studies major is an adjunct major, students majoring in gender studies must also fulfill the requirements of another major in Weinberg College or another school in the University. The major in gender studies must show a minimum of 9 courses not double-counted in any other major.

## Program courses (at least 11 units)

*Core courses (3):* 3 courses selected from 210, 230, 231, 240, 250, and SOCIOL 216

*Electives (8):* 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; and completion of either a senior thesis (398 and 399) or 1 additional 300-level course. Students who complete a senior thesis may be nominated for departmental honors.

Examples of courses that fulfill the elective requirement include but are not limited to the following:

- AF AM ST334
- ANTHRO 354
- FRENCH 384
- MUSICOL 340 (see the School of Music section of this catalog)
- PERF ST 307 (see the School of Communication section of this catalog)

## Minor in Gender Studies

Students may earn a minor in gender studies while pursuing a departmental major in any undergraduate school. Students qualify for the minor by satisfactorily completing the requirements listed below and presenting a minimum of 5 courses not double-counted in their majors.

### Minor course requirements (7 units)

- 2 core courses chosen from 210, 230, 231, 240, 250, and SOCIOL 216
- 5 electives chosen in consultation with an adviser in the Gender Studies Program; at least 3 courses must be at the 300 level; 3 must be gender studies courses; the remaining 2 may be gender studies courses or courses from any department cross-listed under gender studies (for sample electives, see the list under Adjunct Major in Gender Studies)

## 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 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 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 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 391-0 Writing Women's Lives** Seminar launching each student on a research project that illuminates the life of a woman or group of women. Exploration of archives, theories of the self, and historical contexts. Prerequisite: consent of instructor.

**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: one 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

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 a 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.

### Major in Geography

*Program courses:* 211 or 235; 240; 341; and 3 additional geography courses, including 1 unit of research (399)

*Related courses:* ECON 201, 202; MATH 220, 224; 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. In addition to the courses listed below, students choosing to minor in geography must complete MATH 220 and 224 or equivalent and STAT 210.

#### Minor course requirements (6 units)

- 211 or 235, 240, 341
- 3 additional courses approved by the geography program adviser

### 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.

## GEOLOGICAL SCIENCES

The Department of Geological Sciences has changed its name to Earth and Planetary Sciences.

## GERMAN

The Department of German offers courses in three separate tracks, 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 (to fulfill the college language requirement, to continue their German studies in the department, or both) an opportunity to use a variety of audiovisual materials and cultural and literary readings that expose them to different styles of written and spoken language and to the culture and people of German-speaking countries.
- Provide German majors and minors with a course of study in language, literature, and culture 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

The major in German consists of 15 courses: 12 core courses and 3 courses in a concentration. Students

choose one of five concentrations: business studies, critical thought, German-Jewish studies, history and culture, or literature and culture.

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 quarter-course in the department.

### Core courses (12)

#### • Language (4 units)

2 quarter-courses at the 200 level (1 from 201, 203-1,2; 1 from 205-1,2, 207, 209); 303, 305

#### • History and culture (2 units)

1 quarter-course at the 200 level and 1 quarter-course at the 300 level or 2 quarter-courses at the 300 level (from 222, 224, 228, 311, HISTORY 344 or 349)

#### • Literature and culture (6 units)

3 quarter-courses at the 200 level (from 211, 221-1,2,3, 223, 225, 227, or 245) and 3 quarter-courses at the 300 level (from 321-1,2,3, 323, 325, 327, 329, 331, 333, 335, 337, 345, or 398)

### Concentrations (3 units)

#### • Business studies

209, 309-1,2

#### • Critical thought

3 quarter-courses at the 300 level (322, PHIL 310 or 314, and an undergraduate or graduate seminar in German or comparative literature)

#### • German-Jewish studies

234-1,2 and 1 quarter-course at the 300 level (from HISTORY 344, 349, RELIGION 230, 331, 333, 334, or 339)

#### • History and culture

1 quarter-course at the 200 level and 2 quarter-courses at the 300 level or 3 quarter-courses at the 300 level (chosen from 222, 224, 228, 311, HISTORY 344 or 349)

#### • Literature and culture

1 quarter-course at the 200 level (from 221-1,2,3, 223, 225, 227, 245, 226, 230, 232, 236, 238, 240, or 246) and 2 quarter-courses at the 300 level (from 321-1,2,3, 323, 322, 324, 325, 326, 327, 328 329, 331, 333, 335, 337, 345, or 398)

### 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.

Courses listed as prerequisites for an advanced course

may not be taken for credit after the advanced course has been completed. Minors returning from a study abroad program must enroll in at least 1 300-level quarter-course in the department.

#### *Minor in German (9 units)*

- **Language (4 units)**

2 quarter-courses at the 200 level (1 from 201, 203-1,2; 1 from 205-1,2, 207, 209); 303, 305

- **History and culture (1 unit)**

1 quarter-course at the 200 or 300 level (222, 311, HISTORY 344 or 349)

- **Literature and culture (4 units)**

2 quarter-courses at the 200 level (from 211, 221-1,2,3, 223, 225, 227, or 245) and 2 quarter-courses at the 300 level (from 321-1,2,3, 323, 325, 327, 329, 331, 333, 335, 337, 345, or 398)

#### *Minor in Business German (9 units)*

- **Language (4 units)**

2 quarter-courses at the 200 level (1 from 201, 203-1,2; 1 from 205-1,2, 207, 209); 303, 305

- **Business German (3 units)**

209, 309-1,2

- **History and culture (1 unit)**

1 quarter-course at the 200 or 300 level (222, 311, HISTORY 344 or 349)

- **Literature and culture (1 unit)**

1 quarter-course at the 200 level (211, 221-1,2,3, 223, 225, 227, or 245)

### Studying 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.

### 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 more information on these examinations, see the German department's web site at [www.german.northwestern.edu](http://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 Honors under Academic Policies earlier in this section of the catalog.

### 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 section of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

### 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 pedagogy fosters learning in the four modalities: speaking, listening comprehension, reading, and writing. Prerequisite: 101-3 or equivalent.

**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 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: 111-2. Does not count for the language requirement.

**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 227-0 Popular Literature as Cultural History** Study of popular German texts of the last 100 years. Provides insights into the cultural and historical fabric of 20th- and 21st-century Germany, discussion of popular culture's role in society, and introduction to theories of popular literature. 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 and news broadcasts. Prerequisite: high-intermediate skills in listening, reading, and speaking German.

**GERMAN 305-0 Writing as Discovery: Communicating Correctly, Clearly, and Persuasively** Practice in 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 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 311-0 Business Dynasties in Germany** Examination of representative entrepreneurial families in Germany since 1800 and the means by which they built their firms' and nation's disproportionately significant place in the world economy. Prerequisite: high-intermediate skills in

writing and speaking and advanced skills in reading.

**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.

## 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 230-0 Existentialist Thought and Fiction** Traces the development of the Existentialist movement in the 19th and 20th centuries. Readings may include selections from Nietzsche, Heidegger, Sartre, Mann, Kafka, and Rilke.

**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 in Translation** Traces the history of Yiddish literature from the 17th century to the late 20th century, focusing on three Yiddish “classic” writers: S. Y. Abramovich (*Mendele the Bookseller*), Y. L. Peretz, and Sholem Aleichem. The course provides insight into Jewish life in Eastern Europe.

## GLOBAL HEALTH STUDIES

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](http://www.wcas.northwestern.edu/globalhealth).

### Minor requirements (7 units)

- 301
- 2 core courses chosen from 302, 303, 304
- 4 approved elective courses
- International experience requirement: Those minoring in global health studies must also gain substantial public health experience abroad by participating in one of Northwestern’s public health programs in China, France, Mexico, or South Africa or in another supervised international health experience preapproved by the program director.

### 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 United States 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 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 topics have included managing global health challenges and international perspectives on mental health.

## GREEK

See Classics.

## HISTORY

The Department of History is distinguished by the breadth of its faculty's expertise. 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 to think critically 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 quarter-courses in history and 5 graded quarter-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.

### Departmental courses (11 units)

- 2 undergraduate seminars: 395 plus 1 chosen from 101, 102, 103, 392, 394
- 9 200- or 300-level quarter-courses: 5 in one of the four areas of concentration listed above and 4 that lie outside the area of concentration and are distributed to provide both geographical and chronological variety
- 1 quarter of 395 Research Seminar, preferably taken in the junior or senior year (the seminar need not be within the student's concentration)
- At least 2 of the 11 courses 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):** 5 quarter-courses of related subjects at the 200 or 300 levels, at least 2 of which must be at the 300 level and chosen from at least two programs or departments in the social sciences and humanities (the 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 course requirements (7 units)

- 7 history courses at the 100, 200, or 300 level; at least 3 must be at the 300 level
- 4 of those 7 courses must be in one of the following areas of concentration:
  - Europe, including Britain
  - United States
  - Latin America
  - Asia
  - Middle East
  - Africa
- At least 2 of those 4 concentration courses must be at the 300 level

- 3 of the 7 courses must be outside the area of concentration

### Honors in History

Superior students may qualify for departmental honors by enrolling in the honors seminar (398-1,2,3) during their senior year and completing a senior thesis judged to be of honors quality. See Honors under Academic Policies earlier in this section of the catalog.

### 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 section 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 and sophomores only.

**HISTORY 101-6 Freshman Seminar: European History**

**HISTORY 102-6 Freshman Seminar: American History**

**HISTORY 103-6 Freshman Seminar: Non-Western History**

### 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 355-0 Islam in Africa** Africa is currently home to one-fourth of the world's Muslims. Important course themes include roles of women, schooling, slavery, statecraft, mysticism, and colonial rule in shaping Africa's Muslim societies from the 17th century to the present.

**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 285-0 Indian Civilization** History of Hindu culture from antiquity to the 20th century. Change and continuity in religious ideas, practices, institutions, caste, and family life.

**HISTORY 381-1,2 History of Modern China** **1.** Late Imperial China, 1600–1911. **2.** 20th-century China, 1911–present.

**HISTORY 384-1,2 History of Modern Japan** **1.** Japan: the modern state, 1860–1943. **2.** War and postwar Japan, 1943–present.

**HISTORY 385-0 History of India** India since the mid-18th century. Focus on Hindu and Islamic cultural renovation movements, the politics of nation building, and socio-economic change.

### 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 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 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 349-0 History of the Holocaust** Origins and development of the massacre of European Jewry during World War II.

**HISTORY 350-1,2,3 The Intellectual History of Europe**

1. Heritage from antiquity and the Middle Ages. 2. From the Renaissance to the end of the 18th century. 3. 19th century.

## 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 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 (A.D. 7th century) 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 374-0 Historical Background of Jewish-Muslim**

**Relations** Formation of Jewish-Muslim relations in the medieval Near East; how a common heritage became a basis for contention as well as mutual understanding.

## 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 Survey of African American History**

1. From the 16th century through the Civil War. 2. Since the Civil War.

**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.

**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 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 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.

**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 376-1,2 Science and Modern Society** 1. Rise of

science in early modern Europe and colonial America; relationship with philosophy, theology, and Enlightenment culture; science, society, and utopian thought. 2. Science in Europe and America, 1800–present: physical sciences and the power to transform the world; biological and medical sciences and changing social values.

**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 391-0 Special Lectures** Lecture courses on special topics not covered in regular course offerings. Content varies. May be repeated for credit with consent of department.

**HISTORY 392-0 Topics in History** Advanced work through reading, research, and discussion in area of special significance. Graduate students permitted in some courses. Prerequisite: 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 Honors 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 student's adviser and instructor.

## Undergraduate Leadership Program Course

**HISTORY 295-0 Leaders in History** Emphasis on the historical context within which leadership is exercised. Figures, periods, and cultures vary from year to year.

## History Courses in Other Departments

A history major may take no more than 2 quarter-courses listed below to satisfy the 11-course history requirement.

AF AM ST 214-1,2

CLASSICS 211, 212, 321-1,2,3

ECON 315, 318, 321, 323-1,2, 324

## HUMANITIES

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 Distinguished Jean 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](http://www.humanities.northwestern.edu), call 847-491-7946, or e-mail [hum@northwestern.edu](mailto: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 which 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 course 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 drawn from 301, 302, and 395; each may be repeated for credit with a change in topic
- 390 and/or 399 may be used to fulfill the minor requirement with consent

### Courses in the Humanities Scholars Program

Specific topics in these courses will vary as different professors participate in the program.

**HUM 101-0 Freshman Humanities Seminar**

**HUM 102-0 Freshman Humanities Seminar**

**HUM 210-0 The Good Society 1**

**HUM 211-0 The Good Society 2**

### Other 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 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. Prerequisite: consent of institute.

**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. Prerequisite: consent of institute.

**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 Distinguished Jean 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**

## INTEGRATED SCIENCE

The Integrated Science Program (ISP) is a highly selective curriculum of natural sciences and mathematics presented predominantly in small classes at an accelerated pace. ISP 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 the description of ISP under Academic Options in the Undergraduate Education section of this catalog. Also see the Admission section for the achievement tests required.

The ISP curriculum consists of specially designed courses taught by faculty members of science and mathematics departments. Course descriptions are found with 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, computing and information systems, environmental sciences, earth and planetary sciences, materials science, mathematics, physics, or psychology. Specific second-major requirements for ISP students can be found under individual departments in this catalog. For more information, see the ISP web page at [www.isp.northwestern.edu](http://www.isp.northwestern.edu).

### Major in Integrated Science

- *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.

### Courses

**INTG SCI 101-1,2,3 Computing Applications** Introduction to the formulation and solution of scientific problems using advanced computational programming methods. One-third unit of credit each quarter.

**INTG SCI 398-0 Undergraduate Research** Advanced independent study and research for superior students. Consent of ISP director required.

## INTERNATIONAL STUDIES

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.

### Major in International Studies

Twelve quarter-courses are required, as well as proficiency in a language other than English at a level equivalent to two full years of instruction. Five of the courses are the core courses; 3 are electives in a thematic cluster; 3 are regional (area studies) electives; and 1 is an integrating project seminar. Students may opt to complete the regional cluster through study abroad, but in any event must take 12 quarter-courses. Students may also substitute the honors program for a project seminar. Students may double-count no more than 4 courses toward both their international studies and other disciplinary majors.

#### *Program of Study*

##### **Core courses (5 units)**

- 201-1,2
- HISTORY 319-3 or POLI SCI 344
- ECON 201
- POLI SCI 240

##### **Thematic cluster (3 units)**

Students take 3 courses in one of these themes:

- Issues in international security
- Global commons
- Culture and society
- International political economy and development

Lists of eligible courses can be found each quarter at the program office and on the web site. 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 the four themes listed may petition to create a self-designed thematic cluster.

### Regional cluster (3 units)

Students choose 3 quarter-courses related to a geographic region of the world; 1 course must be historical, 1 in literature or the arts, and 1 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 honors thesis

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. Students admitted to the international studies honors program do not take an integrating seminar but instead participate in the 3-quarter honors seminar and write an integrated honors thesis.

### Advising

Each student has a different combination of major 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.

### Minor in International Studies

The minor in international studies requires completing the 5 core courses and 3 quarter-course electives 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 associate director of international studies. See also Honors under Academic Policies in this catalog.

### Courses

**INTL ST 201-1,2 Global History** This sequence introduces the political and social forms organizing human societies over the centuries. **1.** Teaches students how to analyze variations in geopolitics, demographic cycles, long-distance commerce, and world imperial religions over time.

**2.** Examines how Western expansion through colonization gradually brought all societies into the orbit of a single world economy and traces the processes of global integration and disintegration up to 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 Honors 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.

## 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 two minors: Jewish studies and Hebrew studies.



## Minor in Jewish Studies

The minor in Jewish studies requires successful completion of 7 courses in three areas:

- A 3-course survey of Jewish history that provides a basis for advanced work and a unified view of the history of the Jews in the Western world (such courses include RELIGION 220 or any course on the history of ancient Israel); 1 course on the history or culture of the Jewish people in the Middle Ages (consent of director of undergraduate studies required); and 1 course on some aspect of modern Jewish history (consent of director of undergraduate studies required).
- 2 courses on Jewish religion offered in the Department of Religion or approved by the director of undergraduate studies (Eligible courses include RELIGION 230, 320, 332, 333, and 339)
- 2 additional 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 (these courses must be approved by the director of undergraduate studies)

For students who also satisfactorily complete two years of language study in Hebrew, requirements for the minor consist of the successful completion of 5 courses: 3 in the first area and 1 each in the second and third areas above.

## Minor in Hebrew Studies

The minor in Hebrew studies requires the successful completion of 6 courses, at least 2 of which must be at the 300 level, in four areas. Before signing up for the Hebrew studies minor, a student must complete or place out of the second year of Hebrew (AAL 102-1,2,3).

### Minor course 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)

## Course

**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.

## LATIN

See Classics.

## LATIN AMERICAN AND CARIBBEAN STUDIES

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

Eight courses are required for the 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. To qualify for the minor, students must present a minimum of 5 courses not double-counted in their majors. Students who would like more information about the minor should contact the program director.

*Core courses:* The minor has 4 core courses, each in a specific department: anthropology, history, political science, and Spanish and Portuguese. Students normally select the courses from the following list. Alternatives and exceptions must be approved by the program director.

- ANTHRO 390 or 490 (when relevant to Latin America, the Caribbean, and/or U.S. Latinos)
- HISTORY 365, 366, or 369
- 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)

*Elective courses:* Students should take an additional 4 courses on Latin America and the Caribbean chosen from the course list below. Many departments, especially anthropology, history, political science, and Spanish and Portuguese, regularly offer courses on Latin America, the Caribbean, and/or U.S. Latinos; these may be counted toward the minor with the consent of the program director. The program strongly recommends that 1 of these elective courses focus on Latinos in the United States. Students are advised to consult the department web site at [www.wcas.northwestern.edu/lacs](http://www.wcas.northwestern.edu/lacs) for the most up-to-date course listings.

## Courses

**LATIN AM 251-0 Introduction to Latino Studies** Introduction to major material and historical themes that have shaped U.S. Latina/o communities, with focus on parallels of colonization, assimilation and cultural resistance, *mes-tizaje*, and contemporary expressions of cultural innovation. The course primarily addresses Mexican American and mainland Puerto Rican communities, histories, and experiences, stressing commonalities and distinctness of *latinidad* in the United States, discussing Cuban Americans and Central Americans, and examining the role of race, gender, sexuality, and sexual orientation in the shaping of Latina/o histories and identities past and present.

**LATIN AM 351-0 Topics in Latino Studies** Topics may include Latino literature, Latino art, immigration issues, Latinos and the law, borderlands ethnography, Latinos and Latinas (gender issues), Latino drama and theater, Latino history, and sociology of Latinos and Hispanics in the United States.

**LATIN AM 389-0 Introduction to Urban Field Research** Theory and methods of ethnographic field research; preparation for field research projects with community-based organizations serving Latin American and Caribbean communities in Chicago; introduction to creative ways of communicating research, such as exhibitions, forums, or related public education programs.

**LATIN AM 396-0 Gender in Latin America** Exploration of the varied expressions of masculinity and femininity across Latin America, the Caribbean, and the Latin United States from pre-Columbian times to the present. Case studies and emphases may vary from year to year.

## Related Courses in Other Departments

AF AM ST 245, 345, 381

ANTHRO 328, 330, 368, 390 (when relevant to Latin America, the Caribbean, and/or U.S. Latinos)

ART HIST 228, 235

FRENCH 365

HISTORY 291, 365, 366, 367, 368-1,2, 369, 391 or 392 (when relevant)

POLI SCI 353, 356, 390 (when relevant)

SPANISH 211, 230, 231, 260, 261, 301, 340, 341, 342, 343, 344, 345, 346, 347, 361, 380, 390 (when relevant), 395

## LEGAL STUDIES

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

Open to undergraduate students in all schools, legal studies is an adjunct major that may be taken only in conjunction with a departmental major.

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. The adjunct major requires completion of both quarters of 398, typically during the junior year.

In addition to the Advanced Research Seminar, adjunct majors are required to complete a total of 9 approved legal studies electives taught in legal studies or drawn from other departments, including 1 course from each of five categories of electives.

*Core courses:* 398-1,2

*Electives:* Courses that fulfill the elective requirement for the adjunct major may be chosen from the following five categories: argument and communication; global and comparative studies; institutions, organizations, economics; law and inequality; theory and philosophy. All five categories must be represented among the 8 courses chosen. A list of approved courses for the adjunct major is available on the Legal Studies Program web site ([www.northwestern.edu/legalstudies](http://www.northwestern.edu/legalstudies)).

## Minor in Legal Studies

Students may earn a minor in legal studies while concurrently pursuing a departmental major in any undergraduate school. Students qualify for the minor by satisfactorily completing a total of 8 approved law-related courses taught in legal studies or drawn from other departments, including 1 course from each of five categories of electives.

*Minor course requirements:* The 8 courses for the minor may be chosen from the five categories of electives listed under the Adjunct Major in Legal Studies. All five categories must be represented among the 8 courses to be counted toward the minor.

## 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 of distinction may be considered for honors. For more information about honors, consult the program director.

## Courses

**LEGAL ST 376-0 Topics in Legal Studies** Topics such as McCarthyism and free speech, antitrust law and economics, human rights, wrongful conviction, and community

policing. 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. Prerequisite: 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

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 eligible to apply for the four-year BA/MA program in linguistics.

### Major in Linguistics

#### Departmental courses

*Introductory courses:* 250, 260, 270

*Advanced courses:* 9 courses beyond the 200 level, including 350, 360, and 370 (a methods course chosen from 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 undergraduate adviser

**Related courses:** 4 courses selected from other departments in consultation with the linguistics undergraduate adviser

### 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.

#### Minor course requirements (8 units)

- 250, 260, 270
- 5 courses beyond the 200 level, including 2 chosen from 350, 360, or 370 (a methods course chosen from 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 pursuing linguistics at the graduate level 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 in the Undergraduate Education section of this catalog.

### 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 department.

### 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 223-0 Language Myths** Introduction to the scientific study of language through examination of various well-known myths surrounding language and its use.

**LING 224-0 Languages of Chicago and the Midwest**

Introduction to the fundamentals of linguistic theory and the basic phonological, morphological, and syntactic tools needed to describe and analyze an unfamiliar language. The structure and sociolinguistic profiles of immigrant languages of the Chicago area are discussed, including Spanish, Polish, Urdu, Arabic, and Serbo-Croatian as well as aboriginal languages of the area, such as Potawatomi.

**LING 240-0 Languages of the World** Survey of the world's major language families. Varying and universal features of human language. Topics include human versus nonhuman systems of communication, the sounds and gestures of human language, writing systems, word formation and inflection, sentence structure, and word order variation.

**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. Innateness versus learning in acquisition.

**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** Social and linguistic factors in the acquisition of two or more languages. Effects of bilingualism on phonology, syntax, the lexicon, and cognition.

**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 325-0 Language and Medicine** Analysis of language patterns used in medical settings, including doctor-patient interaction and technical language use. Prerequisite: 200-level course or senior standing.

**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 333-0 Methods in Developmental Linguistics**

Methods of investigating children's knowledge of grammatical structure. Experimental design; review and application of statistics; executing developmental linguistic research and reporting of results. Prerequisite: 311.

**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** Principles of the comparative method and the method of internal reconstruction. Historical syntax. Quantitative methods in historical linguistics.

**LING 341-0 Language Typology** A comparison of varying and universal features of the world's languages. Topics include word order, case systems, relative clauses, and grammatical relations. Prerequisite: 260 or consent of instructor.

**LING 342-0 Structure of Various Languages** Phonological, morphological, and 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: consent of instructor.

**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** Philosophical and linguistic approaches to the study of reference.

**LING 372-0 Pragmatics** Introduction to extragrammatic meaning, focusing on the role of context in utterance production and interpretation. Topics include the semantics-pragmatics boundary, implicature, presupposition, and speech acts. Prerequisite: 250, 260, 270 (or equivalent), graduate standing, or consent of instructor.

**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**

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 section of this catalog.

**Foundations in mathematics (5 or 6 units)**

- 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

**Foundations in science (5 or 6 units)**

- 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.

**Core curriculum (5 units)**

- MAT SCI 201, 315, 316-1,2, 351-1

**Program track (5 units)**

Students take courses in their 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; 335 or 370

**Advanced studies (3 units)**

3 elective courses must be taken in at least two areas, including 1 in materials science, chosen from the following:

- 322, 332, 333, 335, 340, 341, 351-2, 355, 360, 361, 370, 376, 380, 385, 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

Students completing the materials physics concentration in physics and astronomy 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.

**Minor in Materials Science****Prerequisites**

- 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 332

**Core courses (6 units)**

- 201, 203, or 301; 315; 316-1,2
- 2 other 300-level materials science courses (excluding 394, 396-1,2, 399)

**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, 315, and 316-1,2 plus 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, PHYSICS 398, or 399) and a written research report.

**MATHEMATICAL METHODS IN THE SOCIAL SCIENCES**

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.

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.

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.) 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.

**Required courses**

- *First year:* 211-1,2,3; MATH 285-1,2,3
- *Second year:* 311-1,2; MATH 300, 385, 386-1,2
- *Senior year:* 398-1 and 398-2 or 398-3

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 prerequisite for admission consideration. High school students fulfilling this prerequisite are encouraged to enter the program as freshmen. Students lacking calculus but planning to enter the program as sophomores should complete at least 2 quarters of calculus (MATH 220 and 224) in their freshman year.

Applicants who wish to enter MMSS as freshmen must apply both to Northwestern and to the program. Students who plan to apply as sophomores are advised to register for a 200-level calculus/linear algebra sequence such as MATH 290-1,2,3, 291-1,2,3, or ES APPM 252-1,2,3 in their freshman year. Students with less mathematics preparation will be considered for admission but may be required to take all or part of the first-year MMSS math sequence.

Northwestern applicants or current students who wish to be considered for the program may request an application from the MMSS director, Walter Annenberg Hall, Room G26, Evanston, Illinois 60208-2630.

### 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 MATH 320-1,2,3 or 321-1,2,3 and take 3 quarter-courses chosen from MATH 310-2,3, 330-1,2,3 or 331-1,2,3, 334, 344, 366-1, or 368 in addition to 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. Those considering graduate work in mathematics should take 330 or 331.

### 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.

### 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

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.

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

*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

*Required courses:* a total of 9 300-level courses offered by the department; these must include 334 and 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. With the prior approval of the director of undergraduate studies, as many as 3 of these 9 courses may be 300-level courses 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.

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.

### Minor in Mathematics

*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

*Required courses:* a total of 6 300-level courses offered by the department, including at least 1 2-quarter sequence chosen from 310-1,2, 320-1,2, 321-1,2, 330-1,2, or 331-1,2

To fulfill the sequence requirement, 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, up to 2 of the 6 required courses may be courses with a substantial mathematical component offered by departments other than mathematics. No such course, however, may be simultaneously counted toward the student's major or school requirements.

### MENU Program

The Mathematical Experience for Northwestern Undergraduates Program (MENU) is designed for students who love mathematics and have a solid background in calculus. It is ideal for mathematically talented undergraduates who are considering a major in mathematics, the physical sciences, or economics, but by no means is it limited to them.

MENU offers two parallel, specially designed tracks: one (291/321/331) for students who are particularly skilled in and passionate about pure mathematics, and the second (290/360) for those more interested in applications. Movement between the two tracks is possible in the initial two weeks of the program.

Successful completion of 290/291 is one of the prerequisites for application to the Kellogg School of Management's certificate programs in financial economics and managerial analytics.

Since admission to 290 and 291 is based on results of the CEEB Advanced Placement Examination (preferably the BC exam), high school students with a keen interest in mathematics should take this exam. Students who have a solid grasp of calculus of one variable (including both differentiation and integration) and who have not taken an AP examination are encouraged to speak to the MENU director about enrolling in 290 or 291 instead of 230.

Students who have done very well in 220 and 224 should speak with the MENU director about continuing their study of calculus in MENU. The director of MENU is available as an adviser for all MENU students, regardless of their major, during their time at Northwestern.

Further information on MENU is available on the mathematics department web site.

### 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 who wish to have a second major in mathematics 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. They may not substitute ISP 398 for any mathematics course in the ISP curriculum. 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's web site. See also Honors under Academic Policies earlier in this section of the catalog.

### 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 section 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

Student 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 also may 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 is 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, antiderivatives. 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 232-0 Multivariable Calculus with Economics**

**Applications** Integration, vector algebra, vector functions, partial derivatives, optimization. Covers material from 224 and 230 specific to the social sciences, especially economics. Not recommended for students studying the natural sciences. Acceptable as preparation for 240, 250, and some 300-level mathematics courses (see individual course descriptions). Students may not receive credit for both 232 and 230 (or any course equivalent to 230). Prerequisite: 220.

**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 or 232. 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 or 232; 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, similar to 240, but in greater depth. **2,3.** Multivariable calculus. Similar to 230/234 but in greater depth. Prerequisites: 1 year of calculus (usually in high school) and consent of department. Students may not receive credit for both 240 and 290-1; both 230 and 290-2; or both 234 and 290-3.

**MATH 291-1,2,3 MENU: Accelerated Linear Algebra and Multivariable Calculus** Emphasis on theory and proofs.

Designed to prepare students to take 300-level mathematics courses such as 321 and 331 as sophomores. **1.** Linear algebra, similar to 240, but in greater depth. Topics include vector spaces, linear functions, linear independence, dimension, determinants. **2,3.** Multivariable calculus. Similar to 230 and 234 but in greater depth. Topics include vector calculus, multiple integration, Stokes's theorem. Prerequisites: 1

year of calculus (usually in high school) and consent of department. Students may not receive credit for both 240 and 291-1; both 230 and 291-2; or both 234 and 291-3.

**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 385. 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** Rigorous analysis in

Euclidean space and on metric spaces. Metric space topology, properties of Euclidean spaces, limits and continuity, differentiation and integration, sequences and series, the inverse and implicit function theorems. Lebesgue integration with applications. Faster paced and more abstract than 320-1,2, this sequence covers more topics in more depth and aims at intensive development of students' ability to analyze and create mathematical proofs. Students may not receive credit for both 320-1 and 321-1 or both 320-2 and 321-2. Prerequisite: grade of A- or above in 291 or 334, A in 300, B or above in 331, or consent of department.

**MATH 325-0 Complex Variables for Applications** Complex numbers, functions of a complex variable, theory of analytic functions, series development, analytic continuation,

contour integration, conformal mapping. Students may not receive credit for both 325 and 360-3 or ESAM 311-3. Prerequisite: 250.

**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 instructor's consent. 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.

**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, 232, or equivalent.

**MATH 342-0 Introduction to Differential Geometry** Curves and surfaces in three-dimensional space. Prerequisites: 234 and 240 or equivalent.

**MATH 344-0 Introduction to Topology** Point-set topology. Prerequisite: 320-1 or 321-1.

**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 360-1,2,3 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. **3.** Complex analysis. Prerequisites: 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. Prerequisite: 240.

**MATH 366-1,2 Mathematical Models in Finance** Analytic modeling of financial problems. Theory of Interests. Basic financial concepts (stocks, bonds, options, arbitrage, hedging). Introductory to ordinary and partial differential equations. Random walk and Brownian motion as a tool of modeling fluctuations. Option pricing. The Black-Scholes formula. Method of discrete approximation (finite difference and sampling). Prerequisite: 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** Mathematical methods and concepts on which continuous nonlinear optimization theory (determining the maxima and minima of a function on an allowable set of points) rests. Topics from unconstrained and constrained optimization, the Kuhn-Tucker theorem on inequality constraints, optimization under convexity, and nonlinear dynamic programming. Prerequisite: 300 or graduate standing. 320-1 or 321-1 is helpful but not required.

**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. 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.

## NEUROBIOLOGY AND PHYSIOLOGY

The Department of Neurobiology and Physiology does not offer an undergraduate degree. See Biological Sciences for a description of that major.

## PHILOSOPHY

Perhaps the most notable feature of the Department of Philosophy is its pluralism — its commitment to exposing students to a broad range of philosophical traditions and issues. With strengths in both Anglo-American and contemporary 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. Full descriptions of the courses offered each quarter are available in the department office two weeks before advance registration.

### Departmental courses (12 units)

Students should complete these required courses, especially 210-1 and 210-3, as early as possible, since material covered is a prerequisite to more advanced work.

- *Logic*: 150
- *History of philosophy*: 210-1,3; 1 chosen from 210-2, 263, 264; and 1 chosen from 310, 311, 312, 313-1,2
- *Remaining 7 courses*: at least 4 at the 300 level (not including 398), and none at the 100 level

Of the 12 courses required of majors, 1 may be a course offered outside the department that 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 course requirements (8 units)

- *4 foundation courses*: 150, 210-1, 210-3, and 263 or 264
- *4 philosophy electives*: no 100-level courses, at least 3 300-level courses (not including 398)

### 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. 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 or reflection. The adviser and another faculty member read the paper. Their comments are submitted to the Committee on Undergraduate Studies, which recommends approved nominations to the Weinberg College Committee on Superior Students and Honors. For more information, consult the director of undergraduate studies. See also Honors under Academic Policies earlier in this section of the catalog.

### 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** Study of argument through the use of elementary formal systems of deductive inference. Informal fallacies and nondeductive modes of inference. 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 250-0 Elementary Logic II** Formal systems of deductive inference and their properties. Translation from ordinary language to formal languages, including first-order quantification and identity and related philosophical problems. Second quarter of 150/250/350 sequence. Prerequisite: 150.

**PHIL 254-0 Scientific Method in 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 263-0 Classics of Ethical Theory** Classical works of moral philosophy from the ancient through the modern periods. Intended primarily for students who are or may become philosophy majors or minors.

**PHIL 264-0 Classics of Political Theory** Classical works of political philosophy from the ancient through the modern periods. Intended primarily for students who are or may become philosophy majors or minors.

**PHIL 265-0 Introduction to the Philosophy of Law**

Ethical and conceptual issues arising in connection with the law, such as the nature of law, the nature of

liberty and of justice, and the theory of punishment.

**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 A.D. 500. 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 A.D. 500 and 1500. 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 324-0 Phenomenology** Major works contributing to the phenomenological movement: texts by Husserl, Heidegger, Sartre, and Merleau-Ponty. Questions of methodology, together with problems in theory of knowledge and ontology.

**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 Systematic Logic** Formal systems of deductive inference. Metatheory, formal semantics, completeness, and set theory. 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.

**PHIL 354-0 Advanced Topics in the Philosophy of Natural Science** Discovery, conceptual change and the growth of scientific knowledge, explanation, relation of theory to observation, confirmation theory, space and time, causality,

and philosophical implications of relativistic and quantum mechanics. Prerequisite: 250 or consent of instructor.

**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 Philosophy of History** Theories of history and historiography, examining issues such as historical memory, the objectivity of interpretation, narrative structures, freedom and causal determinism, teleological purpose, and the social responsibility of the historian.

**PHIL 365-0 Advanced Studies in the Philosophy of Law** Normative and conceptual issues arising in legal contexts.

**PHIL 366-0 Advanced Studies in the Philosophy of Religion** Central problems in the philosophy of religion.

**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 372-0 Philosophy of Education** Educational theories of representative philosophers as related to their culture and the problems of their times.

**PHIL 380-0 Philosophy of Art** 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 398-1,2,3 Senior Tutorial** Undergraduate honors thesis. Grade of K given in 398-1 and 398-2. Prerequisite: consent of instructor.

**PHIL 399-0 Independent Study** Open to properly qualified students with consent of instructor.

## PHYSICS AND ASTRONOMY

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 normally 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, or 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.

### 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.

#### Basic courses (6 units)

- MATH 220 and 224 (or 212, 213, and 214)
- PHYSICS 125-1,2,3 or 135-1,2,3

#### Core sequence (9 units)

- 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

#### Concentrations

Majors must choose one or more of the following areas:

##### *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, 320, and 2 courses selected from 321, 323, 327
- 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:
  - at least 1 300-level physics or astronomy course other than 335, 398, 399
  - ES APPM 311-2,3
  - EECS 310, 336
  - MATH 310-2,3, 354-1,2

##### *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

Students intending to go to graduate school to continue their study of physics and/or astronomy should also consider taking some or all of the following:

- 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, 344
- selected introductory graduate courses such as PHYSICS 412-1,2,3

Students should discuss specific options in this advanced program of study with the director of undergraduate studies before the end of the sophomore year.

### 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. Students choosing the minor in physics must also complete the following 6 prerequisites or their equivalent: MATH 220, 224 (or 212, 213, 214), 230 and PHYSICS 125-1,2,3 or 135-1,2,3

#### Minor sequence (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 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 both ISP and physics by taking 6 additional upper-level courses in physics and astronomy:

- PHYSICS 359-1 or 359-2
- 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 and ASTRON 399 (students pursuing an ISP/physics double major may not substitute ISP 398 for any physics or math course in the ISP curriculum)

#### 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 under Academic Policies earlier in this section of the catalog.

#### 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 section 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.

#### 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 67 and at [www.wcas.northwestern.edu/evolution](http://www.wcas.northwestern.edu/evolution).



## 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 301-0 Radiation in the Environment** In-depth look at radioactivity in the environment, including physical descriptions of radiation and the biological basis for radioactive standards. Nuclear power generation, nuclear waste, techniques for detecting radioactive contamination, and the effects of electromagnetic radiation.

**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 331-0 Thermodynamics** Equations of state, the three laws of thermodynamics, entropy, phase changes, ideal gas, applications. Prerequisites: 135-1,2,3 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 Biophotonics 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 Honors Independent Study** 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

Political science is the study of political behavior, institutions, and processes at the domestic and international levels — of politics in its many forms and locations. Politics is an unavoidable outcome of varied actors inhabiting the same world yet having different interests and priorities. Studying political science helps one understand human behavior, policy making, and the relationships between people, groups, and governments. A background in political science is valuable for future careers in the business sector, the media, public service, and politics in any location.

Northwestern's Department of Political Science is internationally recognized for excellence at both the undergraduate and graduate levels. The department is particularly strong in American politics and government; the politics of foreign countries, especially in Europe, Latin America, Asia, and Africa; law and politics; political economy; international relations; and political theory. Political science faculty are closely associated with the Program of African Studies, the Roberta Buffett Center for International and Comparative Studies, the Institute for Policy Research, and the Gender Studies Program, among others.

### 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. Students who pursue honors must also

complete their 395 requirement by the end of their junior year. Up to 2 political science courses and 2 related courses taken abroad may be counted toward the major.

### Major course requirements

- *Introductory courses:* 3 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)
- *Methods 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)
- *Advanced courses:* 6 300-level courses in political science, 1 of which must be 395
- *Related courses:* 5 quarter-courses in African American studies, American studies, anthropology, economics, gender studies, history, legal studies, philosophy, psychology, and sociology, of which at least 2 must be at the 300 level and no more than 1 may be at the 100 level (all majors also are urged to become proficient in a foreign language)

The methodology requirement should be completed before taking the 395 research seminar. Students should plan to take 395 in junior year, or, if studying abroad then, as early as possible in senior year.

### 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 that cross a variety of areas.

Students may want to pick 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 advising team.

### Minor course 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 10 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 at the beginning of spring quarter of junior year, including from students studying abroad.

Accepted students enroll in the 2-quarter Honors Tutorial (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 are discouraged from writing honors theses in two departments. Those interested in pursuing honors in more than one major should pursue interdisciplinary honors.

For more information see the honors program link on the departmental web page and Honors under Academic Policies earlier in this section of the catalog.

### 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 (two 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 section of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Many political science courses have been renumbered. The former numbers are in parentheses in the course listings.

### 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 in the United States**

Survey of black politics in the United States, including antidiscrimination struggles, blacks' relations with government, whites, political parties, public policy, and electoral politics.

**POLI SCI 328-0 (370-0) 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 (371-0) 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 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 America 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 360-0 Comparative Racial Politics** Theories and concepts of race and ethnicity and their relationship to issues of state power, national identity, and social policy. Methods of comparative analysis used to identify and distinguish patterns of racial politics between and within multiracial nation-states.

**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 367-0 (204-0) 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 (373-0) 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 (344-2) 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 (201-1,2) 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 Political Thought** Political thought of Greece and Rome in historical context and with attention to contemporary theoretical interest.

**POL SCI 302-0 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.

**POLI SCI 303-0 (301-0) 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.

**POLI SCI 304-0 (302-0) Critics of Modernity** 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.

**POLI SCI 309-0 (303-0) 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.

**POLI SCI 310-0 (310-0 and 311-0) 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.

**POLI SCI 311-0 (312-0) Logics of Political Inquiry** Political science as "science." Identity sources, construction, functions, and validation of social science theory and explanation from varied perspectives.

**POLI 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.

**POLI 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.

**POLI 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

**POLI SCI 390-0 Special Topics in Political Science** Designed for investigation of topics that are of current interest to students and faculty but are not adequately covered by other course offerings. No prerequisites.

**CFS 393-1,2, CFS 394-1,2, CFS 395-1,2 Chicago Field Studies** See Chicago Field Studies on page 73.

**POLI SCI 395-0 Political Research Seminar** Required of all political science majors and 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.

**POLI SCI 398-1,2 Honors Tutorial** Two consecutive quarters (fall and winter) during which students work on their honors theses. Prerequisite: 395 and admission to the honors program.

**POLI 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

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 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

#### Departmental courses

*Basic course:* 110

*Major courses:* 201, 205, and at least 7 additional psychology courses, including

- at least 1 upper-level research course from 301, 316, 321, 326, 333, 334, 335, 351, 357, 358, 359, 362, 363, 386, 392, 397-2, 398 (any course listed both here and in one of the following two categories may be double-counted toward that category as well)
- at least 2 personality, clinical, and/or social psychology courses chosen from 204, 215, 301, 303, 306, 316, 326, 357, 384, 385, 386

- at least 2 cognitive psychology and/or neuroscience courses chosen from 212, 228, 312-1,2, 321, 324, 333, 334, 335, 358, 361, 362, 363, 364, 365; COG SCI 210, 211

- at least 3 300-level courses

The following restrictions apply:

- Freshman seminars may not be counted toward the requirements.
- No more than 1 quarter of 397-1 and 399 may be counted toward the requirements; a student may not count both courses toward the major.
- No more than 1 quarter of 397-2 may be counted toward the requirements.
- No more than 2 total credits of 397 and 399 may be taken in any quarter.
- No more than 9 total credits of 397, 398, and 399 may be counted toward Weinberg College graduation requirements.

#### Related courses

- 2 200-level mathematics courses are required
- 3 additional courses must be chosen from the following: any 200-level mathematics course; any 300-level statistics course; any biological sciences, chemistry, or physics course at any level; ANTHRO 213; COG SCI 207; CSD 202, 301, or 302; EECS 110, 111, 130 or 395 (with department consent, PSYCH 351 may also be counted 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 course requirements (7 units)

- 110, 201, and 205
- 4 additional psychology courses, including
  - at least 1 personality, clinical, and/or social psychology course from 204, 215, 303, 326
  - at least 1 cognitive psychology and/or neuroscience course from 212, 228, 312-1, 324, 361, 362, 365; COG SCI 210, 211
  - at least 2 300-level psychology department courses
 No more than 1 quarter of 397-1 and 399 may be counted toward the requirements; a student may not count both courses toward the minor.

### Psychology Second Major for ISP Students

The Integrated Science Program is a highly selective BA program within Weinberg College (see Integrated Science Program). Students in ISP who also wish to complete a major in psychology should consult with the program

director and the director of undergraduate studies in psychology as early as possible to determine their specific additional major requirements.

### 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 page, [www.wcas.northwestern.edu/psych](http://www.wcas.northwestern.edu/psych). See also Honors under Academic Policies earlier in this section of the catalog.

### Courses Primarily for Freshmen and Sophomores

**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. 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.

### Courses Primarily for Juniors and Seniors

**PSYCH 301-0 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 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 316-0 Experimental Social Psychology** Social psychological research techniques, including laboratory experiments, field experiments, and quasi-experiments. Students conduct original research. Prerequisites: 204, 205.

**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 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 sexology. 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 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 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 The Brain and Cognition** Examines the brain's role in cognitive processing, including perception, spatial processing, attention, memory, language, reading, and executive functions. Particular attention is paid to learning and development. Prerequisite: 110.

**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.

**PSYCH 398-1,2,3 Undergraduate Honors 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.

## RELIGION

Because religion is a multifaceted phenomenon, the academic study of religion and the religious is a multidisciplinary field. The undergraduate major in religion is designed to foster an understanding of several major religions through study of their historical development, sacred literature, and social manifestations. The faculty's training and the course offerings concentrate on the traditions of Hinduism, Buddhism, Judaism, Christianity, and Islam, as well as on American and Chinese religions, though courses in other areas are presented occasionally. Study of the interaction of two or more traditions constitutes a regular part of the curriculum and the extracurricular seminars, lectures, and discussions.

The major and minor in religion provide a coherent and

balanced set of departmental courses with work on general theories of religion and on Western and Eastern religious traditions. 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. Majors and minors are permitted to preregister for up to 2 courses per quarter.

### Major in Religion

The major consists of 12 courses in the department:

- 170
- 395
- 10 other religion courses, including at least 9 beyond the 100 level and at least 5 at the 300 or 400 level; at least 2 must be in Eastern religions (Hinduism, Buddhism, Chinese religions) and at least 2 in Western or Abrahamic religions (Judaism, Christianity, Islam)

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 SOCIO 314 or approved in advance by the department's director of undergraduate studies.

### Minor in Religion

The minor consists of 6 courses in the department:

- 170 (395 may be substituted)
- 5 other religion courses beyond the 100 level, including at least 3 at the 300 or 400 level; of these 5, at least 1 must be in Western or Abrahamic religions (Judaism, Christianity, Islam) and at least 1 in Eastern religions (Hinduism, Buddhism, Chinese religions)

### Honors in Religion

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. See also Honors under Academic Policies earlier in this section of the catalog.

### 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 major religious traditions of the world.

### 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 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 316-0 Confucianism** Examination of the Confucian tradition as it developed in China between the 6th century B.C.E. and the 16th century C.E.

**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 340-1,2 Foundations of Christian Thought** Survey of the development of Christian thought. **1.** Early or traditional Christianity. **2.** Christian thought since the Reformation.

**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.

## 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 Islamic Thought** 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 334-0 Jewish Ethics** Survey of arguments and interpretations of ethics and morality from rabbinic, medieval, and contemporary sources in Jewish texts and history.

**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 375-0 Women in Contemporary World Religions** Women's religious roles, activities, and issues in contemporary Judaism, Christianity, Islam, and Neopaganism.

**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****Adjunct Major and Minor in Science in Human Culture**

The adjunct major and minor in science in human culture prepare students to confront the impact of science, medicine, and technology on society and on their own lives. The program welcomes science majors interested in thinking beyond the problem sets assigned in their specialized courses, as well as students in the humanities who wish to surmount the compartmentalization of knowledge that accompanied the rise of modern science. The adjunct major and minor 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 minor, consult the program web page at [www.shc.northwestern.edu](http://www.shc.northwestern.edu). Questions may be directed to the program director.

**Adjunct major course requirements (10 units)**

The science in human culture major is an adjunct major, meaning that students must also fulfill the requirements of another major. In consultation with the program director, students in the adjunct major develop a theme based on their particular interests. They then take 10 courses that

match their interests from the partial list below. Students must take at least 2 core courses chosen from HISTORY 275-1,2, 325, 376-1,2, and 377. At least 6 of the 10 courses for the adjunct major must be at the 300 level. Course substitutions may be allowed with the consent of the program director.

**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.

**Minor course requirements (7 units)**

In consultation with a faculty adviser, students develop a coherent theme that ties together their choice of 7 courses selected from the (partial) list below. Students must take at least 1 300-level seminar. Students applying for the minor in science in human culture must show a minimum of 5 courses not double-counted in any other major(s).

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 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**

**1.** Studies science in social context. **2,3.** For students who wish to qualify for honors by writing a senior thesis.

**SLAVIC LANGUAGES AND LITERATURES**

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

### Departmental courses

*Basic courses:* 102-1,2,3 or equivalent

*Electives:* 14 additional courses in Slavic languages and literatures and related fields

*Honors:* 2 additional courses

### Option A: No study abroad

*Basic electives (7):* 203-1,2,3 and 4 courses chosen from 210-1,2,3; 211-1,2; 255

*Advanced electives (7):* 360 or 361 and 5 other 300- or 400-level Slavic languages and literatures courses; 1 course in a related field chosen with the undergraduate adviser

### Option B: Study in Russia

*Basic electives (4):* chosen from 210-1,2,3; 211-1,2; 255

*Study abroad:* 4 or more units toward the major

*Advanced electives (6):* 360 or 361 and 5 other 300- or 400-level Slavic languages and literatures 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 course requirements (7 units)

- 1 course each in three basic areas: history, culture, and contemporary society and linguistics
- 3 of the 7 courses at the 300 level
- up to 1 course on Russia and up to 3 relevant language courses (e.g., Czech, Polish, Bosnian, Croatian, Serbian)
- approval of course selections 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.

*Prerequisites:* completion of two years of college-level language or equivalent as demonstrated by course work such as 102-3 or equivalent

### Minor course requirements (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 course requirements (8 units)**

- 4 200-level courses in Slavic languages and literatures
- 4 300-level courses, at least 2 of them 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 under Academic Policies earlier in this section of the catalog.

**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 coordinator.

**SLAVIC 102-1,2,3 Intermediate Russian** Russian language and culture. Reading, writing, listening, and speaking. Prerequisite: 101-3 or consent of language coordinator.

**SLAVIC 106-1,2,3 Elementary Czech** Czech language and culture. Basic reading, writing, listening, and speaking. Prerequisite: take in sequence or get consent of language coordinator.

**SLAVIC 107-1,2,3 Introduction to Bosnian/Croatian/Serbian** A largely oral approach to the basic grammar and vocabulary necessary for reading, speaking, comprehending, and writing basic Bosnian/Croatian/Serbian (B/C/S). Most material is presented in the Latin alphabet, but students are expected to use the Cyrillic alphabet as well and to gain basic knowledge of the similarities and differences among the languages. Must be taken in sequence. Prerequisite: consent of language coordinator.

**SLAVIC 108-1,2,3 Elementary Polish** Polish language and culture. Basic reading, writing, listening, and speaking. Prerequisite: consent of language coordinator. Prerequisite: take in sequence or get consent of language coordinator.

**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 coordinator.

**SLAVIC 206-1,2,3 Intermediate Czech: Language and Culture** Continuation of 106; reading on topics in Czech culture. Prerequisite: 106-3 or consent of language coordinator.

**SLAVIC 207-1,2,3 Intermediate Bosnian/Croatian/Serbian: Language and Culture** Continuation of 107; readings on topics in Bosnian/Croatian/Serbian. Continued emphasis on perfecting reading, writing, listening, and speaking skills. Must be taken in sequence. Prerequisites: 107-3 or consent of language coordinator.

**SLAVIC 208-1,2,3 Intermediate Polish: Language and Culture** Continuation of 108; reading on topics in Polish culture. Prerequisite: 108-3 or consent of language coordinator.

**SLAVIC 303-1,2,3 Advanced Russian Language and Culture** Conversation, listening comprehension, reading, and composition. Explore Russian culture and society through videos and contemporary readings. Fourth-year course. Prerequisite: 203-3 or consent of language coordinator.

**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 coordinator.

**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, syntax.

**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. Students become familiar with major achievements of Polish artistic prose in the 20th century. Taught entirely in Polish. Content varies; may be repeated for credit. Prerequisite: consent of language coordinator.

**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 318-0 19th-Century Russian Comedy and Satire** The nature of comedy, the types of satire, and the functions of laughter in the works of Gogol and Chekhov.

**SLAVIC 319-0 The Philosophical Story** Examines a key form of Russian and East European fiction, the story about abstract philosophical issues; its role in general philosophical debates, how it works as literature, philosophical issues it raises.

**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, Meierkhöld; design innovations of Tatlin, Malevich, Exter.

**SLAVIC 372-0 Introduction to Eastern European Jewish Culture** Cultural heritage of Russian and Eastern European Jewish communities from the 18th to 20th centuries. Works of Sholom Aleichem and Isaac Bashevis Singer; relations of Jewish culture to surrounding European cultures.

**SLAVIC 375-0 Eastern European Literature of the Holocaust** Novels, short stories, and memoirs by Eastern Europeans who experienced the Nazi occupation or were marked by its aftermath; problems of identity, memory, genre.

**SLAVIC 377-0 Theory and Practice of Literary Translation** Theoretical and practical problems of literary and cultural translation. Prerequisites: 300-level proficiency in a Romance, Germanic, or Slavic language; consent of instructor.

**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 391-0 The Rise and Fall of Yugoslavia** Yugoslavia from origins as a dream to existence as a multinational state and collapse in the late 1980s; nationalism, interrelationship of politics and culture; readings from historians, cultural critics, and literary works.

**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 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, Mandelshtam, Pasternak, Brodsky. Prerequisite: consent of instructor.

**SLAVIC 398-0 Senior Honors Seminar** Topics vary yearly.

**SLAVIC 399-0 Independent Study** For Russian majors selected as candidates for departmental honors; for other advanced students with consent of instructor.

## SOCIOLOGY

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, 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

**Departmental courses:** 1 sociology course at the 100 or 200 level (except 226) and 9 additional courses, distributed as follows:

- 3 courses in methods of social research: 226, 303, 329 (226 should be taken by the sophomore year; 303 and 329 in the junior year)
- 306 (junior or senior year)
- 398-1,2 (fall and winter quarters of the senior year)
- 4 additional 300-level sociology courses; only 1 unit each of 376 and 399

One Chicago Field Studies internship course (CFS 393-1,2) may be substituted for 329 and another for 1 of the 4 additional 300-level courses.

In certain cases, students who are combining a major in sociology with a major in another field that also requires a senior research seminar may arrange to fulfill their seminar requirement in a combined project.

**Related courses:** 4 300-level courses in African American studies, anthropology, economics, history, linguistics, philosophy, political science, psychology, or gender studies 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. Two 300-level courses allow students to see how these methods are used in practice.

#### Minor course 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 may be counted toward the minor for 376 and 399.

One 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 course 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 may be counted toward the minor for 376 and 399.

One 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.

### Four-Year BA/MA

In rare instances, superior students may petition the department to complete BA and MA degrees in the normal four-year period required for the BA. Only unusually gifted and motivated students are accepted into this rigorous program. Interested students should consult with the undergraduate advisers early in their academic careers. See Accelerated Master's Programs in the Undergraduate Education section of this catalog.

### 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 under Academic Policies earlier in this section of the catalog.

## 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 section 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 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 276-0 Sport in American Society** Interrelationships between sport and social institutions; the nature of American society; capitalism and inequality in sports.

**SOCIOL 301-0 The City: Urbanization and Urbanism**

Theories of urbanization, housing, jobs, race and class, segregation, social networks, politics, and reform policies. Research projects. Prerequisite: 110 or 207.

**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. Relationship of inequality to problems of contemporary urban education. 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. 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 role of production structures and other social institutions on pollution and depletion. Social support for and resistance to environmental protection policies. Inequalities in use of resources and incidence of environmental hazards. Prerequisite: 100- or 200-level course.

**SOCIOL 314-0 Sociology of Religion and Ideology** Belief systems in society. Production of ideas. Religion, art, science, political ideology, and folk-knowledge as social products. Prerequisite: 100- or 200-level course.

**SOCIOL 315-0 Industrialism and Industrialization** Structure and culture of modern industry; consequences for status and class organization. Labor force, formal and informal organization of management and labor. Union-management interaction. Factors affecting industrial morale. 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 318-0 Sociology of Law** 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 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 young people interact with families, schools, peers, neighborhoods, and workplaces, influencing them and being influenced by them. 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 decisions in modern societies. Prerequisite: 100- or 200-level course.

**SOCIOL 332-0 Work and Occupation in Modern Industrialized Societies** Sociological perspectives on work. Students view their own occupational futures in the context of the changing social relations of production. Prerequisite: 100- or 200-level course.

**SOCIOL 333-0 Law, Norms, and Power** How laws and informal 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.

## SOUND DESIGN

Please see Sound Design in the Cross-School Programs section of this catalog.

## SPANISH AND 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 course requirements (15)**

- 201-1 or 201-2 (heritage speakers of Spanish must take an appropriate substitute course)
- 202-1 (heritage speakers may take 207 as a substitute)
- 202-2
- 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, on condition that these courses be 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 201-1, 201-2, 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 course requirements (8):* 8 courses at or above the 200 level, including at least 2 at the 300 level. Heritage speakers of Spanish must substitute other courses for 201-1 and 201-2; 202-1 may be replaced by 207.

#### **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's web site and contact a faculty adviser.

#### **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 section 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 one year. Communicative method. Development of speaking, listening, conversation, and grammar skills through context. Three class meetings

a week. Outside online video lab twice a week.

**SPANISH 102-1,2,3 Intermediate Spanish** Communicative method. Further development of grammar, vocabulary, speaking, and writing skills through readings in modern prose. Three class meetings a week. Outside online video lab twice a week. Prerequisite: 101-3 or 115-2.

**SPANISH 115-1,2 Accelerated First-Year Spanish**

For students with some previous experience in Spanish. Communicative method. Development of speaking, listening, conversation, and grammar skills through context. Three class meetings a week. Outside online video lab twice a week. Offered winter and spring. Prerequisite: department placement.

**SPANISH 199-0 Language Workshop** Intensive review of linguistic patterns and development of fluency and grammatical accuracy in speaking and writing. Prerequisite: 102-3, AP score of 4, or Spanish Language Placement Exam.

**SPANISH 201-1,2 Reading and Speaking I and II** Sequence designed to develop speaking strategies and structures.

1. Accurate informal and formal conversation. 2. Public speaking and further development of specialized vocabularies. Cultural and literary readings. Must be taken in sequence. Prerequisite: Spanish Language Placement Exam or 199 for 201-1; AP score of 5 or 201-1 for 201-2.

**SPANISH 202-1,2 Reading and Writing I and II**

Sequence designed to develop writing and linguistic skills. 1. Short literary texts. 2. Expository texts. Must be taken in sequence. Prerequisite: 201-1 or AP score of 5 for 202-1; 202-1 for 202-2.

**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: 201-1 or 201-2; 202-1 or 207; 202-2.

## 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 (may be taken concurrently): 201-1 or 201-2; 202-1 or 207; 202-2.

**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 (may be taken concurrently): 201-1 or 201-2; 202-1 or 207; 202-2.

**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 (may be taken concurrently): 201-1 or 201-2; 202-1 or 207; 202-2.

**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 Literature** 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 sub-genres (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 Guamán 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 *rastacuerro*, 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: 201-1 or 201-2; 202-1 or 207; 202-2; 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: 201-1 or 201-2; 202-1 or 207; 202-2; 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: approval 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** Accelerated audiolingual study of the Portuguese language for beginners. The equivalent of two years of unaccelerated language courses. Concurrent registration in 111 and 112. 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.

**PORT 201-0 Reading and Speaking Portuguese** An intermediate course designed to offer instruction in reading and speaking in various modes and to expand mastery of Brazilian Portuguese for oral expression and comprehension. 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** Development of competence in reading, speaking, and writing. Readings focus on Brazilian historical, cultural, and sociopolitical structures. Prerequisite: 202 or equivalent.

**PORT 399-0 Independent Study** Independent study under supervision. Consultation with the director of undergraduate studies required.

## STATISTICS

Statistics is the scientific discipline that deals with the organization, analysis, collection, and interpretation of numerical data. Statistical methods are widely used to design and analyze experiments, sample surveys, censuses, and other observational programs. 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

#### Departmental courses

- 320-1,2, 325, 350, 351
- MATH 310-1 or IEMS 202
- 2 of the following courses: STAT 352, 355, 359; MATH 310-2; IEMS 305, 315 (students may not apply both MATH 310-2 and IEMS 315 to the major requirement)

**Related courses:** 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

### 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 course requirements (6 units)

- 201, 202, or 210, 320-1,2, 325 or 351, 350 or ECON 381-2
- MATH 310-1 or IEMS 202

#### Four-Year BA/MS

The department offers a four-year BA/MS program in statistics for outstanding undergraduate majors. Interested students should contact their adviser or department chair and should see Accelerated Master's Programs in the Undergraduate Education section of this catalog.

#### 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 398, during which a research paper is developed. For more information, consult the director of undergraduate studies. See also Honors under Academic Policies earlier in this section of the catalog.

#### 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.

**STAT 210-0 Introductory Statistics for the Social Sciences** Introduction to basic concepts and methods of statistics and probability. Methods of data collection, descriptive statistics, probability, estimation, sampling distributions, confidence intervals, hypothesis testing.

**STAT 232-0 Applied Statistics** Use of statistical models to draw conclusions from experimental and survey data. Covers simple linear regression, multiple regression, and analysis of variance and covariance. Emphasis on application of methods and interpretation of results. Prerequisite: 202 or 210, MATH 220, or equivalent.

**STAT 302-0 Elementary Statistical Methods** Tabular and graphical presentation of data, hypothesis tests, confidence intervals, comparisons of means and proportions, regression and correlation. Prerequisite: MATH 224 or equivalent.

**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. Prerequisite: MATH 310-1 or IEMS 202.

**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 quarter-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**

#### Related Courses in Other Departments

IEMS 202, 305, 315 (see McCormick School section)  
MATH 310-1,2,3

#### TRANSPORTATION AND LOGISTICS

Please see Transportation and Logistics in the Cross-School Programs section of this catalog.

## UNDERGRADUATE LEADERSHIP

The Undergraduate Leadership Program, a certificate program open to all undergraduates, helps students understand the nature of leadership and prepares them to become leaders. (See Undergraduate Leadership Program in the Cross-School Programs section of this catalog.)

## WRITING PROGRAM

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 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.



## School of Communication

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). In addition to the specialized program presented by each department, the five departments of the School of Communication combine to offer the undergraduate degree program in interdepartmental studies. 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.

For more information, see the school's web site at [www.communication.northwestern.edu](http://www.communication.northwestern.edu).

## ACADEMIC POLICIES

### Requirements for the Degree of Bachelor of Science 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. 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 Undergraduate Education section).

### Requirements for the Degree of Bachelor of Arts in Communication

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 the section on the foreign language requirement in the Weinberg section 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-minus 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. D and P grades may apply 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: interdepartmental studies, communication sciences and disorders, communication studies, performance studies, radio/television/film, or theatre (including 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 Regulations in the Undergraduate Education section 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.

### **Teaching Certification**

The Department of Communication Sciences and Disorders offers a program leading to public school certification.

### **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.

## **ACADEMIC OPTIONS**

### **Minor Programs**

The School of Communication offers three minor programs, each requiring 7 courses. 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 better in order to be counted toward the minor.

#### *Human Communication Science (7 units)*

A minor in human communication sciences requires at least 7 courses in the communication sciences and disorders department.

- CSD 202 Biological Foundations of Human Communication (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 chosen from the following (students should consult with their adviser for other course options):
  - CSD 301 Anatomy and Physiology of the Vocal Mechanism
  - CSD 302 Anatomy and Physiology of the Peripheral Hearing Mechanism
  - CSD 303 Brain and Cognition
  - CSD 306 Psychoacoustics
  - CSD 307 Acoustic Phonetics
  - CSD 309 Culture, Language, and Learning
  - CSD 310 Biological Foundations of Speech and Music
  - CSD 314 Topics in Cognitive Neuroscience
  - CSD 350 Cognitive Development in Atypical Learners
  - CSD 392 Language Development and Usage
  - CSD 399 Independent Study
  - CSD 406 Functional Neuroanatomy

- At least 3 300- or 400-level clinical courses chosen from the following (students should consult with their advisers for other course options):  
CSD 318 Introduction to Audiology  
CSD 336 The Field of Special Education  
CSD 373 Introduction to Learning Disabilities  
CSD 375 Diagnostic Procedures for Exceptional Children  
CSD 376 Remedial Education for Children with Learning Disabilities  
CSD 396 Diagnostic Procedures in Speech and Language Pathology  
CSD 419 Pediatric Audiology  
CSD 434 Neuropsychology and Learning Disabilities  
CSD 435 Neuromotor Speech Disorders in Adults  
CSD 438 Dysphagia  
CSD 475 Aphasia  
CSD 491 Fluency, Disfluency, and Stuttering  
CSD 492 Language Disorders in Preschool Children  
CSD 493 Vocal Physiology and Pathology  
CSD 494 Advanced Study in Disorders of Fluency

#### *Theatre (7 units)*

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.

Of the 7 courses for the minor, 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).

- 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

#### *Dance (7 units)*

The minor in dance encourages students majoring in other fields to organize their dance studies in a coherent manner. The minor requires students to gain both depth and breadth in the study and practice of dance.

Of the 7 courses for the minor, 3 must be 300-level courses. At least 5 of the 7 courses for the minor must be offered by the dance program; the other 2 may be approved courses in departments or programs outside dance (e.g., performance studies, gender studies, comparative literature).

- DANCE 101-1 Introduction to the Dance Experience: Dance in Context
- Dance 101-2 Introduction to the Dance Experience: Movement Awareness

- 1 course in dance history, theory, or criticism
- 1 course from dance performance
- 1 unit of dance technique, including classes from 2 different dance genres (e.g., Modern and Jazz)
- 2 electives reflecting the student's special interests

### **Interschool Options**

For information about the interschool programs listed below, see the Cross-School Programs section.

#### *Animate Arts Adjunct Major*

Any Northwestern undergraduate is eligible to declare an adjunct major in animate arts. This course of study provides an interdisciplinary approach to studying and creating new digital media. Its curriculum tightly integrates education in the arts and in technology, particularly computer programming.

The program is structured as an adjunct, interdepartmental major. A limited number of specific introductory courses will be offered in the curriculum as well as a senior-level project sequence. Students' electives will be chosen from the existing course offerings of the relevant departments.

#### *Music Theatre Program*

The Certificate in Music Theatre provides the opportunity for School of Music students majoring in voice and School of Communication students majoring in theatre to create a second area of specialization.

#### *Program in Sound Design*

The Program in Sound Design offers a certificate in sound design to Communication and Music students and a minor to Weinberg College students who are accepted and who complete the required 7 courses.

#### *Undergraduate Leadership Program*

The Undergraduate Leadership Program, an interschool certificate program open to all undergraduates, helps students understand the nature of leadership and prepares them to become leaders.

### **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.

The School of Communication offers departmental and thesis sequences leading to the master's degree as well as a program leading to the degree of master of science

in communication with emphasis in communication management or communication systems. 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 degree are available from the School of Communication.

All departments of the School of Communication participate in graduate studies and research. Graduate programs may be relatively specialized in the offerings of one department or arranged to represent the offerings of two or more departments.

## INTRODUCTORY AND RELATED COURSES

**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 Processes and Pathologies of Human Communication** 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.

**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

The Roxelyn and Richard Peppers Department of Communication Sciences and Disorders is the locus at Northwestern of basic science and research in human communication and its disorders, offering clinical training in audiology and hearing sciences, learning disabilities, and speech and language pathology. Undergraduate and graduate curricula provide a foundation for the study of normal and disordered human communication based on hearing, speech, language, and learning processes. Classroom,

clinical, and research facilities of the department are located in the Frances Searle Building on the Evanston campus, with the opportunity to do further clinical work at the Feinberg School of Medicine on the Chicago campus.

## Areas of Study for Departmental Majors

The undergraduate program in communication sciences and disorders is designed to provide a thorough background of information about human communication and its disorders. The program emphasizes basic science principles that underlie all human communication and cognition. Students are also introduced to clinical issues and research findings that pertain to disorders of communication and learning. Upon completion of the undergraduate degree (bachelor of science in communication), many students pursue clinically based or research graduate degrees or go on to medical school. Others enter careers in health-related private industry or the public sector.

Undergraduate majors in communication sciences and disorders may choose a general education in human communication sciences (premed; see next paragraph) or from among three areas of concentration: audiology and hearing sciences, learning disabilities, and speech and language pathology. Undergraduates are encouraged to identify their area of concentration as soon as possible so that they can formulate a course plan suited to their interests. However, selection of an area of concentration by registration for fall quarter of their junior year may still allow reasonable time to complete the recommended course work. Students should consult with their academic advisers on a regular basis to ensure their course work is appropriate. Students can change from an area of concentration to the general education track at any time. Undergraduates who do not complete the recommended course work for a concentration can still graduate with a major in communication sciences and disorders but may be at a disadvantage when applying for advanced degree programs.

Undergraduate majors in communication sciences and disorders who choose to pursue a premed track are encouraged to begin the recommended course work during their freshman year because of the importance of following the best sequence of courses in this track's curriculum. Undergraduates who do not complete the premed course work can still graduate with a major in communication sciences and disorders but will need to fulfill any remaining medical school requirements in a postbaccalaureate program if applying to an advanced-degree program.

### *Premed Track*

The premed track is particularly well suited to students who plan to attend graduate or professional school in fields such as medicine, dentistry, or neuroscience. It also provides excellent preparation for students who plan to pursue graduate study in audiology and hearing sciences, learning disabilities, or speech and language pathology; to conduct

research in these areas; or to engage in professional practice. In addition to taking courses in communication sciences and disorders, students in this track complete courses in general chemistry, organic chemistry, biology, physics, and mathematics. Students should consult with their adviser for additional requirements and recommendations.

Students admitted to the Honors Program in Medical Education (a seven- or eight-year program) 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 may spend only three years on the Evanston campus, they may take fewer 100- and 200-level courses in the department and the School of Communication than some four-year undergraduates. These requirements are being reviewed, and students should check with their academic adviser for updated information.

### *Audiology and Hearing Sciences*

The audiology and hearing sciences area of concentration encompasses the study of hearing, hearing disorders, and the treatment of hearing disorders. Undergraduate course work in this program provides the scientific foundation necessary for clinical practice and/or auditory research. Emphasis is on basic communication science, including study of the anatomical, physiological, and physical bases of hearing. Information on normal communication processes is presented. An introduction to audiologic assessment and hearing loss management is provided, with the opportunity for supervised clinical experience for advanced undergraduate students.

The doctor of audiology program (AuD) is a professional degree program in audiology and hearing sciences designed to prepare students for the clinical practice of audiology. Students interested in careers in auditory research may emphasize the development of research skills at the master's degree level to prepare for continued study at the doctoral level.

Students completing graduate study in audiology and hearing sciences may qualify for clinical certification by the American Speech-Language-Hearing Association, Illinois state licensure in audiology, and registration with the Illinois Department of Public Health in the area of hearing aid dispensing. Audiology professionals may be employed in hospitals, community and university clinics, schools, industry, rehabilitation centers, and research laboratories. Advanced professionals may be self-employed in private practice.

### *Learning Disabilities*

The undergraduate concentration in learning disabilities provides academic preparation for graduate study leading to the MA degree in learning disabilities and related fields. The field of learning disabilities is concerned with learning processes and their dysfunctions, including disorders of

attention, perception, memory, language, conceptualization and reasoning, and processing speed. 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. Students may also create an interdisciplinary program by combining learning disabilities with such ancillary fields as audiology, education, linguistics, neuroscience, psychology, or speech and language pathology.

The undergraduate curriculum emphasizes the psychological, linguistic, and biological bases of normal language and cognitive development. Courses incorporate clinical examples from and/or observations in area clinics and local schools. Advanced undergraduate courses are focused more directly on disorders in basic processes and on clinical applications of basic theory, including some supervised clinical teaching.

Graduates may enter MA and/or PhD programs to pursue advanced work and school certification as a learning behavior specialist or as a researcher. Graduates with advanced degrees may work in public or private schools, universities, hospitals, or private practice.

### *Speech and Language Pathology*

The undergraduate emphasis in speech and language pathology combines academic instruction with laboratory activities and supervised clinical experiences to give students a background for graduate study in the field. The undergraduate curriculum emphasizes the psychological, linguistic, neurological, acoustic, anatomical, and physiological bases of normal auditory and language behavior. As 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, such as problems of speech sound production, language development, fluency, and voice. This program also offers courses of study leading to the MA degree in speech and language pathology or a PhD degree. Graduate courses are concerned with the neurophysiologic and structural disorders affecting communication and swallowing and with a more detailed study of disorders of language, fluency, articulation, and voice. Students study the theory, evaluation, and management of aphasia, cerebral palsy, cleft palate, laryngeal pathologies, and other complex disorders.

Students completing graduate programs of study in speech and language pathology may qualify for teaching certification by the Illinois State Board of Education, Illinois state licensure, and certification by the American Speech-Language-Hearing Association. Professional speech and language pathologists work in schools, child

development programs, specialized educational settings, universities, hospitals, clinics, rehabilitation centers, and private practice.

### Honors Program

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 in the Undergraduate Education section of this catalog.

### Independent Study

Upperclass students in the department 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.

### Requirements for a Major in Communication Sciences and Disorders

There is one set of requirements for a major in communication Sciences and Disorders. However, well-designed course plans are recommended for each area of concentration. Students should consult their adviser for details.

- 2 GEN CMN courses: 108 and a choice of 101, 102, or 103
- A total of 13 CSD courses, including the following:
  - 100-level course: 112
  - 200-level course: 202
  - 300- and 400-level courses in communicative disorders: 10 courses (excluding practicum courses), including 3 clinically oriented and 3 basic science courses
- 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.
- Writing proficiency: requirement for all students
- 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 under Areas of Study for Departmental Majors, Premed Track, earlier in this section.

### Courses for Undergraduates and Graduates

#### GEN CMN 108-0 Processes and Pathologies of Human Communication

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 201-0 Phonetics** Training in transcription of English speech sounds. Introduction to phonological analysis, dynamics of articulation, and dialect variations.

#### CSD 202-0 Biological Foundations of Human 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.

#### CSD 304-0 Statistics in Communication Sciences and Disorders

Introduction to research design and data analysis in communication sciences and disorders; statistical inference.

**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.

**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 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** Theories of normal and atypical child development — including cognition; language; gross and fine motor, social, and interpersonal functioning; and intrapsychic functioning — during the first three years of life. Prerequisite: advanced status in developmental disabilities or consent of instructor.

**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 375-0 Diagnostic Procedures for Exceptional Children**

Introduces students to differential diagnostic procedures used in special education. Examination of cognitive and emotional disorders, sensory impairment, physical handicaps, and legal aspects of diagnosis.

**CSD 376-0 Remedial Education for Children with Learning Disabilities** Theories and intervention principles for disorders of oral language, reading, written language, mathematics, and nonverbal learning.

**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 378-1,2 Student Teaching in Learning Disabilities and Related Disorders** Supervised teaching of exceptional children. Observation and participation in classes of normal-learning children as well as children with learning problems and related disorders.

**CSD 379-1,2 Student Teaching in Learning Disabilities and Related Disorders** Continuation of 378.

**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 398-1,2 School Practicum in Speech and Language Pathology** Supervised practicum of speech-language

pathology services in schools. Participation in parent-teacher conferences and on IEP teams. Prerequisites: 334 and 397.

**CSD 399-0 Independent Study** Prerequisite: consent of undergraduate dean after submission of petition.

*Undergraduates may take 400-level courses with permission of the instructor.*

## COMMUNICATION STUDIES

The Department of Communication Studies offers liberal arts-oriented course work focused on the most fundamental and pervasive of human activities. The study of human communication ranges from interpersonal processes such as persuasion and relationship formation to organizational processes such as group leadership and dispute resolution, as well as to the strategies and styles of public deliberation and debate and the political and cultural processes involving mass media, the Internet, and telecommunications systems. At the same time, the study of human communication encompasses the scholarly traditions of both the humanities and social sciences. The intellectual foundations for this study range from classical rhetoric to cognitive science, from the economics of computer-mediated communication networks to the ethics of public argument.

### Course Specializations for Departmental Majors

The department has organized the wealth of theory and research on human communication — as well as the real-world applications of that theory and research — into six course specializations. These are interrelated sets of courses that can help students coordinate their choice of classes with their intellectual interests, postgraduate educational plans, and career goals. Students who major in communication studies are encouraged, though not required, to organize their course work within one or two of these specializations as described below.

#### *Organizational Communication*

The success of all organizations — whether small neighborhood groups or giant multinational corporations — depends on effective communication. Organizations must have members who are skilled in the basic communication activities of persuasion, group leadership and decision making, bargaining and negotiation, and team problem solving. And in the contemporary world, organizations also demand the knowledge necessary to analyze and act on information gathered from surveys and other research methods, to harness the resources of communication technology, and to thrive in an environment of diverse individuals. This specialization includes courses that develop basic communication skills as well as courses that examine communication processes in such contexts as task-oriented groups and professional-client relationships. It also includes courses that focus on the organizational

challenges associated with technology, information management, cultural diversity, and image building. This specialization will be of interest to students who wish to work — and who will seek to lead — in either business or not-for-profit organizations. To complete this specialization, students must take 201, 250, and 360 and choose a minimum of 3 courses from the following: 205, 229, 270, 275, 329, 340, 341, 343, 350, 361, 362, 363, 364, 365, 366, 371, 391, 393, and appropriate sections of 395 chosen in consultation with an adviser.

#### *Communication Industries and Technologies*

Mass communication and telecommunications are reshaping the culture, commerce, and politics of the United States and the world. Media firms are merging into ever-larger organizations that produce film, television, music, books, magazines, newspapers, and software for audiences worldwide. At the same time, technology is breaking down the old distinctions among computers, telephones, video, and print to create new networks that integrate video, voice, and data. These changes present new and sometimes unanticipated challenges to managers in business as well as to leaders in government, education, the arts, and the professions. This course specialization is intended for students who wish to prepare for these challenges by developing an understanding of the social, economic, legal, and technical aspects of mass communication and telecommunications. It will be of interest to students who seek careers in such communication fields as advertising and public relations, management of entertainment and information industries, and public policy making. To complete this specialization, students must take 205 and 270 and select a minimum of 4 courses from the following: 201, 229, 275, 330-1,2, 350, 355, 370, 374, 376, 377, 378, 383, 384, 385, 388, 393, and appropriate sections of 395 chosen in consultation with an adviser.

#### *Rhetoric, Media, and Public Culture*

Citizens of the 21st century must understand the communication opportunities, obligations, and risks that emerge in an era of cultural diversification and conflict. This course specialization examines the relationship between communication and culture from a rhetorical and critical perspective — that is, from a point of view emphasizing the use of language and image to characterize social reality, create forums for deliberation and debate, and confront controversial issues and cultural differences. The specialization includes courses that engage the issues raised by differences of race, class, gender, nationality, and political conviction. It also includes courses that examine such cultural processes as the legitimization of social authority, the construction of personal as well as national identity, and the articulation of national purpose and international obligation. The role of the mass media in these issues and processes is of particular concern. This course specialization is



intended for students interested in positions of civic leadership, such as in community-based organizations, social reform movements, and cultural, political, and educational institutions. To complete this specialization, students must take 210 and 220 and select a minimum of 4 courses from the following: 275, 310, 315, 322, 324-1,2, 325-1,2,3, 326, 327, 328, 329, 330-1,2, 332, 340, 370, 371, 373, 374, 376, 377, 384, 392, and appropriate sections of 395 chosen in consultation with an adviser.

### *Relational Communication*

Our lives are spent in relationships with others. Most people are born into a family, form friendships, join work groups, and begin romantic attachments that sometimes turn into new family units. Interpersonal communication is the means by which we develop, maintain, and terminate these relationships. The relational communication specialization focuses on these processes. It has four components: courses examining the psychological variables that affect how people create and interpret the communication behaviors that occur during social interaction; courses examining the contexts in which relational communication occurs, such as the family and the work group; courses focusing on strategies and processes of interpersonal influence; and courses focusing on the impact of gender, culture, and other factors on the processes of relational communication. This specialization is intended for students interested in the psychological foundations of human communication as well as students interested in the helping professions (e.g., therapy, counseling). To complete this specialization, students must take 201, 241, and 250 and select a minimum of 3 courses from the following: 205, 340, 341, 343, 344, 350, 360, 366, 378, 382, 390, and appropriate sections of 395 chosen in consultation with an adviser.

### *Media and Politics*

Communication is essential to both effective leadership and citizen participation. Leaders must employ the arts and sciences of communication to negotiate policy, move public opinion, maintain relations with other nations, and of course, win votes. Citizens must understand these arts and sciences if they are to maintain self-government. This course specialization focuses on the role of communication in the political processes of modern democracies, especially on how government officials, candidates, and citizens interact with the mass media in the realm of public affairs. The specialization is intended for students interested in political organizing and consulting, opinion polling, policy analysis, and research work in public interest groups and other not-for-profit organizations. To complete this specialization, students must take 270 and a minimum of 3 courses from the political leadership group, focusing on the rhetoric and strategies of political persuasion, consisting of 315, 322, 325-1,2,3, 328, 330-1,2, 332, 380,

and 391; and a minimum of 2 courses from the citizen participation group, concerning Americans' beliefs and the ways they respond to political information, consisting of 201, 205, 331, 355, 370, 371, 372, 373, 380, 383, 384, 388, 392, 393, and appropriate sections of 395 chosen in consultation with an adviser.

### *Argumentation and Advocacy*

Lawyers, policy makers, and indeed all citizens must be able to put forward and defend their views when matters of common concern are debated. This course specialization is based on the conviction that the skills of advocacy can best be cultivated in the liberal arts tradition by uniting intensive practice in the arts of argumentation with theory-based understanding of advocacy and deliberation. In this specialization, courses emphasizing practice require students to think critically about their positions, plan their communicative strategies effectively, and argue their cases forcefully. Courses emphasizing understanding enlarge students' views of the traditions and institutions — especially the law — that shape the processes of advocacy and deliberation on vital issues. Thus prepared, students can take their places as articulate citizens in the various communities to which they belong. The perspectives and skills offered in this specialization are particularly appropriate for students interested in law careers. To complete this specialization, students must take 220 and select 2 practice-oriented courses from 215, 221, and GEN CMN 104 as well as 3 theory-oriented courses from 205, 210, 310, 315, 322, 324-1,2, 325-1,2,3, 326, 327, 330-1,2, 331, 363, 391, and appropriate sections of 393 and 395 chosen in consultation with an adviser.

## **General Requirements for a Major in Communication Studies**

14 School of Communication courses:

- GEN CMN 102
- 205, 250, 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.
- An additional 8 200- or 300-level School of Communication courses, at least 5 of which must be in the department; of those 5, 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:

- 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 the foreign language requirement in the Weinberg section of this catalog.
- 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.

### Departmental Honors Program

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 in the Undergraduate Education section of this catalog.

### 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 Development of Rhetorical Theory** Study of classical and contemporary texts to understand foundational problems, concepts, and claims regarding the political, social, and cultural functions of public discourse.

**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 Innovation** Organizations and communities depend on innovative ideas, products, or processes to help them solve their problems and to 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: 201, 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 Media and American Society** 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 Marketing 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.

## INTERDEPARTMENTAL STUDIES

For students who would like to combine interests from more than one department, the school offers the interdepartmental studies major. Majors in interdepartmental studies may seek a general education with exposure to a broad range of disciplines or a professional preparation from two related areas of communication.

### Requirements for a Major in Interdepartmental Studies

- A minimum of 3 courses distributed among at least three School of Communication departments and selected from the following: GEN CMN 101, 102, 103, 104, 108, 110; THEATRE 140-1, 140-2, 140-3; RTVF 180; CSD 112
- A minimum of 3 courses at the 200 level distributed among at least three School of Communication departments
- An additional 10 courses in communication distributed among at least two departments, including at least 8 courses at the 300 or 400 level. It is the student's responsibility to take all courses prerequisite for 300- and 400-level courses. Eligible students are urged to elect 399 during their senior year; this independent study should be arranged to correlate two of the communication areas the student has studied.
- 6 courses at the 200 level or above outside communication, including at least 3 300-level courses. If they apply, courses taken to meet the distribution requirement may be used to satisfy this requirement.
- Electives in communication and other areas to complete a minimum of 45 courses
- Approval of the dean for undergraduate affairs of major programs for undergraduate work

## PERFORMANCE STUDIES

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.

### Requirements for a Major in Performance Studies

- Introductory courses: GEN CMN 101 or 102; GEN CMN 103
- 200-level courses: a minimum of 4 courses in communication, including the following courses in the department: 216, 224, and 1 unit of 210-1, 210-2, or 210-3
- Production courses in theatre: 2 courses selected from THEATRE 140-1,2,3, 240-1,2,3, 241-1,2,3, 249-1,2, 354, 355, 363; or 1 course selected from the preceding courses and 1 registration for 119; or 2 registrations for 119
- An additional 10 courses in communication, at least 6 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 6 300-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
- 6 courses at the 200 level or above outside communication, including at least 3 300-level courses in literature; if they apply, courses taken to meet the distribution requirement may be used to satisfy this requirement
- 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 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 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 399-0 Independent Study** Prerequisite: consent of undergraduate dean after submission of petition.

## RADIO/TELEVISION/FILM

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 Chicago-area television and radio station and production companies. Frequent guest lectures are offered by alumni with careers in media and by other well-known professionals.

### Requirements for a Major in Radio/Television/Film

- Introductory courses: 180; a minimum of 3 courses in communication at the 100 or 200 level outside the department
- 200-level courses: 220, 230, 280; 280 is prerequisite for all 300-level production courses
- An additional 8 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
- 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
- Electives in communication and other areas to complete a minimum of 45 courses.

### Courses Primarily for Freshmen and Sophomores

#### **RTVF 180-0 Media Construction I: Concept and Image**

**Design** Introduces the core components of media: idea, image, sound, and sequence. Students use still cameras and digital editing programs. Prerequisite for 280. 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 280-0 Media Construction II: The Moving Image and Sync Sound** Explores the challenges and opportunities created by shooting and editing sync sound. Prerequisites: 180, 220. Prerequisite to 300-level production courses. Required for majors; typically taken in sophomore year.

**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: 280, 380.

**RTVF 375-0 Designing for the Internet** Design concepts as they relate to the web in an intensive studio/workshop environment. Prerequisite: 280.

**RTVF 376-0 Interactive Media** Exploration of the techniques and aesthetics of interactivity using various media. Prerequisites: 280 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. Prerequisite: 280.

**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. Prerequisite: 280.

**RTVF 391-0 TV Studio Directing** Directing, crewing, and technical skills for multiple camera live-on-tape television production in narrative and nonnarrative genres; preproduction, directorial communication, blocking, pacing, visualization. Prerequisite: 380.

**RTVF 392-0 Documentary Production** Students examine documentary practices and produce their own shorts. Prerequisite: 280.

**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. Prerequisite: 280.

**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. Prerequisite: 280.

**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.

## 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; stage production; design; playwriting; dramaturgy; creative drama and children's theatre; 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. 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.

## Requirements for a Major in Theatre

### • Introductory courses

THEATRE 140-1 Theatre in Context, 140-2 Theatre in Context, 140-3 Production in Context (includes one build crew and one run crew)

GEN CMN 110 Voice for Performance

GEN CMN 103 Analysis and Performance of Literature or 1 performance studies or radio/television/film course

- 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)
- Electives in communication and other areas to complete a minimum of 45 courses.
- 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:

### o Performance (at least 2 courses)

THEATRE 210 Training the Actor's Voice

THEATRE 243-1,2,3 Acting I: Principles of Characterization

THEATRE 253-1,2 Mime

THEATRE 260 Fundamentals of Stage Directing

THEATRE 310 Advanced Voice/Styles

THEATRE 311 Dialects for the Stage

THEATRE 312-1 The Art of Storytelling

THEATRE 330 Special Topics

THEATRE 340-1,2 Stage Directing

THEATRE 341-1,2,3 Acting II: Analysis and Performance

THEATRE 346-1,2,3 Playwriting

THEATRE 347 Children's Theatre

THEATRE 348-1 Creative Drama

THEATRE 348-2 Advanced Creative Drama

THEATRE 349-1,2,3 Acting III: Problems in Style

THEATRE 359 Directing for the Open Stage  
(see Graduate School catalog)

THEATRE 442 Theatre Practice: Children's Theatre Tour (see Graduate School catalog)

### o Design/technology (at least 2 courses at the 200 level)

THEATRE 240-1,2,3 Stagecraft

THEATRE 241-1,2,3 Design Process

THEATRE 242 Stage Makeup

THEATRE 249-1 Introduction to Stage Management

THEATRE 249-2 Advanced Stage Management

THEATRE 263 Theatre Sound

THEATRE 330 Special Topics

THEATRE 342 Lighting Design II

THEATRE 343 Scene Design II

THEATRE 344 Costume Design II

THEATRE 350 Production Management  
 THEATRE 353 Topics in Stagecraft  
 THEATRE 354 History of Costume and Décor  
 THEATRE 355 Scene Painting  
 THEATRE 356-1,2,3 Graphic Arts for the Stage Designer  
 THEATRE 357-1,2 Freehand Drawing for the Stage Designer  
 THEATRE 361 Textile Arts and Crafts for the Costume Designer  
 THEATRE 363 Theatre Sound  
 THEATRE 364-1,2,3 Period Pattern Drafting and Draping  
 THEATRE 379 Topics in Stage Management and Leadership

- o **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 in office 215 of the Theatre and Interpretation Center.

### 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 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 Children's Theatre** 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 Graphic Arts for the Stage Designer** Techniques and materials of graphic communication for the stage designer. May be repeated for credit with change of topic. Crew participation in department productions

may be required. **1.** Perspective, rendering, and color. **2.** Theatrical drafting and calligraphy. **3.** Theatrical model building and three-dimensional design development. Prerequisite: junior standing or consent of instructor.

**THEATRE 357-1,2 Freehand Drawing for the Stage Designer** Drawing for scenery, costume, and lighting designers; principles of drawing and composition using a variety of drawing materials. 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.

## **Requirements for a Major in Dance**

- Introductory courses: DANCE 101-1,2,3; THEATRE 119 (2 quarters, no credit); 1 course from the following: GEN CMN 101, 102, 103, 108, 110
- Upper division core requirements: DANCE 201, 202, and 395
- 200- or 300-level communication courses: 3 courses
- Electives in communication and other areas to complete a minimum of 45 courses.
- Dance techniques: at least 4 units (each dance technique class carries .33 units of credit), which must include DANCE 140 Cultural Forms as well as at least 1 unit of modern taken sequentially and 1 unit of jazz taken sequentially, each in consecutive quarters in a single academic year; selected from
  - DANCE 110 Movement for the Stage
  - DANCE 120 Topics in Preparation for Performance
  - DANCE 130 Music Theatre Dance
  - DANCE 150 Modern I
  - DANCE 160 Jazz I
  - DANCE 170 Ballet I
  - DANCE 180 Tap I
  - DANCE 250 Modern II
  - DANCE 260 Jazz II

DANCE 270 Ballet II  
 DANCE 280 Tap II  
 DANCE 350 Modern III  
 DANCE 360 Jazz III  
 DANCE 370 Ballet III  
 DANCE 380 Tap III

- At least 6 courses chosen from the following categories:

- o **Performance** (at least 2 credits)

DANCE 225 Dance Composition  
 DANCE 235 Choreography for Music Theatre  
 DANCE 325 Advanced Choreographic Study  
 DANCE 326 Advanced Improvisation  
 DANCE 345 Studies in Collaboration  
 DANCE 387 Theatre/Dance Practicum  
 DANCE 465 Studies in Dance (see Graduate School catalog)

- o **History, theory, and criticism** (at least 2 credits)

DANCE 215 Dance History  
 DANCE 315 Dance Criticism  
 DANCE 335 Special Topics in Dance Research (methods or history topics)  
 DANCE 365 American Rhythm Dancing and the African American Performance Aesthetic  
 THEATRE 367 History of the Lyric Theatre  
 DANCE 399 Independent Study

- o **Professional studies** (at least 2 credits)

DANCE 335 Special Topics in Dance Research  
 DANCE 355 Dance in Education  
 DANCE 356 Dance and Expressive Arts Therapies  
 DANCE 375 Summer Dance Institute  
 THEATRE 380 Internship in Theatre Practice  
 DANCE 399 Independent Study  
 DANCE 465 Studies in Dance (see Graduate School catalog)

## **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.

**DANCE 140-0 Cultural Forms** Sections offer instruction in different ethnic dance forms; those offered in the past

include flamenco, Indian, and African. Not offered every quarter; may not be offered every year.

**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 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 Experiential Anatomy for Performances** 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.

**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 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 yearlong sequence with grade and 1 credit awarded in the spring.

**DANCE 399-0 Independent Study** Prerequisite: consent of undergraduate dean after submission of petition.

## School of Education and Social Policy

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. In this view, learning communities include not only schools and classrooms but also workplaces, families, neighborhoods, and other societal arrangements where learning takes place. Through their broad-based interdisciplinary research, teaching, and outreach activities, SESP 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. Students integrate and apply this knowledge to the outside world and their own lives.

At the undergraduate level, the school provides an interdisciplinary curriculum, practical experience, and research activities that are closely linked to SESP's faculty and to the graduate programs in learning sciences and in human development and social policy. Students learn to understand human development and improve learning in its various social contexts by applying the social and behavioral sciences. The school offers four concentrations leading to the degree of bachelor of science in education and social policy: human development and psychological services, learning and organizational change, secondary teaching, and social policy. Students in other undergraduate schools within Northwestern also may complete the requirements of the secondary teaching concentration and qualify for secondary certification.

SESP offers advanced degrees in elementary and secondary teaching, higher education, learning and organizational change, learning sciences, and human development and social policy.

For more information about SESP, see the school's web site at [www.sesp.northwestern.edu](http://www.sesp.northwestern.edu).

## ACADEMIC POLICIES

### Grade and Residency Requirements

The following requirements concerning residence and grade point average (GPA) apply to all students seeking the degree of bachelor of science in education and social policy:

- A minimum of 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- and an overall GPA of 2.5 in all professional core courses and teaching subject area requirements. 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 their core and concentration courses and distribution requirements.
- 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 not be used toward distribution requirements or SESP core or concentration 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 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 universities other than Northwestern that is to be counted toward fulfilling Northwestern requirements must be approved in advance by the student's adviser and the assistant dean. Students taking courses at a community college must earn a grade of B or higher to have the credit accepted by SESP.
- Every candidate for a degree must file an application for the degree, along with a Course Planning Form, in the SESP Office of Student Affairs one year in advance of the date of graduation (see Academic Calendar). That office will forward the application, when approved, to the Office of the Registrar.

- Students who wish to transfer into SESP's secondary teaching concentration may not be able to meet the requirements unless they plan carefully throughout their undergraduate program.
- Students who wish to transfer into SESP from another Northwestern school must
  - o meet SESP concentration requirements
  - o possess a minimum cumulative GPA of 2.0 (students in the secondary teaching concentration must also have a GPA of 2.5 in professional core courses and teaching subject area requirements)
  - o demonstrate an understanding of how transferring to SESP will support their academic goals
  - o attend the appropriate information and orientation sessions
- Students transferring from another university must complete their final 23 units at Northwestern.
- Students in the human development and psychological services, learning and organizational change, and social policy concentrations must complete a 10-week practicum during the junior year (9 weeks during the Summer Session just before or after the junior year). The practicum includes 30 hours per week at a supervised practicum site (SESP 383) and a concurrent seminar (SESP 385) analyzing the practicum experiences. Students receive 4 units upon completion of these requirements. Secondary education students must complete a quarter-long student teaching internship and be enrolled in TEACH ED 388/389 Student Teaching Seminar.
- Additional requirements are stipulated in the SESP *Undergraduate Handbook*. All students are expected to be familiar with and observe these policies.

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

## Honors

Students who maintain records of academic distinction may qualify for the honors program. Any student who has attained an overall cumulative GPA of 3.5 or above after winter quarter of the junior year is eligible for provisional admission to the program beginning 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 during the 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 the fall quarter of their 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 during 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 honors program coordinator in the SESP Office of Student Affairs.

## Undergraduate Research

SESP provides a variety of in-depth research and innovative learning opportunities for undergraduates, including SESP 298 Student-Organized Seminar, 390 Research Apprenticeship, and 399 Independent Study. Students in the human development and psychological services, learning and organizational change, and social policy concentrations may use a maximum of 3 units of SESP 390 or SESP 399 toward concentration requirements. Credit earned in SESP 298 may only be used as elective credit. Additional information about undergraduate research opportunities in SESP and faculty research projects may be obtained through the academic advisers in the SESP Office of Student Affairs.

## Probation

In addition to the University regulations regarding academic probation, an undergraduate student in SESP is ordinarily placed on academic probation when, in any one quarter, he or she does not receive at least three final grades of A, B, C, or P or has 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.

## Academic Advising

Each undergraduate student is assigned to an adviser in the SESP Office of Student Affairs. For the advising system to work effectively, the student must take all academic questions to the adviser. The adviser is responsible for helping to plan the academic program to meet the requirements for completion and graduation. Advisers also help students access 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. Failure to do so may result in a hold being placed on a student's registration.



## Petitions for Exemptions

Students must petition if they wish to be exempted from 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 completion of that course.

## ACADEMIC OPTIONS

The interdisciplinary and flexible nature of SESP concentrations allows many undergraduates to pursue a minor or a second major in addition to their SESP concentration or to enroll in University-wide certificate programs. Many students also elect to spend one or more quarters in a University-approved study abroad program.

For information on the interschool programs listed below, see the Cross-School Programs or Weinberg College section of this catalog, unless otherwise directed. The following is not a complete list; it contains examples of programs that are popular choices among SESP students.

### *SESP Programs for All Students*

#### **Field Study**

This summer program is offered in Chicago, San Francisco, and Washington, D.C., and is open to any student interested in social policy, workplace learning, or human services. Students spend nine weeks in a practicum setting, an experience that becomes the foundation to explore the larger issues of work and personal development.

#### **Service Learning Certificate**

Students across the University may earn a certificate in service learning through a two-year program that connects volunteer experience with an academic component to increase their understanding of community needs.

#### *Other Programs*

#### **Business Institutions**

The Program in Business Institutions approaches the study of business through an investigation of the cultural, political, and social consequences of business institutions.

#### **Global Health Studies**

This interdisciplinary minor is designed to provide skills for dealing with international health issues. Students learn about domestic and international approaches to international crisis management and review perspectives on specific health issues within the diverse U.S. population. The minor combines course work and international experience.

## International Studies

International studies is an undergraduate interschool adjunct major that is taken in conjunction with a departmental major. It explores our interconnected world system and how the contemporary world is politically structured and economically organized.

## Legal Studies

Legal studies is another undergraduate interschool major that is taken in conjunction with a departmental major. Not a "pre-law" program, it 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.

## Study Abroad

Students are encouraged to explore the myriad options for junior-year study abroad. Credit may be applied toward concentration, distribution, and elective requirements with the consent of the student's adviser. See the Academic Options section at the beginning of this catalog for more information.

## Undergraduate Leadership

The Undergraduate Leadership Program, an interschool certificate program open to all undergraduates, helps students understand the nature of leadership and prepares them to become leaders.

## ACADEMIC PROGRAMS

### **The Bachelor's Degree in Education and Social Policy**

Students in SESP receive a bachelor of science degree in education and social policy; 45 units are required for the degree. 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 secondary teaching and learning and organizational change concentrations comes from the school's learning sciences graduate program.

The human development and psychological services, learning and organizational change, and social policy concentrations have similar distribution and core requirements, though each has different major courses. The secondary teaching concentration is markedly different from the other concentrations, due in large part to Illinois Board of Education requirements.

## Human Development and Psychological Services, Learning and Organizational Change, and Social Policy

### *Preprofessional Preparation*

SESP concentrations offer opportunities to prepare for a number of career options. Students 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. They are encouraged to design their concentrations with career objectives or graduate and professional school admission policies in mind.

Human development and psychological services, learning and organizational change, and social policy are especially appropriate concentrations for those seeking careers in management, consulting, education reform, design of learning systems, clinical psychology, social work, counseling, law, public service, human resources, and public sector management.

Students interested in such fields as child development, social work, clinical psychology, medicine, and counseling normally enter the human development and psychological services concentration. The core course work in human development and psychological counseling, combined with other courses in psychology, sociology, and interpersonal communication, is particularly important for students considering such careers. Students with these interests are encouraged to include in their concentrations the prerequisites in psychology and quantitative methods needed for graduate work in psychology and in the human services professions.

The learning and organizational change concentration is well suited to students who plan careers in management, consulting, change management, training, design of knowledge systems, and human resources in profit and not-for-profit organizations. Students 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.

Students interested in public service, public policy, and law typically choose to follow the requirements of the social policy concentration, where they can combine the policy-related course work with courses in political science, communication studies, economics, urban affairs, and sociology to prepare either for graduate work in law or public policy or for policy positions in public and private agencies. Students in this concentration 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.

In all three concentrations — human development and psychological services, learning and organizational change, and social policy — students 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.

To work toward these goals, students register for a 1-quarter practicum in off-campus settings — such as governmental entities, community agencies, hospitals, juvenile homes, learning and development departments of for-profit organizations, and legal organizations — where they can observe and participate in the activities of a socializing institution. Concurrent with this practicum — taken during the junior year (including the summer before or after) in the Chicago area or, during Summer Session, in San Francisco or Washington, D.C. — students meet in a weekly practicum analysis seminar. This seminar helps them integrate their past learning from course work with their observations of human behavior in an organizational setting.

### *Distribution Requirements (10 units)*

Students in the human development and psychological services, learning and organizational change, and social policy concentrations complete at least 2 units in each of the following areas:

- Natural sciences
- Formal studies (mathematics, logic, etc.)
- Historical studies
- Ethics and values (religion, philosophy, etc.)
- Literature and fine arts

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 assistant dean of SESP.

### *SESP Core (8 units)*

#### **Basic courses — 2 units**

SESP 201 Human Development: Childhood and Adolescence or 203 Human Development: Adulthood and Aging

Another human development course chosen from SESP 201, 203

LOC 212 Learning and Understanding

SESP 316 Moral Values in Human Development:

An Introduction

SESP 317 Gender and the Life Course

SESP 318 Adult Development and Work Careers

SESP 319 Family Development in Changing Society

**Research methods — 2 units**

SESP 210 Introduction to Statistics and Research

Methodology

SESP 372 Methods of Observing Human Behavior

(students must complete 372 before undertaking the practicum)

**Practicum — 4 units**

SESP 383 Practicum (2 units)

SESP 385 Practicum Analysis Seminar (2 units)

The practicum is a one-quarter unpaid experience in an off-campus setting related to the student's program. It is completed the summer before the junior year, during the junior year, or the summer after. While at the practicum site, students conduct social science research that serves as the basis for a final research paper.

Concurrent with the practicum, students attend a weekly seminar (SESP 385) taught by a Northwestern faculty member that integrates their experiential knowledge with the theoretical training in their course work. Students may not take a 5th unit while completing their practicum without the consent of their adviser.

Students must contact the practicum director in the school's Office of Student Affairs at least two quarters (three for summer practicums) before the beginning of the quarter in which the practicum will be taken. The practicum director advises students about procedures and application materials for a practicum placement.

*Individual Program Requirements*

Students in the human development and psychological services, learning and organizational change, and social policy concentrations prepare a plan that includes a rationale for the configuration of courses chosen for their concentrations. Many students work with their advisers to develop an interdisciplinary specialization within their concentrations by selecting 5 or more courses around a particular theme.

**Human Development and Psychological Services**

This concentration explores how human development is influenced by family, schools, community, and the workplace. 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. Students are expected to work with their advisers to develop an individualized program of study.

**Total requirements — 45 units****Distribution requirements — 10 units****SESP core — 8 units****Major program — 18 units**

## • Basic courses — 5 units

HDPS 201 Introduction to Psychological Services

HDPS 301 Introduction to Counseling

3 courses chosen from HDPS 302 The Human

Personality, HDPS 311 Group Dynamics, SESP 303

Program Development and Implementation, and

SOC POL 304 Social Policy and the Human Services

- Major courses — 13 units, at least 5 at the 300 level, selected from an approved list in human development and psychological services, other SESP concentrations, and other areas such as anthropology, communication studies, linguistics, psychology, and sociology. Up to 3 units of SESP 390 Research Apprenticeship or SESP 399 Independent Study and 3 units of SESP 398 Honors Thesis may be counted toward this requirement.

**Electives — 9 units**

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.

**Learning and Organizational Change**

This concentration explores how organizations and the individuals in them use knowledge and learning to create and respond to change in the environment. It addresses the effects of such forces as technology, globalization, and changing demographics on theories and applications of learning, innovation, and knowledge sharing. Drawing on current research in learning sciences and organization behavior, this interdisciplinary concentration also involves the disciplines of economics, anthropology, psychology, sociology, and computer science to give students the ability to view, understand, and influence change in organizations. Students are expected to work with their advisers to develop an individualized program of study.

**Total requirements — 45 units****Distribution requirements — 10 units****SESP core — 8 units****Major program — 18 units**

## • Basic courses — 7 units

LOC 211 Introduction to Organization Theory and Practice

LOC 212 Learning and Understanding

LOC 301 Macrocognition: Intelligence in Context

LOC 306 Studies in Organizational Change

LOC 310 Learning Organizations for Complex Environments

1 course chosen from LOC 311 Tools for Studying

Organizations, LOC 391 Organizational Planning

and Analysis, HDPS 311 Group Dynamics, SESP 303

Program Development and Implementation, SESP 318

Adult Development and Work Careers

1 course in learning sciences chosen from  
COG SCI 207, 210, 211; PSYCH 228

- Major courses — 11 units, at least 5 at the 300 level, selected from an approved list in learning and organizational change, other SESP concentrations, and other areas such as cognitive science, communication studies, computer science, economics, psychology, and sociology. 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, and 260), technology, and international studies or foreign language. Up to 3 units of SESP 390 Research Apprenticeship or SESP 399 Independent Study and 3 units of SESP 398 Honors Thesis may be counted toward this requirement.

#### **Electives** — 9 units

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.

#### **Social Policy**

This concentration explores how policies function as the guiding principles on which social programs are based. It analyzes how social policies and social institutions influence the course of human lives and how people can influence social policies. This concentration provides a strong interdisciplinary background in the social sciences and an understanding of current social policy issues, and it draws upon current research in the fields of African American studies, anthropology, communication studies, economics, gender studies, history, philosophy, political science, public health, and sociology. Students are expected to work with their advisers to develop an individualized program of study.

**Total requirements** — 45 units

**Distribution requirements** — 10 units

**SESP core** — 8 units

**Major program** — 18 units

- Basic courses — 7 units  
SESP 202 Introduction to Community Development  
SOC POL 201 Introduction to Social Policy  
SOC POL 304 Social Policy and the Human Services  
SOC POL 307 Educational Policy  
ECON 201 Introduction to Macroeconomics  
ECON 202 Introduction to Microeconomics  
POLI SCI 220 American Government and Politics
- Major courses — 11 units, at least 6 at the 300 level, selected from an approved list in social policy, other SESP concentrations, and other areas such as African American studies, communication studies, economics, political science, and sociology. Up to 3 units of SESP 390 Research Apprenticeship or SESP 399 Independent Study and 3 units of SESP 398 Honors Thesis may be counted toward this requirement.

#### **Electives** — 9 units

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.

#### **Secondary Teaching**

SESP's interdisciplinary secondary teaching curriculum combines course work in a chosen field from Weinberg College — such as English, history, or mathematics — with courses in child and adolescent development, educational philosophy, and urban education.

*SESP students:* Students who wish to pursue secondary teaching certification must complete the following requirements and apply for formal admission to the SESP teacher preparation program (see below). Students completing degree requirements within SESP receive the degree of bachelor of science in education and social policy; 45 units are required for the degree.

*Weinberg College students:* Students who wish to pursue secondary teaching certification must complete the following requirements and apply for formal admission to the SESP teacher preparation program (see below). Students also must complete a major and fulfill the degree requirements of Weinberg College.

#### **Distribution Requirements (14 units)**

Students complete

- 1 oral communication course
- 1 multicultural studies course reflecting a non-Western perspective
- 2 units of intensive writing
- 2 units in each of the following 5 areas:  
Natural sciences  
Formal studies (mathematics, logic, etc.)  
Historical studies  
Ethics and values (religion, philosophy, etc.)  
Literature and fine arts

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 assistant dean of SESP.

#### **Professional Core (11 units)**

- SESP 201 Human Development: Childhood and Adolescence
- TEACH ED 302 Social Contexts of Education
- TEACH ED 304 Seminar on Teaching: Introduction to Schooling in Communities
- TEACH ED 313 Problems in the Philosophy of Education
- TEACH ED 327 Educating Exceptional Children
- 1 unit chosen from TEACH ED 354–359 Methods and Techniques

- TEACH ED 378 Practicum/Seminar: Humanities or 379 Practicum/Seminar: Mathematics and Science
- TEACH ED 388 Student Teaching Seminar: Humanities or 389 Student Teaching Seminar: Mathematics and Science (4 units)

*Note:* Students seeking endorsement to teach art or foreign languages or in middle schools must also take TEACH ED 328 Dynamics of Middle School Curriculum and TEACH ED 329 Health and Physical Development.

### *Teaching Subject Area Requirements (12–19 units)*

Programs in specific teaching major fields listed below are designed to meet requirements of the Illinois State Board of Education. Teaching major requirements may differ from those of a departmental major, and departmental course offerings change frequently. Teacher certification candidates are required to meet regularly with the advising staff of the Office of Student Affairs to ensure that certification requirements are met. In the event that courses listed here are no longer offered by the departments, suitable replacements will be found.

### **Art (12 units)**

- 4 introductory courses: ART 120, 125, 140, 150
- 5 studio courses: ART 210 or 310; 222 or 225; 231 or 232; 240 or 250; and 1 additional unit in painting and drawing, printmaking, sculpture, or photography
- 3 courses in art history, theory, and criticism: 2 chosen from ART HIST 220, 230, 240, 250; 1 chosen from ART 270, 272, 372 or 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
- BIOL SCI 210-2,3; 301 or 309; 315
- 1 course chosen from BIOL SCI 346, 347, 348, 349, 350; 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
- CHEM 102, 103, 342-1
- CHEM 210-1,2,3 or 212-1,2,3
- 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 210-1; CHEM 101; EARTH 201; PHYSICS 135-1,2,3

- 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  
ENGLISH 298
- TEACH ED 324 Foundations of Reading and Language Acquisition and 325 Foundations of Writing Processes (Secondary)
- 8 literature courses:  
2 American literature courses  
2 English literature courses  
4 additional literature courses, 1 of which must be a non-Western literature
- 1 additional linguistics course chosen from LING 220, 221, 250, 260, 270, 311, 312, 321, 322, 323, 341, 342; ENGLISH 206; or a poetry course

### **Foreign Languages**

#### *French (12 units)*

- 6 language courses: FRENCH 202, 203, 301, 302, 303, 305
- 3 literature courses: FRENCH 210 and 2 additional 300-level literature courses taught in French
- 3 culture and civilization courses: FRENCH 201 or 211; 355; 1 chosen from 380, 390, 391-1,2, 396

#### *German*

Requirements are under review. Consult with the SESP Office of Student Affairs for current information.

#### *Latin (12 units)*

- 3 language courses: LATIN 101-1,2,3
- 4 literature courses: LATIN 201-1,2,3, 310
- 5 other 200- or 300-level Latin, Greek, or classics courses

#### *Spanish (13 units)*

- 3 language and composition courses: SPANISH 201-1,2 or an appropriate substitute for heritage speakers; 202-1 or 207; 202-2
- 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 from a period earlier than 1800

### **Mathematics (12 units)**

- 5 calculus/analysis courses chosen from MATH 220, 224, 230, 234, 250, 320-1,2,3, 353
- 2 algebra courses chosen from MATH 240, 330-1, 334
- 1 probability and statistics course chosen from MATH 310-1,2,3; SESP 210; STAT 202, 210, 302
- 1 computer science course
- MATH 300 or 342

- MATH 340

- 1 additional 300-level mathematics course

Students enrolled in Mathematical Experience for Northwestern Undergraduates courses should consult with the SESP adviser to determine course equivalencies.

## Social Science

### *History (15 units)*

- HISTORY 201-1,2, 210-1,2
- 2 non-Western civilization courses chosen from HISTORY 255-1,2,3, 270, 281, 284-1,2 285, 381-1,2, 384-1,2, 385, 365, 366, 368-1,2
- 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 or SESP 210 or STAT 202 or 210

### *Economics (19 units)*

- 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, 4 in U.S. history (HISTORY 201-1,2 and 210-1,2 recommended)

### *Political Science (19 units)*

- POLI SCI 220 and 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, 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, 4 in U.S. history (HISTORY 201-1,2 and 210-1,2 recommended)

### *Sociology (19 units)*

- SOCIOL 110, 226, 303, 329
- *SESP students:* 8 additional sociology courses, 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, 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.

Note that requirements for the program parallel and are related to courses in the 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 junior year. To be admitted, they must have received a passing score on the Illinois Certification Testing System (ICTS) Basic Skills exam and have a GPA of 2.5 overall as well as in the teaching subject area requirements. SESP students must be eligible for entrance to the program no later than the end of fall quarter of junior year. Weinberg College students may start the program later than the fall of junior year but then may finish later than June of senior year. Students are required to attend meetings about the certification process.

### *Clinical Experience*

Students complete three clinical experiences: a 30-hour nonschool experience (completed during winter of sophomore or junior year as part of TEACH ED 304); a 100-hour school practicum (typically completed during fall of senior year); and student teaching (typically completed during winter of 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 enough courses from 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 must spend a minimum of 10 hours a week for the 10-week term at the practicum site. Clinical experiences gained at the site are central to the discussions 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 TEACH ED 354–359 and TEACH ED 378 or 379, earned a passing score on the ICTS subject exam, fulfilled minimum GPA requirements for student teaching, and passed the first assessment of the digital portfolio. (The digital portfolio, an electronic document of the student's work, is used as an assessment tool in certification.) Some school districts also require a criminal background check.

Student teaching involves full-time placement in a local school for the entire quarter, during which no other courses are taken. 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 take and pass the ICTS Assessment for Professional Teaching exam. The digital portfolio must also pass a 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 education program, earn a rating of recommendation for certification for student teaching, pass all outside examinations as noted above, and successfully complete the digital portfolio.

Although legal requirements for certification vary from state to state, the teacher training program offered through SESP is sufficiently flexible 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, we encourage all students who have completed the program to apply for an Illinois license before leaving the state.

We also recommend that students apply for the certificate immediately upon graduation. Graduates of the teacher-training program at Northwestern who are recommended for certification but do not apply for certification upon graduation may not be eligible for certification at a later date due to changes in state requirements.

Please note that 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 that applicants submit to a criminal background check, including fingerprinting.

## **COURSES**

*Note:* First-year students are restricted from most SESP 300-level courses, with the exception of research courses and HDPS 341.

### ***Core 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.

#### **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 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 between moral reasoning and 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 Changing Society**

Societal changes and their effects on the family.

#### **SESP 351-0 Topics**

Advanced work on special topics.

#### **SESP 372-0 Methods of Observing Human Behavior**

Guided practice in systematic and participant observation of human behavior. Observer bias, field notes, unobtrusive measures.

**SESP 383-0 Practicum** (2 units) Intensive, supervised participant observation of interpersonal relationships — especially those of professional and client — and the effects of institutional structure and policy on both professionals and clients. For students in the human development and psychological services, learning and organizational change, and social policy concentrations and those enrolled in the summer Field Studies Program. Taken concurrently with 385. Prerequisites: 372 and consent of program director.

**SESP 385-0 Practicum Analysis Seminar** (2 units) Small-group meetings only for students in the human development and psychological services, learning and organizational change, and social policy concentrations to analyze SESP 383 practicum experiences, organize their perceptions of their own internships, and share them with other class members. Taken concurrently with 383. Prerequisite: 372.

#### *Research and Other Opportunities*

**SESP 298-0 Student-Organized Seminar** Students initiate courses supervised by sponsoring faculty to explore topics not covered in other courses. Consulting with a faculty sponsor, students prepare a seminar plan and submit it to the assistant dean for student affairs before the middle of the quarter preceding the quarter in which the seminar is to be held. The plan includes a topic description, reading list, specifications of term papers and written examinations, prerequisites, and meeting schedule. All proposals are formally reviewed and approved before the seminar is offered. Enrollment is allowed in only 1 Student-Organized Seminar per quarter and must be on the pass/no credit basis. Consult with the assistant dean for further details.

**SESP 299-1, 2 Service Learning Capstone Research** Independent study courses leading to the completion of a capstone project for the Service Learning Certificate Program.

**SESP 390-0 Research Apprenticeship** Opportunity for undergraduates to apprentice with faculty mentors engaged in research projects centering on questions of learning and human development and the organizational arrangements in which these processes occur. Prerequisites: consent of instructor directing the research project and assistant dean. (Students wishing to register must first complete the Request for Independent Study/Special Courses Form available in the SESP Office of Student Affairs.)

**SESP 391-0 Advanced Research Methods** Overview of research methods that may be used in the design and implementation of the honors thesis. Prerequisites: 210 and 372 recommended.

**SESP 398-0 Honors Thesis** (3 units) Research experience in which students develop, design, implement, and evaluate

a research project under the guidance of a faculty adviser. Prerequisites: senior status; a cumulative grade point average of 3.5 by the end of winter quarter of the junior year; recommendation for the honors program by the SESP 391 instructor(s); and consent of program director.

**SESP 399-0 Independent Study** Under the direction of faculty members, students pursue special topics not covered in regular courses around the questions of learning and human development and the organizational arrangements in which these processes occur. Prerequisites: consent of instructor directing the study and of the assistant dean. (Students wishing to register must first complete the Request for Independent Study/Special Courses Form available in the SESP Office of Student Affairs.)

#### *Human Development and Psychological Services*

**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 process of career development and its relation to the world of work. Discussion of career development theories. Focus on self-assessment; decision-making skills; educational, occupational, and community information; and job-seeking skills.

**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 his or her societal and historical context. 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 weekend group relations conference.

**HDPS 341-0: Marriage 101** The intricacies and problems of close, committed, interpersonal relationships, especially marriage.

**HDPS 351-0 Topics in Human Development and Psychological Services** Advanced work on special topics.

#### *Learning and Organizational Change*

**LOC 211-0 Introduction to Organization Theory and Practice** Major organizational behavior theories are introduced; students have opportunities to examine these theories and practice through organizational analysis.

**LOC 212-0 Learning and Understanding** Framework for learning in all aspects of life: traditional school subjects, professional training, creative and performing arts, personal health, basic survival skills. Students are encouraged to draw from their own experiences.



**LOC 301-0 Macrocognition: Intelligence in Context** How people learn to understand, reason, and solve problems; knowledge representation, expertise, transfer, and meta-cognition; study of distributor cognition.

**LOC 306-0 Studies in Organizational Change** Theories and methods of organizational changes are examined through analysis of organizational adaptations using 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 Studying Organizations** Understanding cause-and-effect relationships pertaining to organizational behavior and performance.

**COMP SCI 330-0 Human-Computer Interaction** See Computer Science, McCormick School of Engineering and Applied Science.

**LOC 351-0 Topics in Learning and Organizational Change** Advanced work on special topics.

**LOC 391-0 Organizational Planning and Analysis** Culminating academic experience in which students apply knowledge and skills to analysis of real-world learning and organizational change problems and to the design and analysis of solutions.

### *Secondary Teaching*

**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 40 hours of field experience. *Note:* Students seeking certification must take the Illinois Basic Skills Test before the end of the quarter of enrollment in TEACH ED 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. Includes supervised field experience.

**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. This course is 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. Topical areas covered for secondary education students completing state certification requirements.

**TEACH ED 351-0 Topics in Teacher Education** Advanced work on special topics.

**TEACH ED 354–59 Methods and Techniques** Students in the Secondary Teaching concentration take 1 of the following 6 methods courses:

- TEACH ED 354 Methods and Techniques: Art
- TEACH ED 355 Methods and Techniques: Foreign Languages
- TEACH ED 356 Methods and Techniques: English
- TEACH ED 357 Methods and Techniques: Secondary Mathematics
- TEACH ED 358 Methods and Techniques: Sciences
- TEACH ED 359 Methods and Techniques: Social Sciences

These methods courses analyze the literature and research related to the subject area and teaching methodology. In addition, they examine the development of learning experiences, methods, and educational techniques appropriate to the middle and high school levels. Concurrent registration in 378 or 379 required.

**TEACH ED 378-0 Practicum/Seminar: Humanities**

**TEACH ED 379-0 Practicum/Seminar: Mathematics and Science** Students complete a practicum that requires a minimum of 10 hours per week for the whole quarter

observing and assisting in a school approved by the director of undergraduate teacher education. Concurrent registration in the applicable methods and techniques course (354–359) required. Prerequisites: 304 and passing score on the Illinois Basic Skills Test.

**TEACH ED 388-0 Student Teaching Seminar: Humanities**

**TEACH ED 389-0 Student Teaching Seminar: Mathematics**

**and Science** (4 units) This seminar and accompanying internship, which last the entire quarter, help develop teaching methodologies through intensive clinical experience and teaching under the supervision of master teachers in the teacher-training schools. Increasingly sophisticated teaching responsibilities and, finally, primary responsibility for teaching a group or a class. Prerequisites: 304; 378 or 379; the applicable methods and techniques course (354–59); successful completion of the practicum experience; an approved contract for the internship experience; consent of the director of undergraduate teacher education; and passing score on the Illinois subject-area test.

*Social Policy*

**SOC POL 201-0 Introduction to Social Policy** Social policy formulation: the substance of major American social policies, the agenda-setting process, and the manner in which the political system shapes social policy in this country.

**SOC POL 303-0 Administration and Policy Studies** Education and human development as a multi-institutional, ecological, and macrosociological phenomenon. Issues in the philosophy, history, economics, and politics of education.

**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, 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 Social Policy and Contemporary Education**

**Issues** Through exploration of current K–12 education policy issues, students gain an understanding of the major debates occurring in education and build a skill set that enables them to be critical consumers of policy. Specific 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 Topics in Social Policy** Advanced work on special topics.

## Robert R. McCormick School of Engineering and Applied Science

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, computational biology and informatics, 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 1,150 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. Many of its holdings of scholarly journals are available to Northwestern students over the Internet.

More information about McCormick can be found on its web site ([www.mccormick.northwestern.edu](http://www.mccormick.northwestern.edu)).

## 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.

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).

In addition to, and independent of, the requirements set by McCormick, all students must satisfy the Undergraduate Residence Requirement. (See the Undergraduate Education section of this catalog.)

### 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.
- *Basic program:* 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.

### Personal Computers

Northwestern's campus is fully networked and has widespread wireless Internet connectivity. Accordingly, the McCormick faculty has adopted a policy making each

engineering undergraduate responsible for his or her own computing hardware and software for basic tasks and connection to the University's computer network. McCormick maintains a number of public and departmental computing laboratories, but these are used primarily for higher-level or specialized applications.

## 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 (1) 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 and (2) 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 major 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 such as

Biologically Inspired Materials Center  
Center for Advanced Cement-Based Materials  
Center for Dynamic Systems and Control  
Center for Intelligent Processing of Composites  
Center for Nanofabrication and Molecular Self-Assembly  
Center for Photonic Communications and Computing  
Center for Quality Engineering and Failure Prevention  
Center for Quantum Devices  
Center for Surface Engineering and Tribology  
Center for Ultra-scale Computing and Information Security  
DND Collaborative Access Team Synchrotron Research Center  
Falk Center for Molecular Therapeutics  
Institute for BioNanotechnology in Medicine  
Institute for Design Engineering and Applications  
Institute for Environmental Catalysis  
Infrastructure Technology Institute  
Materials Research Science and Engineering Center  
Materials Technology Laboratory  
McCormick Manufacturing Institute  
Motorola Center for Communications Research  
Nanoscale Science and Engineering Center  
Northwestern Center for Engineering Education Research  
Optimization Technology Center  
Steel Research Group  
Transportation Center

### 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.

### Concurrent BS/MS

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.

### Five-Year BA/BS

McCormick encourages breadth of interest and to this end supports combined degree programs in engineering and liberal arts. One approach is the 3-2 program, in which students attend a liberal arts college for the first three years with a course of study that develops a basic understanding of science and mathematics and a strong component in the social sciences and humanities. Following the three years of basic studies and on recommendation of their liberal arts college, students transfer to Northwestern. When they complete the requirements of a field of engineering, a BS in engineering is awarded by Northwestern; the BA is awarded by the original liberal arts college based on their 3-2 plan requirements.

Another approach to combining liberal arts and engineering is a parallel arrangement of studies at Northwestern, in which a fifth year results in a BA with a major in Weinberg College and a BS in a particular field of engineering. Students should file a petition outlining this dual plan of study before their fourth year; it must be approved by the departments and schools administering the degree work. Students must complete the stated requirements of both schools and expected majors.

Students receiving financial aid should note the restrictions under Satisfactory Academic Progress and Financial Aid on page 21.

### 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. The program may be entered no later than the beginning of the sophomore year; admission requires concurrent approval of both the School of Music and McCormick. (See also Five-Year BS/BMus or BS/BAMus in the School of Music section of this catalog.)

### 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 co-op program must take 2 units of credit in addition to the 48 needed for a bachelor's degree; 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. Requirements include

- 5 core courses in biological science and biochemical engineering
- 4 electives providing opportunity for greater depth in both fundamental biology and engineering applications
- 1 quarter of independent study to provide hands-on practical experience with a biotech-related project

A minimum GPA of 2.0 must be maintained in the courses in the certificate program, and successful completion of a McCormick BS degree is required.

### Certificate in Engineering Design

This certificate program, administered by the Institute for Design Engineering and Applications, 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. In addition to 2.5 units of required course credit and 3.5 units of elective credit, students must build a portfolio demonstrating their accomplishments in prototyping and implementation, modern software tools, design analysis, writing, project management, and effective graphical communication. Successful completion of a Northwestern baccalaureate degree is required.

### Honors Program in Undergraduate Research

The Honors Program in Undergraduate Research in McCormick provides an unusual opportunity for students with superior motivation and scholastic credentials (high school rank and test scores) to be admitted to work with an engineering faculty mentor/adviser in a challenging research project. This research project participation could begin in the first year and continue through all the undergraduate years, allowing close association with a faculty researcher probing the frontiers of knowledge in engineering or engineering science.

This unique opportunity for experiencing the excitement of original research and the associated approach to learning provides students with not only encouragement but also excellent preparation for graduate study. If students in the Honors Program in Undergraduate Research achieve advanced placement as well as satisfactory performance in the research project and accompanying course work, during their third year of undergraduate study they will be considered for admission to the Graduate School and for award of financial aid.

### 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.

### Honors Program in Engineering and Journalism

The Honors Program in Engineering and Journalism is intended to prepare exceptional students for communications careers emphasizing engineering, science, and technology. This joint program involves completing a McCormick bachelor's degree and then a Medill School of Journalism master's degree. It normally requires five years of study, but unusually capable students may be able to shorten the time through use of advanced placement credits and accelerated scheduling. To be considered for the program, applicants to Northwestern complete an additional questionnaire that is evaluated by a Medill faculty panel. Students are evaluated by the faculty during the program to verify that performance is satisfactory. Part of the engineering humanities requirements must be fulfilled

with Medill courses EDIT 201 Editing and Writing the News and 202 History and Issues of Journalism.

### Honors Program in Engineering and Law

A law degree built upon an engineering undergraduate education is unusually valuable for a host of careers, such as those in technology-intensive businesses or in intellectual property, including patents. The Honors Program in Engineering and Law combines a Northwestern engineering degree, on-the-job work through the co-op program, and provisional admission to Northwestern University School of Law. The undergraduate portion takes four years, including five academic quarters of co-op work. Students must maintain a 3.25 undergraduate GPA. They take the LSAT at the beginning of their junior year and are expected to score at or above the median of the previous year's entering law class. Their admission to the law school is reviewed late in the junior year.

## 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 major field of study and will be reassigned 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](mailto:mccormick-school@northwestern.edu).

### Organizations for Engineering Students

The Northwestern Engineering Student Council 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 McCormick Undergraduate Research Board is organized to stimulate undergraduate research and to provide financial support for projects begun by individual students.

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  
 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

## PROGRAMS OF STUDY

### McCormick Curriculum Requirements

All curricula leading to the bachelor of science degree in engineering or applied science must have the same basic components — mathematics, engineering analysis and computer proficiency, basic sciences, design and communications, basic engineering, social sciences/humanities, unrestricted electives, and major program. Lists of courses qualifying for these components follow.

The abbreviations used for McCormick departments and major curricula in the listings that follow are  
 BME (biomedical engineering)  
 CHEM ENG (chemical and biological engineering)  
 CIV ENG (civil and environmental engineering)  
 EECS (electrical engineering and computer science)  
 ES APPM (engineering sciences and applied mathematics)  
 GEN ENG (general engineering)  
 IDEA (Institute for Design Engineering and Applications)  
 IEMS (industrial engineering and management sciences)  
 MAT SCI (materials science and engineering)  
 MECH ENG (mechanical engineering)

### *Mathematics (4 units)*

MATH 220 Differential Calculus of One-Variable

Functions

MATH 224 Integral Calculus of One-Variable Functions

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)*

GEN ENG 205-1,2,3,4 Engineering Analysis or  
 206-1,2,3,4 Honors Engineering Analysis

### *Basic Sciences (4 units)*

4 courses from at least two of the areas below; no more than 2 from earth 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)*• **Writing and design**

ENGLISH 106-1,2 Writing in Special Contexts  
 IDEA 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)*

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

• **Fluids and solids**

BME 270 Fluid Mechanics  
 BME 271 Introduction to Biomechanics  
 CHEM ENG 321 Fluid Mechanics  
 CIV ENG 216 Mechanics of Materials I  
 CIV ENG 219 Continuum Mechanics I  
 MECH ENG 241 Fluid Mechanics I

• **Materials science and engineering**

MAT SCI 201 Introduction to Materials  
 or MAT SCI 203 Microstructure and Engineering  
 Properties of Materials  
 or MAT SCI 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 ENG 306 Uncertainty Analysis in Civil  
 Engineering  
 EECS 302 Probabilistic Systems and Random Signals  
 IEMS 201 Introduction to Statistics  
 IEMS 303 Statistics I  
 MECH ENG 359 Reliability Engineering

• **Systems engineering and analysis**

CHEM ENG 210 Analysis of Chemical Process Systems  
 CIV ENG 304 Civil and Environmental Engineering  
 Systems Analysis  
 IEMS 310 Operations Research  
 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)*

7 courses, which must be approved in advance by the  
 McCormick Humanities Panel, chosen according to  
 one of two options in the following areas:

- Social and behavioral sciences
- Historical studies and values
- Fine arts, language, and literature

*Option A:* At least 2 courses must be chosen in each area.

Only 3 may be 100-level introductory courses; 3 must  
 be thematically related to provide depth.

*Option B:* 5 of the 7 courses must be clearly thematically  
 related. For breadth, no more than 5 courses may come  
 from a single area.

*Unrestricted Electives (5 units)*

Students may take any credit course in the University to  
 explore or extend technical or nontechnical interests.

*Major Program (16 units)*

Any program of study finds its depth or concentration in  
 the 16 units given to the major program of the curriculum.  
 Each engineering 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 elec-  
 tives. 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. Alter-  
 nately, self-designed plans may be submitted, but they  
 should be worked out in consultation with a faculty adviser.

## Curricula in Majors

Students must meet not only McCormick curriculum requirements but also the specific requirements for the major curriculum being pursued. The following listings of these curricula present additional information or specifics to be used with the basic curriculum.

Some of the listed curricula contain specializations or options within the curriculum. 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](http://www.mccormick.northwestern.edu).

### *Applied Mathematics*

(Department of Engineering Sciences and Applied Mathematics)

**Total requirements** — 48 units

**Mathematics** — 4 units

**Engineering analysis and computer proficiency**

— 4 units

GEN ENG 205-1,2,3,4

**Basic sciences** — 4 units

PHYSICS 135-2,3

2 additional basic science courses (biological sciences, chemistry, geological sciences, or astronomy)

**Design and communications** — 3 units

**Basic engineering** — 5 units

EECS 230 or 231

4 courses from at least three of the following areas: computer architecture and numerical methods, electrical science, fluids and solids, materials science and engineering, systems engineering and analysis, and thermodynamics

**Social sciences/humanities** — 7 units

**Unrestricted electives** — 5 units

**Major program** — 16 units

• **Required courses** — 7 units

ES APPM 311-1,2 Methods of Applied Mathematics

ES APPM 311-3 Methods of Applied Mathematics:

Complex Variables or MATH 325 Complex Variables for Applications

ES APPM 322 Applied Dynamical Systems

ES APPM 346 Modeling and Computation in Science and Engineering

ES APPM 421-1 Models in Applied Mathematics

1 modeling course from an approved list

• **Additional courses** — 3 units

MATH 334 Linear Algebra: Second Course

2 courses chosen from EECS 302; IECS 202, 303, 310, 313; MATH 330-1,2,3

- **Engineering or the sciences** — 4 units at the 300-level or higher leading to an approved concentration in one of the following areas: engineering, the sciences, mathematical social sciences (e.g., economics), mathematics (e.g., discrete mathematics or analysis), or numerics
- **Technical electives** — 2 units at the 300 level or higher in engineering, science, or mathematics

### *Biomedical Engineering*

(Department of Biomedical Engineering)

**Total requirements** — 48 units

**Mathematics** — 4 units

**Engineering analysis and computer proficiency**

— 4 units

GEN ENG 205-1,2,3,4

**Basic sciences** — 4 units

PHYSICS 135-2,3

CHEM 102 and 103 or 171 and 172

**Design and communications** — 3 units

ENGLISH 106-1,2; IDEA 106-1,2; BME 390-2

**Basic engineering** — 5 units from the following areas, no more than 1 unit per area:

*Thermodynamics:* BME 250; CHEM 342-1;

MECH ENG 220

*Fluids and solids:* BME 270, 271; CIV ENG 216;

CHEM ENG 321; MECH ENG 241

*Materials science:* MAT SCI 201, 301

*Electrical science:* EECS 202, 270

*Computer architecture and numerical methods:*

EECS 203, 328

*Probability, statistics, and quality control:* BME 220;

EECS 302; IECS 201, 303; MECH ENG 359

**Social sciences/humanities** — 7 units

**Unrestricted electives** — 5 units

**Major program** — 16 units at the 200 level or higher, none of which may be taken P/N

- BME 101 Introduction to Biomedical Engineering (noncredit)
- **Core** — 9 units
  - BIOL SCI 210-2 Biochemistry and Molecular Biology
  - CHEM 210-1 Organic Chemistry
  - BME 301, 302, 303 Systems Physiology or physiology in the Feinberg School of Medicine
  - BME 305 Biomedical Signals Analysis
  - BME 306 Biomedical Systems Analysis
  - BME 307 Quantitative Experimentation and Design
  - BME 390-1 Biomedical Engineering Design
- **Areas of specialization** — 7 units
 

Students select one of the following areas of specialization or an alternate set of courses developed with their advisers and approved by the Biomedical Engineering Undergraduate Committee:

  - Biological material and biotechnology
  - Biomechanics and rehabilitation
  - Biomedical signals and images

Electronic instrumentation

Transport processes and tissue engineering

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.

### *Chemical Engineering*

(Department of Chemical and Biological Engineering)

**Total requirements** — 48 units

**Mathematics** — 4 units

**Engineering analysis and computer proficiency** — 4 units

GEN ENG 205-1,2,3,4

**Basic sciences** — 4 units

PHYSICS 135-2,3

CHEM 102 and 103 *or* 171 and 172

**Design and communications** — 3 units

**Basic engineering** — 5 units

*Thermodynamics:* CHEM ENG 211

*Fluids and solids:* CHEM ENG 321

*Materials science:* MAT SCI 301

*Systems engineering and analysis:* CHEM ENG 210

*Probability, statistics, and quality control:*

CHEM ENG 312; IEMS 201, 303; *or* BME 220

**Social sciences/humanities** — 7 units

**Unrestricted electives** — 5 units

**Major program** — 16 units

• **Required courses** — 12 units

CHEM 210-1,2 Organic Chemistry

CHEM 342-2 Quantum Mechanics and Spectroscopy

CHEM ENG 212 Phase Equilibrium and Staged Separations

CHEM ENG 275 Molecular and Cell Biology for Engineers (BIOL SCI 210-2 may substitute)

CHEM ENG 307 Kinetics and Reactor Engineering

CHEM ENG 322 Heat Transfer

CHEM ENG 323 Mass Transfer

CHEM ENG 341 Process Dynamics and Control

CHEM ENG 342 Chemical Engineering Laboratory

CHEM ENG 351 Process Economics, Design, and Evaluation

CHEM ENG 352 Chemical Engineering Design Projects

• **Areas of specialization** — 4 units

The remaining 4 units are chosen from advanced engineering, mathematics, or science courses. They must be selected to fulfill one of the six areas of specialization offered by the department: biomedical engineering, biotechnology, chemical process engineering, environmental engineering, general chemical engineering, or polymer science and engineering. At least 1 of these courses must be an approved 200- or 300-level science elective.

### *Civil Engineering*

(Department of Civil and Environmental Engineering)

**Total requirements** — 48 units

**Mathematics** — 4 units

**Engineering analysis and computer proficiency** — 4 units

GEN ENG 205-1,2,3,4

**Basic sciences** — 4 units

PHYSICS 135-2; CHEM 101, 102; CHEM 103 *or*

PHYSICS 135-3

**Design and communications** — 3 units

**Basic engineering** — 5 units

*Fluids and solids:* CIV ENG 216; MECH ENG 241

*Thermodynamics:* 1 course

*Electrical science:* 1 course

MAT SCI 203 *or* 1 other course from system

engineering and analysis, computer architecture and numerical methods, computer programming, *or* materials science

**Social sciences/humanities** — 7 units

**Unrestricted electives** — 5 units

**Major program** — 16 units; 10 must be civil engineering courses

• **Basic civil engineering** — 7 units

CIV ENG 221 Theory of Structures I

CIV ENG 222 Structural Steel Design

CIV ENG 250 Introductory Soil Mechanics

CIV ENG 260 Fundamentals of Environmental Engineering

CIV ENG 330 Construction Management

CIV ENG 340 Fluid Mechanics II

CIV ENG 371 Introduction to Transportation Planning and Analysis *or* 376 Transportation System Operations

• **Mathematical techniques and science** — 2 units

2 courses chosen from an approved list, 1 of which must be a calculus-based probability and statistics course

• **Technical electives** — 7 units

7 courses at the 200 level or higher in mathematics, science, engineering, *or* another area supporting their specialty; 2 must be chosen from an approved list of design and synthesis courses, and 1 of those 2 must be the currently designated “capstone design course”

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

*Computer Engineering**(Department of Electrical Engineering and Computer Science)***Total requirements** — 48 units**Mathematics** — 4 units**Engineering analysis and computer proficiency**

— 4 units

GEN ENG 205-1,2,3,4

**Basic sciences** — 4 units

PHYSICS 135-2,3; 2 units from chemistry, biological sciences, or earth sciences

**Design and communications** — 3 units**Basic engineering** — 5 units*Probability, statistics, and quality control:* EECS 302*Electrical science:* EECS 202 (grade of C– or better required for graduation)*Computer architecture and numerical methods:*

EECS 203 (grade of C– or better required for graduation).

*Computer programming:* EECS 231

1 course in thermodynamics, fluids and solids, systems engineering and analysis, or materials science

**Social sciences/humanities** — 7 units**Unrestricted electives** — 5 units**Major program** — 16 units• **Required courses** — 5 units

EECS 205 Fundamentals of Computer System Software

EECS 303 Advanced Digital Logic Design

EECS 361 Computer Architecture

EECS 311 Data Structures and Data Management

EECS 343-1 Operating Systems

• **Technical electives** — 10 units

Technical electives may be used to tailor a program to a particular area of specialization. Students must take at least 5 units from the following four tracks and 2 units from the fundamental electrical engineering courses listed below. The remaining 3 electives 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. 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.

*High-performance computing track*

EECS 328 Numerical Methods for Engineers

EECS 333 Introduction to Communication Networks

EECS 358 Introduction to Parallel Computing

EECS 362 Computer Architecture Project

*VLSI and CAD track*

EECS 353 Digital Microelectronics

EECS 357 Introduction to VLSI CAD

EECS 391 VLSI Systems Design

EECS 392 VLSI Systems Design Projects

*Embedded systems track*

EECS 332 Digital Image Analysis

EECS 346 Microprocessor System Design

EECS 347 Microprocessor System Projects

EECS 390 Introduction to Robotics

BME 384 Biomedical Computing

*Software track*

EECS 310 Mathematical Foundations of

Computer Science

EECS 322 Compiler Construction

EECS 336 Design and Analysis of Algorithms

EECS 339 Introduction to Database Systems

EECS 394 Software Project Management and Development

*Fundamental electrical engineering courses*

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 225 Fundamentals of Electronics

• **Design requirement** — 1 course chosen from

EECS 347 Microprocessor System Projects

EECS 362 Computer Architecture Project

EECS 392 VLSI Systems Design Projects

*Computer Science**(Department of Electrical Engineering and Computer Science)***Total requirements** — 48 units**Mathematics** — 4 units

MATH 220, 224, 230

1 course chosen from the computer science mathematics list (available from the department)

**Engineering analysis and computer proficiency**

— 4 units

GEN ENG 205-1,2,3; EECS 111

**Basic sciences** — 4 units**Design and communications** — 3 units**Basic engineering** — 5 units*Computer science:* EECS 211*Probability, statistics, and quality control:* 1 course

3 other courses chosen from the basic engineering list on page 193, excluding computer science

**Social sciences/humanities** — 7 units**Unrestricted electives** — 5 units**Major program** — 16 units• **Required courses** — 8 units

EECS 213 Introduction to Computer Systems

EECS 311 Data Structures and Data Management

6 computer science courses at the 200 level or higher, excluding 317

• **Technical electives** — 8 units

4 courses chosen from the advanced computer science list (available from the department)

2 courses chosen from the mathematics, external technical electives, or advanced computer science lists (available from the department)

2 unrestricted electives approved by the department adviser

These technical electives must include 2 quarters of project work, 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.

### *Electrical Engineering*

(Department of Electrical Engineering and Computer Science)

**Total requirements** — 48 units

**Mathematics** — 4 units

**Engineering analysis and computer proficiency**  
— 4 units

GEN ENG 205-1,2,3,4

**Basic sciences** — 4 units

PHYSICS 135-2,3

2 additional basic science courses

**Design and communications** — 3 units

**Basic engineering** — 5 units

*Electrical science:* EECS 202 (grade of C- or better required for graduation)

*Computer architecture and numerical methods:* EECS 203 (grade of C- or better required for graduation)

*Computer programming:* EECS 230 or 211

*Probability, statistics, and quality control:* EECS 302

1 other course chosen from thermodynamics, fluids and solids, systems engineering, or materials science and engineering

**Social sciences/humanities** — 7 units

**Unrestricted electives** — 5 units

**Major program** — 16 units

• **Required courses** — 5 units

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 225 Fundamentals of Electronics

• **Technical electives** — 10 units

Technical electives may be used to tailor a program to a particular area of specialization. Students must take at least 6 courses chosen from the following six tracks and 2 courses from 300-level EECS technical electives (which may include the courses below). The remaining 2 electives 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.

### *Biomedical engineering track*

BME 317 Biochemical Sensors

BME 325 Introduction to Medical Imaging

BME 327 Magnetic Resonance Imaging

BME 333 Modern Optical Microscopy and Imaging

BME 383 Cardiovascular Instrumentation

### *Circuits and electronics track*

EECS 303 Advanced Digital Logic Design

EECS 346 Microprocessor System Design

EECS 353 Digital Microelectronics

EECS 355 ASIC and FPGA Design

EECS 391 VLSI Systems Design

EECS 393 VLSI Design and Analysis of High-Speed

Integrated Circuits

### *Communications systems track*

EECS 307 Communications Systems

EECS 333 Introduction to Communication Networks

EECS 378 Digital Communications

EECS 380 Wireless Communications

### *Control systems track*

EECS 360 Introduction to Feedback Systems or

MECH ENG 391 Fundamentals of Control Systems

EECS 374 Introduction to Digital Control

EECS 390 Introduction to Robotics

MECH ENG 333 Introduction to Mechatronics

### *Digital signal processing track*

EECS 332 Digital Image Analysis

EECS 359 Digital Signal Processing

EECS 363 Digital Filtering

### *Electromagnetics and optics track*

EECS 308 Advanced Electromagnetics and Photonics

EECS 379 Lasers and Coherent Optics

EECS 382 Photonic Information Processing

EECS 383 Fiber-Optic Communications

EECS 386 Computational Electromagnetics and Photonics

### *Solid-state engineering track*

MECH ENG 381 Introduction to Microelectromechanical Systems (MEMS)

EECS 250 Physical Electronics and Devices

EECS 381 Electronic Properties of Materials

EECS 384 Solid-State Electronic Devices

EECS 385 Optoelectronics

EECS 388 Nanotechnology

• **Design requirement** — 1 unit

1 course chosen from

EECS 347 Microprocessor System Projects

EECS 392 VLSI Systems Design Projects

EECS 398 Electrical Engineering Design

EECS 399 Projects (when 399 is a design project)

*Environmental Engineering**(Department of Civil and Environmental Engineering)***Total requirements** — 48 units**Mathematics** — 4 units**Engineering analysis and computer proficiency** — 4 units

GEN ENG 205-1,2,3,4

**Basic sciences** — 4 units

PHYSICS 135-2; CHEM 101, 102, 103

**Design and communications** — 3 units**Basic engineering** — 5 units*Thermodynamics:* CHEM 342-1*Fluids and solids:* MECH ENG 241*Computer architecture and numerical methods:* EECS 328

or ES APPM 346 or 1 materials science course

*Probability, statistics, and quality control:* 1 unit

(CIV ENG 306 recommended)

*Systems engineering and analysis:* CIV ENG 304 or  
IEMS 326**Social sciences/humanities** — 7 units**Unrestricted electives** — 5 units**Major program** — 16 units• **Core** — 12 units

CHEM 210-1 Organic Chemistry

CIV ENG 260 Fundamentals of Environmental  
Engineering

CIV ENG 340 Fluid Mechanics II

CIV ENG 361 Environmental Microbiology and  
Public HealthCIV ENG 363 Environmental Engineering Applications  
I: Air and LandCIV ENG 364 Environmental Engineering Applications  
II: Water

CIV ENG 365 Environmental Laboratory

CIV ENG 367 Aquatic Chemistry

CIV ENG 370 Environmental Engineering Design

ENV SCI 201 Earth: A Habitable Planet

ENV SCI 202 The Health of the Biosphere

ENV SCI 235 Atmosphere and Climate

• **Technical electives** — 4 units

2 courses from an approved list

2 courses, 200 level or higher, in engineering or  
mathematics or science in Weinberg College*Industrial Engineering**(Department of Industrial Engineering)***Total requirements** — 48 units**Mathematics** — 4 units**Engineering analysis and computer proficiency** — 4 units

GEN ENG 205-1,2,3,4

**Basic sciences** — 4 units

CHEM 101, 102

CHEM 103 or PHYSICS 135-3

PHYSICS 135-2

**Design and communications** — 3 units**Basic engineering** — 5 units

EECS 230

EECS 317 or EECS 328

IEMS 326

2 additional basic engineering courses

**Social sciences/humanities** — 7 units**Unrestricted electives** — 5 units**Major program** — 16 units• **Probability and statistics** — 2 units

IEMS 202 Probability

IEMS 303 Statistics I

• **Operations research** — 3 units

IEMS 313 Deterministic Models and Optimization

IEMS 315 Stochastic Models and Simulation

IEMS 317 Discrete-Event Systems Simulation

• **Applied behavioral science** — 1 unitIEMS 340 Field Project Methods or 342 Organization  
Behavior• **Production and logistics** — 1 unit

IEMS 381 Supply-Chain Modeling and Analysis

or 382 Production Planning and Scheduling

or 383 Service Operations Management

• **Senior design project** — 2 unitsIEMS 390 Systems Management, 391 Industrial Engi-  
neering Design, or 392 Systems Project Management

IEMS 393 Industrial Engineering Design Project

• **Electives** — 7 units4 courses chosen from the Department of Industrial  
Engineering (excluding 399) and IDEA 344

Manufacturing Engineering Design

1 additional engineering course

2 engineering courses at the 200 level or higher or any  
course chosen from an approved listP/N is permitted only in the last group. No more than  
2 units of 399 are permitted. A list of electives may be  
found on the department web site.• **Concentration** (optional)

At least 4 courses chosen 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.

*Manufacturing and Design Engineering*  
(*Institute for Design Engineering and Applications*)

**Total requirements** — 48 units

**Mathematics** — 4 units

**Engineering analysis and computer proficiency**  
— 4 units

GEN ENG 205-1,2,3,4

**Basic sciences** — 4 units

PHYSICS 135-2,3

2 chemistry courses

**Design and communications** — 3 units

**Basic engineering** — 5 units

*Materials science:* MAT SCI 201

*Systems engineering and analysis:* IEMS 326

*Fluids and solids:* CIV ENG 216

1 electrical science or computer architecture and numerical methods course

1 additional course

**Social sciences/humanities** — 7 units

**Unrestricted electives** — 5 units

**Major program** — 16 units

• **Core** — 10 units

IDEA 308 Human-Centered Product Design  
or MECH ENG 315 Theory of Machines —  
Design of Elements

IDEA 344 Manufacturing Engineering Design

IEMS 201 Introduction to Statistics  
or IEMS 303 Statistics I

IEMS 305 Statistical Methods for Quality Improvement  
or IEMS 307 Quality Improvement by Experimental  
Design

IEMS 310 Operations Research

IEMS 382 Production Planning and Scheduling

MAT SCI 318 Materials Selection

MECH ENG 240 Introduction to Mechanical Design  
and Manufacturing

MECH ENG 340-1 Computer-Integrated  
Manufacturing

MECH ENG 340-2 or -3 Computer-Integrated  
Manufacturing

• **Senior design project** — 2 units

MECH ENG 398 Engineering Design  
or IDEA 298 Interdisciplinary Design Projects I  
or IEMS 391 Industrial Engineering Design Project  
1 other design course approved by the Manufacturing  
Engineering Curriculum Committee

• **Technical electives** — 4 units

2 courses from an approved list and 2 300-level  
engineering courses

*Materials Science and Engineering*  
(*Department of Materials Science and Engineering*)

**Total requirements** — 48 units

**Mathematics** — 4 units

**Engineering analysis and computer proficiency**  
— 4 units

GEN ENG 205-1,2,3,4

**Basic sciences** — 4 units

PHYSICS 135-2,3

CHEM 102 and 103 *or* 171 and 172

**Design and communications** — 3 units

**Basic engineering** — 5 units, including

*Fluids and solids:* CIV ENG 216 or 219

*Thermodynamics:* MAT SCI 314 and 315

*Materials science:* MAT SCI 301

*Elective:* selected from electrical science, systems  
engineering and analysis, computer architecture  
and numerical methods, computer programming,  
or probability, statistics, and quality control

**Social sciences/humanities** — 7 units

**Unrestricted electives** — 5 units

MAT SCI 190 recommended

**Major program** — 16 units

• **Required courses** — 11 units

MAT SCI 316-1,2 Microstructural Dynamics

MAT SCI 331 Physical Properties of Polymers

MAT SCI 332 Mechanical Behavior of Solids

MAT SCI 351-1,2 Introductory Physics of Materials

MAT SCI 361 Crystallography and Diffraction

MAT SCI 390 Materials Design

MAT SCI 391 Process Design

MAT SCI 396-1,2 Senior Project in Materials Science  
and Engineering

• **Technical electives** — 5 units

Each student must choose the remaining courses in a  
consistent manner to fulfill an area of concentration.  
These courses may be in engineering, natural sciences  
(usually chemistry or physics), and mathematics. 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 bioma-  
terials, design and manufacturing, electronic materials,  
metals and ceramics, nanomaterials, polymeric materi-  
als, and surface science are described in a departmental  
manual for majors.

*Mechanical Engineering**(Department of Mechanical Engineering)***Total requirements** — 48 units**Mathematics** — 4 units**Engineering analysis and computer proficiency**  
— 4 units

GEN ENG 205-1,2,3,4

**Basic sciences** — 4 units

PHYSICS 135-2,3

2 chemistry courses

**Design and communications** — 3 units**Basic engineering** — 5 units*Thermodynamics:* MECH ENG 220*Fluids and solids:* MECH ENG 241; CIV ENG 216*Materials science:* MAT SCI 201*Electrical science:* EECS 270 (students planning to take advanced EECS courses may substitute EECS 221)**Social sciences/humanities** — 7 units**Unrestricted electives** — 5 units**Major program** — 16 units• **Required courses** — 7 units

MECH ENG 202 Mechanics II

MECH ENG 224 Experimental Engineering I

MECH ENG 240 Introduction to Mechanical Design  
and ManufacturingMECH ENG 315 Theory of Machines — Design of  
ElementsMECH ENG 340-1 Computer-Integrated  
Manufacturing

MECH ENG 377 Heat Transfer

MECH ENG 390 Introduction to Dynamic Systems

• **Advanced study** — 4 units, at least 1 from each group:*Dynamics/controls*

MECH ENG 314 Theory of Machines — Dynamics

MECH ENG 362 Stress Analysis

MECH ENG 363 Mechanical Vibrations

MECH ENG 365 Finite Elements for Stress Analysis

MECH ENG 391 Fundamentals of Control Systems

CIV ENG 327 Finite Element Methods in Mechanics

EECS 360 Introduction to Feedback Systems

*Thermofluid science*

MECH ENG 370 Thermodynamics II

MECH ENG 373 Engineering Fluid Mechanics Design

MECH ENG 340-2 Computer-Integrated

Manufacturing

MECH ENG 366 Finite Elements for Design and  
Optimization

MECH ENG 398 Engineering Design

• **Electives** — 5 units

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, geologicalsciences, 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 avail-  
able from the department office.**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.Available courses may be combined in a variety of  
interdisciplinary plans as long as the all-school specifica-  
tion of eight basic components is met. Examples of com-  
bined 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.**GENERAL ENGINEERING COURSES****IDEA 106-1,2 Engineering Design and Communication**(.5 unit) 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 com-  
munications; 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 engi-  
neering or interdisciplinary subjects of current interest.**GEN ENG 191-0 MEOP Complete Seminar** Issues unique to  
minority engineering students. Working in groups, achiev-  
ing one's full potential, succeeding in class, increasing  
involvements with faculty and in their research. Primarily  
intended for freshmen.**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 introduc-  
tion 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.** 3D parametric modeling with AutoDesk Inventory.

**GEN ENG 394-0 Special Topics in Engineering Design** Product/process design. Topics include requirements definition, conceptual and detailed design, analysis and simulation, prototype development, laboratory and field evaluation, technical assessment, and report writing.

**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.

## BIOMEDICAL ENGINEERING

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.

## Undergraduate Program

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.

## 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 Biotechnology*

Biochemical engineering, biochemistry, molecular biology, and biosensors are components of the broad field known as biotechnology. Students in this area learn the various aspects of biotechnology 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.

## Curriculum

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.

## 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 major, 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.

**BME 270-0 Fluid Mechanics** Fundamentals of fluid mechanics and their applications to biological systems.

**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.

**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.

**BME 308-0 Biomedical Engineering Laboratory** Laboratory and associated lecture concerning quantitative physiology, testing, and evaluation of biomedical apparatus. Prerequisites: at least 2 courses chosen from 301, 302, 303. Preference given to seniors in biomedical engineering.

### **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.

**BME 315-0 Application of Genetic Engineering to Immunochemistry** Recent developments in genetic engineering as applied to the rapidly developing field of immunochemistry for antibodies and related proteins.

**BME 317-0 Biochemical Sensors** Theory, design, and applications of chemical sensors used in medical diagnosis and patient monitoring. Electrochemical and optical sensors. Prerequisites: chemistry through 210-2; physics through 135-3.

### **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 Transport Fundamentals** 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, pseudoelectric, 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 384-0 Biomedical Computing** Principles of modern (computer-based) medical instrumentation, including analogy versus digital design tradeoffs, efficient digital filter designs, and algorithms for physiological signal processing, automated event recognition, and classification. Prerequisites: EECS 270 or equivalent and some experience in computer programming, 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**

## CHEMICAL ENGINEERING

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.

### **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 (C– or better); 211.

**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.

**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.

**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 recommended.

**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: 307, 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, 323.

### **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; 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: 322; GEN ENG 205-4; or consent of instructor; 321 and 323 recommended.

**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.

**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. The breakdown, from which honors students may deviate with consent of the department's education committee, is as follows:

Courses specified by name and number	21
Courses specified by subject	6
Courses required to fit into broad categories	16
Free electives	5
<b>Total</b>	<b>48</b>

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.

**Laboratories***Computation*

The department integrates computing through its own dedicated servers and network administrator. The system aids project management, geotechnical, and structural computing as well as specialized software accessed from other departments.

*Geotechnical Engineering*

This facility has a variety of conventional and special equipment for computer-controlled testing and evaluation of rocks, soils, and soil-foundation systems — under both static and dynamic loadings — for undergraduate study, graduate study, and research. In addition, construction-monitoring instruments are remotely operated via telemetry.

*Structural Engineering and Structural Mechanics*

The department has a large first-class modern laboratory for testing structural materials, especially cement-based materials and composites. The laboratory is equipped with several closed-loop computer-controlled or servo-controlled testing machines capable of static and dynamic loading as well as advanced instrumentation for electron and optical microscopy studies with facilities for image analysis and holographic capabilities, creep testing in

programmed environmental chambers, multiaxial or torsional loading, impact testing, acoustic defect detection, and other nondestructive test methods. Basic facilities, including a perforated testing floor, are available also for static and dynamic testing of structural models and structural components. Students conduct experiments using electrical and mechanical strain gauges, structural models, and photo-elastic models. A fully equipped shop and technical assistance are available for the design and construction of special loading devices.

## Courses

**MAT SCI 203-0 Microstructure and Engineering Properties of Materials** See Materials Science and Engineering.

**CIV ENG 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 ENG 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 ENG 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 ENG 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 ENG 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 ENG 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 ENG 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 ENG 261-0 Environmental Engineering Analysis**

Development of quantitative analytical tools for describing physical, chemical, and microbiological processes in natural and engineering systems relevant to environmental engineering. Prerequisites: 260; CHEM 102.

## **CIV ENG 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 ENG 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 ENG 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 ENG 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 ENG 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 ENG 318-0 Mechanics of Fracture**

Stress concentration: analysis of the stress field near a crack tip; fracture modes; brittle and ductile fracture; fracture toughness; fracture criteria; fracture-mechanics design; fatigue; dynamic effects. Prerequisites: course in mechanics of materials.

**CIV ENG 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 ENG 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 ENG 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 ENG 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 ENG 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 ENG 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 ENG 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 ENG 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 or consent of instructor.

**CIV ENG 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 ENG 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 ENG 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 ENG 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 ENG 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 ENG 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 ENG 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 ENG 356-0 Transport Processes in Porous Media** Transport processes in porous media, including unsaturated flow, flow in deformable porous media, convective transport of solutes with hydrodynamic dispersion effects, and coupled flow phenomena with particular emphasis on electrokinetics. Prerequisite: 355.

**CIV ENG 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 ENG 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 ENG 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 ENG 361-0 Environmental Microbiology and Public Health** Evaluation of the disease status of a community; elements of vital statistics and epidemiology; etiology of infectious and noninfectious diseases; control of environmentally based health hazards.

**CIV ENG 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 ENG 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 ENG 340 recommended.

**CIV ENG 365-0 Environmental Laboratory** Chemical and microbiological aspects of environmental engineering and science are explored through an integrated laboratory course.



**CIV ENG 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 ENG 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 103 or CIV ENG 267.

**CIV ENG 370-0 Environmental Engineering Design** Decision making in selection and implementation of environmental control measures. Water supply and wastewater management: quantities to be handled, transportation systems, treatment processes, solid wastes management. Prerequisite: senior standing in civil or environmental engineering or consent of instructor.

**CIV ENG 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 ENG 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.

**CIV ENG 382-0 Infrastructure Facilities and Systems** Theory, function, planning, design, ownership, finance, and operation of contemporary infrastructure systems presented in lecture-discussion format, along with weekly field trips to sample systems. Prerequisite: senior standing in civil or environmental engineering or consent of instructor.

**CIV ENG 395-0 Special Topics in Civil Engineering** Topics suggested by students or faculty and approved by the department.

**CIV ENG 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 ENG 399-0 Projects** Special studies under faculty direction. Credit to be arranged.

## DESIGN ENGINEERING AND APPLICATIONS

The Institute for Design Engineering and Applications (IDEA) is the unit of the McCormick School that emphasizes the importance of design throughout the undergraduate curriculum and is dedicated to fostering innovation among engineering students and faculty.

The institute administers

- introductory courses required of all McCormick students (IDEA 106-1,2)
- the bachelor's degree in manufacturing and design engineering
- a certificate in engineering design
- a master's degree in product development

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.

### Courses

**IDEA 106-1,2 Engineering Design and Communication** (.5 unit each) See General Engineering Courses.

**IDEA 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.

**IDEA 297-0 Intermediate Topics in Engineering Design** (.5 unit) Topics suggested by students and faculty with approval of the institute.

**IDEA 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. At least one team member must be registered in 398. Prerequisite: 106-1,2.

**IDEA 306-0 Technology Assessment and Innovation** Application of real-world methodologies to innovative engineering design. Critical evaluation of candidate technologies; consideration of stakeholder needs and constraints; design review; design proposal. Prerequisite: sophomore standing or 106-1,2.

**IDEA 307-0 Introduction to Industrial Design Methods**

The process of product development from an industrial design perspective.

**IDEA 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.

**IDEA 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.

**IDEA 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.

**IDEA 370-0 Engineering Portfolio Development** 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.

**IDEA 395-0 Special Topics in Manufacturing Engineering** Topics relevant to manufacturing engineering and approved by the institute. Prerequisite: consent of instructor.

**IDEA 398-0 Manufacturing Engineering Design Project** 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.

**IDEA 399-0 Independent Study** Independent study on a manufacturing engineering topic supervised by a faculty member. Prerequisite: consent of instructor.

## ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

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, animate arts, cognitive science. It collaborates with Weinberg College to offer the computing and information systems major (see the Weinberg College section of this catalog).

Detailed information on degree requirements and elective courses is available from the department office or at [www.eecs.northwestern.edu](http://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.

### **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.

### **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

## 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, microprogramming, 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 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 computer science majors.

### 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 computer science majors. 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. Prerequisite: 202.

**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 majors. 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 computer science majors. 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 majors.

**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 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 347-0 Microprocessor System Projects** Programmable logic devices such as PAL and FPGA. Design, prototype, and test individual projects involving microprocessors and programmable logic devices. Prerequisites: 303, 346.

**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 Algorithmic Techniques for Bioinformatics**

Interdisciplinary course focusing on fundamental algorithmic techniques for computational problems that arise from sequencing and analyzing DNA, RNA, and proteins. Prerequisite: 336 or consent of instructor.

**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 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 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 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** 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<sub>c</sub> 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.

## ENGINEERING SCIENCES AND APPLIED MATHEMATICS

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.

### 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: 252-3; MATH 250; or GEN ENG 205-4.

**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: 252-3; MATH 250; or GEN ENG 205-4.

**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

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. This undergraduate 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 a grasp of engineering analysis and design for environmental control systems planning and design.

McCormick faculty members are engaged in research on physical, chemical, and biological processes for water supply, waste treatment, pollution control, and resource recovery; water resources; toxicology; environmental systems planning and design; chemistry and treatment of industrial wastes; land reclamation and contaminant effects on ecosystems.

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.

### Environmental Engineering Laboratory

Facilities are provided for instruction and research in environmental chemistry, environmental microbiology, environmental fluid mechanics, and the unit operations of water and waste treatment. Specialized apparatuses and instrumentation are available for studies in each area.

## INDUSTRIAL ENGINEERING AND MANAGEMENT SCIENCES

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 IE 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.

To learn more about the program, visit the department's web site at [www.iems.northwestern.edu](http://www.iems.northwestern.edu).

## Courses

### *Economics and Financial Decisions*

**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.

### *General Business Management*

**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 224, 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.

### *Operations Research*

**IEMS 310-0 Operations Research** Survey of operations research techniques. Linear programming, decision theory, stochastic processes, game theory. Not open to industrial engineering majors. 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.

### *Organization Theory, Behavioral Science, and Technology Management*

**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 non-majors: consent of instructor.

**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.

### *Probability and Statistics*

**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 majors. 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 303-0 Statistics I** 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 Statistics II** 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.

### *Production and Logistics*

**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: 310 or 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: 302; 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.

#### *Senior Design Project*

**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 majors; 310 for manufacturing engineering majors.

**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.

#### *Special Topics*

**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.

## **MATERIALS SCIENCE AND ENGINEERING**

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.

## **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 majors.

**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 203-0 Microstructure and Engineering Properties of Materials** Processing, microstructure, and properties of engineering materials with emphasis on structural materials such as concrete, steel, wood, glass, and ceramics. Not to be taken for credit with or after 201 or 301. Prerequisites: CHEM 102; MATH 230.

**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. Majors in materials science and engineering 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 322-0 Kinetics of Heterogeneous Reactions** Rates and mechanisms of heterogeneous gas-solid, liquid-solid, and solid-solid reactions such as carburization, reduction, oxidation, corrosion, stress-corrosion, and heterogeneous structural transformations. Role of microscopic and macroscopic defects.

**MAT SCI 331-0 Physical Properties of Polymers** Different kinds of polymeric materials. Relationships between structure and physical properties; rubber elasticity, the glassy state, crystallinity in polymers. Lectures, laboratory. Prerequisites: 201 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 335-0 Polymer Processing and Properties** Effects of processing flows on microstructure and properties of semicrystalline and glassy polymers. Extrusion and molding; structural characterization and mechanical behavior; additives.

**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; 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: 201; 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 385-0 Image Analysis** Quantitative analysis of microstructures in materials from measurements on two-dimensional sections, transmission micrographs, and scanning electron micrographs.

**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

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.

### 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, 241; EECS 270; MECH ENG 262 or CIV ENG 216.

**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 ENG 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 ENG 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 ENG 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: GEN ENG 205-3 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 ENG 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 ENG 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 ENG 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 ENG 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 ENG 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.

## Medill School of Journalism

The Medill School has epitomized excellence in journalism since 1921. Now, as the media face unprecedented change, Medill's undergraduate program is leading the way in preparing multimedia journalists to shape and navigate a dynamic media landscape. A Medill education ensures that students become skilled not only at writing, reporting, editing, production, and critical thinking but also with 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 pioneering 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 the news media. 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.

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, or online news operations across the United States and selected locations abroad, including South Africa.

Many Medill students find jobs in print, broadcast, or online journalism, public relations, or related fields directly after graduation. Others pursue a Medill master's degree. Medill offers two graduate programs. The master of science in journalism program offers advanced study in specialized subject reporting (such as business, politics, or science) and in specialized techniques (such as magazine

writing and editing, interactive media, and videography). The master of science in IMC program has specialized concentrations in consumer insight and analysis and stakeholder communications.

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.

For more information, see the school's web site at [www.medill.northwestern.edu](http://www.medill.northwestern.edu).

## ACADEMIC POLICIES

### Requirements for the Degree of Bachelor of Science in Journalism

- A minimum of 45 units must be completed on the college level.
- 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 the Undergraduate Education section of this catalog.)
- 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.
- 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. (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 three-unit social science concentration, however, cannot be applied to a Weinberg College major.)

### 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 reflects the grades of all journalism courses attempted (including F's).
- All Y and X grades, unless made up satisfactorily by the end of the subsequent quarter, are counted as F's.
- A grade of F and/or N earned twice in the same required course is grounds for mandatory transfer out of Medill.
- Before starting the Journalism Residency, students must
  - earn a grade of C or better in EDIT 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 EDIT 201-1 Reporting and Writing and EDIT 201-2 Multimedia Storytelling
- Students may earn a grade of D or worse in no more than 2 units in journalism and 3 units overall. Exceeding these limits is grounds for mandatory transfer out of Medill.
- When journalism courses are repeated, both grades are computed in the journalism GPA but only 1 unit may be applied toward the 45 units required for the BSJ. (Exception: a second unit of EDIT 373 Investigative Journalism may be applied toward the 45-unit requirement with consent of the instructor.)
- Students who do not meet the minimum GPA requirements are placed on academic probation. Continued poor performance results in mandatory transfer to another school within Northwestern or dismissal from the University.

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 those offered by the faculty under the P/N option)
- all foreign language courses taken to meet the global and diverse cultures requirement

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.

### Medill Integrity Code for Academic and Professional Conduct

All Medill students are required to uphold the Medill Integrity Code for Academic and Professional Conduct, which, among others things, requires adherence to principles of honesty and integrity in academic efforts and related professional 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

Medill offers an accelerated degree program that permits outstanding students to complete both the bachelor of science in journalism and the master of science in journalism degrees in less than five years. 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.

### 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, the Undergraduate Leadership Program, and the international studies and legal studies adjunct majors, among other areas (see the Cross-School Programs and Weinberg College sections of this catalog).

### 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.

## 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 Undergraduate Education section of this catalog).

## STUDENT RESOURCES

### Faculty Advisers

When students enter Medill, they are assigned to a faculty adviser who is available to help develop an individual academic program. Staff members within Medill's Office of Student Life and student peer advisers also help advise students in such areas as degree requirements, career paths, noncredit internships (especially during the summers), and work in campus media.

### Activities

Through student publications and broadcast media, professional organizations, and convocations, Medill students have many journalistically related opportunities outside of the classroom.

Students write and edit the *Daily Northwestern* and the *Chronicle*, independent, student-run newspapers published during the academic year, and the *Summer Northwestern*, a weekly newspaper published during Summer Session. Students also may participate in a variety of other student-run print and online campus publications. The University gives no academic credit for work on student-run publications, which have no formal connection with Medill.

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 PROGRAM

### Medill Curriculum Requirements

*Arts and Sciences (23 units)*

See the *Medill Undergraduate Handbook* for a complete list of courses that fulfill the arts and sciences course requirements.

#### Distribution requirements — 14 units

- Art or art history — 1 unit
- Economics — 1 unit
- History — 3 units; at least 1 must be in U.S. history and at least 1 in non-U.S. history
- Literature — 3 units chosen from any department in the University dealing with literature, either in English or in a foreign language
- Political science — 2 units, 1 in American government and 1 in international relations or international studies
- Religion, philosophy, or ethics — 1 unit not including courses in logic
- Science, mathematics, or logic — 3 units  
1 course in statistics chosen from ANTHRO 362; BME 220; IEMS 201; MATH 202, 285; POLI SCI 310, 311, 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; CIV ENG 206; COG SCI 210; GEOG 211, 235, 313, 341; MAT SCI 101; PHIL 150, 250, 350, 351

**Social science concentration** — 3 units in anthropology, economics, 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. Note: INTL ST 201-1,2 may be counted toward the social science concentration in political science.

**Elective concentration** — 6 units 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. (Exceptions: 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 or a second major in Weinberg College or an adjunct major in a

cross-disciplinary area offered through Weinberg College, such as business institutions, international studies, gender studies, or legal studies. Permission to pursue a second or adjunct major must be secured from the appropriate Weinberg College department.) No more than 1 unit of field study or independent study credit and no AP credits may be applied toward the elective concentration. Students should check with an adviser about whether the courses they have chosen also meet the global and diverse cultures requirement.

### *Electives (8–10 units)*

Students may take any non-Medill credit course to explore or extend their interests.

### *Global and Diverse Cultures*

The Medill faculty believes that all students should understand and appreciate diverse cultures and the world beyond the United States. Consequently, 11 of the units chosen to meet the arts and sciences and elective requirements must be related to the study of global and diverse cultures.

Three of these units must be in a foreign language, unless students can demonstrate proficiency as defined by Weinberg College. The other 8 units 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 classes offered throughout the University but may appeal to Medill's senior director of undergraduate education and teaching excellence if they believe other classes qualify.

### *Journalism (12–14 units)*

#### **Core — 5 units**

##### *Freshman year*

EDIT 201-1 Reporting and Writing

EDIT 201-2 Multimedia Storytelling

EDIT 202 Introduction to 21st-Century Media

##### *Sophomore year*

EDIT 301 Enterprise Reporting in Diverse

Communities

##### *Junior year*

EDIT 370 Media Law and Ethics

#### **Journalism Residency — 5 units**

Students begin pursuing one of the following programs during late sophomore year or junior year:

##### *Newspaper/Online*

- EDIT 310 Media Presentation: Newspaper/Online
- 1 of the following:
  - EDIT 320 Storytelling: Interactive News
  - EDIT 321 Storytelling: Magazine and Feature Writing
  - EDIT 322 Storytelling: Videography and Broadcast Presentation
- 3 of the following:
  - EDIT 345 Journalism Residency in Newspaper/Online: Reporting (1 or 2 units)

EDIT 346 Journalism Residency in Newspaper/Online: Presentation (1 or 2 units)

##### *Magazine*

- EDIT 311 Media Presentation: Magazine
- 1 of the following:
  - EDIT 320 Storytelling: Interactive News
  - EDIT 321 Storytelling: Magazine and Feature Writing
  - EDIT 322 Storytelling: Videography and Broadcast
- 3 of the following:
  - EDIT 355 Journalism Residency in Magazine: Writing (1 or 2 units)
  - EDIT 356 Journalism Residency in Magazine: Presentation (1 or 2 units)

##### *Broadcast*

- EDIT 312 Media Presentation: Videography and Broadcast
- 1 of the following:
  - EDIT 320 Storytelling: Interactive News
  - EDIT 321 Storytelling: Magazine and Feature Writing
  - EDIT 322 Storytelling: Videography and Broadcast
- 3 of the following:
  - EDIT 365 Journalism Residency in Broadcast: Reporting (1 or 2 units)
  - EDIT 366 Journalism Residency in Broadcast: Production (1 or 2 units)

#### **Electives — 2–4 units**

Students must take at least 2 journalism electives from as many of the following categories as their program allows. 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.

##### *Elective Category I: Storytelling Techniques*

EDIT 310 Media Presentation: Newspaper/Online

EDIT 311 Media Presentation: Magazine

EDIT 312 Media Presentation: Videography and

Broadcast

EDIT 320 Storytelling: Interactive News

EDIT 321 Storytelling: Magazine and Feature Writing

EDIT 322 Storytelling: Videography and Broadcast

EDIT 368 Documentary

EDIT 371 Journalism of Empathy

EDIT 374 News and Numbers

EDIT 375 Literary Journalism

EDIT 376 Design and Infographics

EDIT 378 Photojournalism

##### *Elective Category II: Subject Areas*

EDIT 372 International Journalism: South Africa

EDIT 373 Investigative Journalism

EDIT 380 Legal Reporting

EDIT 381 Business Reporting

EDIT 382 Environmental Reporting  
 EDIT 383 Health and Science Reporting  
 EDIT 384 Building Interactive Communities  
 EDIT 390 Special Topics  
 EDIT 399 Independent Study

*Elective Category III: Media Marketing Communications*

IMC 303 Ad Creativity and Innovation  
 IMC 304 Direct and Database Marketing

## COURSES

**EDIT 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.

**EDIT 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.

**EDIT 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.

**EDIT 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: 201-1,2 and sophomore standing.

**IMC 303-0 Ad Creativity and Innovation** Introduction to advertising in the economy and society: theory and practice of marketing, research, copywriting, media planning, direct marketing; how advertising works; advertising agencies and other organizations; role of advertising in society and the economy; legal aspects. Prerequisite: 301.

**IMC 304-0 Direct and Database Marketing** Fundamental principles of direct marketing, including marketing, promotion, and business considerations; survey of database, media, and creative techniques used by traditional and nontraditional marketers. Prerequisite: 301.

**EDIT 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: 301.

**EDIT 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: 301.

**EDIT 312-0 Media Presentation: Videography and Broadcast** 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: 301.

**EDIT 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: 301; 310, 311, or 312.

**EDIT 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: 301; 310, 311, or 312.

**EDIT 322-0 Storytelling: Videography and Broadcast** 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: 301; 310, 311, or 312.

**EDIT 345-0 Journalism Residency in Newspaper/Online: Reporting** (1 or 2 units) Hones reporting and news writing skills in a newsroom through practical assignments, including multimedia opportunities whenever possible, under deadline pressure and close editorial supervision. Prerequisites: 310; 320, 321, or 322. Taken with 346.

**EDIT 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: 310; 320, 321, or 322. Taken with 345.

**EDIT 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: 311; 320, 321, or 322. Taken with 356.

**EDIT 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: 351; 320, 321, or 322. Taken with 355.

**EDIT 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 television newsroom under close professional supervision. Prerequisites: 312; 320, 321, or 322. Taken with 366.

**EDIT 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 television newsroom under close professional supervision. Prerequisites: 312; 320, 321, or 322. Taken with 365.

**EDIT 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: 361 and junior standing.

**EDIT 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: junior standing.

**EDIT 371-0 Journalism of Empathy** Exploration of writing and reporting about people and places neglected and misunderstood by mainstream America. Prerequisite: senior standing.

**EDIT 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: 301 and junior standing for Medill students; consent of instructor for others.

**EDIT 373-0 Investigative Journalism** The news media in their adversarial role in public affairs reporting, including 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.

**EDIT 374-0 News and Numbers** Development of an in-depth reporting/writing project, including researching the subject; analyzing the appropriate interviews, computer data, and/or surveys; writing and editing; and preparing information graphics. Prerequisite: 301.

**EDIT 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: 340, 351, or 360.

**EDIT 376-0 Design and Infographics** 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: 310, 311, or 312.

**EDIT 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: 310, 311, or 312.

**EDIT 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.

**EDIT 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.

**EDIT 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.

**EDIT 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.

**EDIT 384-0 Building Interactive Communities** Advanced course in creating digital “playgrounds,” including interactive web sites and games, for users to interact with one another. Managing a variety of community and “pull” content.

**EDIT 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.

**EDIT 390-0 Special Topics** Specialized, experimental courses offered from time to time by faculty. Prerequisites: vary depending on the course.

**EDIT 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.

## School of Music

One of the oldest degree-granting music institutions in the United States, the Northwestern University 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 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 this 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 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 Richard Goode, Leon Fleisher, Renata Scott, Oscar Ghiglia, and Janos Starker. 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 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 School of Music is a founding member of the National Association of Schools of Music, which fully accredits all its degree programs.

For more information see [www.music.northwestern.edu](http://www.music.northwestern.edu).

## ACADEMIC POLICIES

### Programs of Study

The School of Music offers programs leading to the professional degrees of bachelor of music, master of music, graduate certificate in performance, 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 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 and are given significant opportunities to explore other interests with free electives.

### *Bachelor of Music*

Courses of study leading to the bachelor of music degree include majors in piano, strings, voice, winds and percussion, music cognition, music composition, music



education, musicology, music technology, music theory, and music academic studies. 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 next column.

### *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 technology for music. 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 page.

### *Five-Year BA/BMus*

Students accepted into the combined Weinberg College of Arts and Sciences–School of Music program may simultaneously earn a BA degree from Weinberg College and a BMus degree from the School of Music. They must complete all Weinberg degree requirements, including at least 30 Weinberg courses, as well as all School of Music bachelor of music degree requirements, including at least 30 music courses. Fulfilling both music and Weinberg requirements usually takes five years of full-time study, and the Undergraduate Residence Requirement of 15 quarters is obligatory (see Undergraduate Education).

Participants in this combined program must be accepted by both the School of Music and Weinberg College of Arts and Sciences. Interested students should consult with the associate dean for undergraduate studies in Weinberg College and the assistant dean for admission and student affairs in the School of Music.

### *Five-Year BS/BMus or BS/BAMus*

Students accepted into the combined McCormick School of Engineering and Applied Science–School of Music program may simultaneously earn a BS degree from the McCormick School and a BMus or BAMus degree from the School of Music. They must complete all McCormick School degree requirements, including at

least 36 McCormick courses, as well as all School of Music bachelor of music or bachelor of arts in music degree requirements, including at least 30 courses. Fulfilling both music and engineering requirements usually takes five years of full-time study, and the Undergraduate Residence Requirement of 15 quarters is obligatory (see Undergraduate Education).

Participants in this combined program must be accepted by both the School of Music and the McCormick School. Interested students should consult with the undergraduate engineering dean's office in the McCormick School and the assistant dean for admission and student affairs in the School of Music.

### *Five-Year BMus/MSJ or BAMus/MSJ*

Northwestern offers extremely talented students the opportunity to earn in five years both a BMus or BAMus degree from the School of Music and an MSJ degree from the Medill School of Journalism. The joint program is intended to prepare exceptional students for journalism careers emphasizing music and arts reporting. At least 4 journalism courses are required at the undergraduate level before students enter the graduate program. Prospective students apply to this joint program while applying for undergraduate admission to Northwestern.

## **Degree Requirements**

### *Bachelor of music (50–52 units)*

Candidates for the degree of bachelor of music must complete 50–52 units, depending on the minimum number of courses required for their major. (Completion of at least 49 units is required for the ad hoc 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 (16 units of credit) in addition to the requirements for the individual major.

- Music core requirements (16 units)
  - 2 years of music theory (3 units)
  - 2 years of aural skills (3 units)
  - 1 year of keyboard skills (1.5 units)
  - 5 courses in music history (3 units)
  - 1 course in conducting (1 unit)
  - 1 year of ensemble (1.5 units)
  - 1 year of 100-level performance study (3 units)
- General education (nonmusic) (12 units; 8 units for music education majors)
- Free electives (music or nonmusic) (0 units for music education majors; 4.5 units for violin, viola, and cello performance majors; 6 units for all others)
- Major studies requirement (16–27.5 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 (8 units)  
2 years of music theory (3 units)  
1 year of aural skills (1.5 units)  
4 courses in music history (2 units)  
1 year of ensemble (1.5 units)
- Additional music courses (10 units)
- General education (nonmusic) (13 units)
- Nonmusic electives (8 units)
- Foreign language (6 units)

### *Other Requirements*

All freshmen in the School of Music must participate in band, choir, or orchestra, as appropriate to their principal auditioned instrument. For their last 24 units, all students must be registered at Northwestern; for their last 12 units, they must be registered in the School of Music. Credit toward graduation is generally not granted for summer work taken at other colleges or universities as part of the last 24 units.

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 an application for the degree 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 24-unit residency requirement.

In addition to and independent of the requirements set by the School of Music, all students must satisfy the Undergraduate Residence Requirement (see Undergraduate Education).

## **Music Performance Study**

The School of Music offers instruction for majors in piano, strings, voice, and winds and percussion. Students should consult their advisers or 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 performance 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 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. Students who know they will be absent from classes or performing organizations for three or more consecutive days for such professional or personal commitments as auditions or off-campus performances or for any other nonemergency reasons are required to prepare a petition requesting permission to be absent from their academic and performance responsibilities in the School of Music. This petition must be submitted to the assistant dean for admission and student affairs for approval.

Failure to comply with these regulations can be cause for failure in the courses or ensembles for which a student is registered during that quarter.

## **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 School of Music combines a specialization in a performance area with one in an academic area or composition, 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 School of Music but may earn only one bachelor's degree. 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 School of Music 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

School of Music 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 School of Music minor.

### *Arts Administration (8 units)*

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

### *Commercial Music (8 units)*

- JAZZ ST 330 Writing for Jazz Ensembles
- JAZZ ST 331 Advanced Jazz Writing
- 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

### *Jazz Studies*

See the School of Music's Office of Student Affairs for current requirements.

### *Music Cognition (9 units)*

- 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)

### *Music Composition (9 units)*

- MUS COMP 111 and 311 Class Composition (6 units)
- MUS COMP 314-1 Instrumentation or 314-2 Orchestration (1 unit)
- 1 elective chosen from 300-level music composition courses
- 1 elective in music technology
- MUS COMP 390 Composition Colloquium (6 quarters, 0 credit)

### *Music Criticism (7 units)*

The minor in music criticism is open to music majors only.

- EDIT 201-1 Reporting and Writing
- EDIT 201-2 Multimedia Storytelling
- EDIT 301 Enterprise Reporting in Diverse Communities (prerequisite: 201)
- EDIT 202 Introduction to 21st-Century Media or 370 Media Law and Ethics
- EDIT 310 Media Presentation: Newspaper/Online, 311 Media Presentation: Magazine, or 312 Media Presentation: Videography and Broadcast
- MUSIC 398 Internship or 399 Independent Study
- 1 300-level musicology course)

### *Musicology (6 units)*

The minor in musicology is open to music majors only.

- 6 units in musicology, at least one of which must be chosen from MUSICOL 323 or 326–329 (courses on music of the world's cultures) and at least one of which must be chosen from MUSICOL 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.

### *Music Technology (6 units)*

The 6 units required for the minor in music technology are to be chosen from the following list of courses.

- MUS TECH 259 Introduction to Music Technology or MUS TECH 262 Technology in the Music Classroom
- MUS TECH 321 Producing in the Virtual Studio
- MUS TECH 322 Recording and Basic Audio
- MUS TECH 335 Selected Topics in Music Technology
- MUS TECH 337 Multimedia for the Web
- MUS TECH 338 Programming
- MUS TECH 340 Composing with Computers
- MUS TECH 342 Computer Sound Synthesis
- MUS TECH 345 Technology-Based Performance
- MUS TECH 348 3-D Sound and Spatial Audio

### *Music Theory (6 units)*

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

### *Music Theatre*

The School of Music and the School of Communication offer a joint certificate program in music theatre. For information, see the Cross-School Programs section of this catalog.

## Graduate Studies

The School of Music offers programs of study leading to the master of music degree, the graduate certificate in performance, and the doctor of music degree. Information

concerning these programs is available from the Office of Admission and Financial Aid in the School of Music. For information about the requirements for the doctor of philosophy degree in music, contact the Graduate School.

## RESOURCES

### Musical Organizations

As a part of their program of study, music majors are required to participate in School of Music 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.

#### *University Brass Ensemble*

The University Brass Ensemble provides performance challenges and learning opportunities for serious brass players interested in literature for ensembles of various sizes and compositional styles.

#### *Jazz Groups*

The Jazz Ensemble, Jazz Band, 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 and Mallet Ensembles*

The Percussion and Mallet Ensembles offer students an opportunity to perform percussion chamber works representative of diverse musical styles from renaissance transcriptions through avant-garde theater pieces. The ensembles maintain active performance schedules both on and off campus and are open to all percussion students.

#### *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 School of Music 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 School of Music 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 School of Music 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 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 Wind 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.

**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 School of Music, the entire Northwestern University community, and researchers from around the world. For more information see [www.library.northwestern.edu/music](http://www.library.northwestern.edu/music).

**Pi Kappa Lambda**

Pi Kappa Lambda, a national music honor society, was founded at Northwestern University in 1918 for the recognition and encouragement of the highest level of musical achievement and academic scholarship among music majors. Alpha chapter elected as its first member Peter Christian Lutkin, the first dean of the School of Music, and his initials in their Greek equivalents were adopted for the name of the society. The national office has been housed in the Northwestern University School of Music since 1984. Two deans and one faculty member from Northwestern have served as national president, and the society has grown to more than 200 chapters in colleges, conservatories, and university schools of music.

To be considered for membership in Pi Kappa Lambda, seniors must be in the upper one-fifth of their class, and juniors in the upper one-tenth of their class. Candidates must also display a high level of musical excellence as well as scholarship. Nominations and elections are the responsibility of the Pi Kappa Lambda faculty committee.

**MUSIC STUDIES FOR NONMAJORS**

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 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 School of Music.

### Private Lessons for Credit

Nonmusic majors may take half-hour private music lessons for .5 course credit in GEN MUS 115 Applied Piano and Organ and Chamber Groups, 120 Applied Strings and Chamber Groups, and 125 Applied Winds/ Percussion and Chamber Groups. A registration fee of \$240 (for 2007–08) is billed to the student's tuition and fees account. Nonmusic majors may take voice classes or private 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 of \$215 for voice classes, \$265 for beginning private voice lessons, or \$330 for intermediate or advanced private voice lessons (for 2007–08) is billed to the student's tuition and fees account. Students are accepted for private 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, 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 and Chamber Groups** (.5 units) Private lessons and coaching for nonmajors; audition required.

**GEN MUS 120-0 Applied Strings and Chamber Groups** (.5) Private lessons and coaching 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 and Chamber Groups** (.5) Private lessons and coaching 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 classic, 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 252-0 Harmony** 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 360-0 Nonmajor Private Voice, Advanced** (.5) Private lessons for nonmajors; audition required.

## INTERDEPARTMENTAL COURSES FOR MUSIC MAJORS

The music theory, musicology, aural skills, keyboard skills, and ensembles sequences are required for, and limited to, all undergraduates in the School of Music. Ensembles listed under Conducting and Ensembles are available by audition to all students in the University.

### Courses Open to Undergraduates

**MUSIC 101-1,2,3 Theory Skills Testing** (0) Skills tests taken in conjunction with MUSIC 111-1 (or 110-0) and 111-2,3.

**MUSIC 110-0 Introduction to Theory** (.5) Taken in place of MUSIC 111-1 as recommended by the coordinator of freshman theory and aural skills.

**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 (or 110 for 111-2).

**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 (.5)**

Introduction to both the world's musical variety and common issues related to music production worldwide.

**MUSIC 214-0 Music History I (.5)** Principles, materials, and concepts of the historical study of Western art traditions, from medieval through renaissance.

**MUSIC 215-0 Music History II (.5)** Continuation of 214, from baroque through early romantic.

**MUSIC 216-0 Music History III (.5)** Continuation of 215, from the middle of the romantic era through the present.

**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. An additional specialization option, music academic studies, requires 1 course from each of the five programs and 7 300-level courses selected from any of the Department of Music Studies offerings.

### *Music Composition*

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 Studies Requirements

For a major in composition, 16 course units are required beyond the core degree requirements.

- 212 Composition (3 units; some credit may be given for applied instrument or voice lessons)
- 312 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)
- Music theory courses in analysis (2 units; 1 unit must be in 20th-century analysis)
- 380 Senior Recital (0 units)
- 390 Composition Colloquium (0 units)

### 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 Composition** Original composition; individual instruction.

**MUS COMP 212-0 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 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 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*

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 Studies Requirements**

For a major in music education, 26 to 28 course units are required beyond the core degree requirements.

- Additional private lessons (6 units)
- Additional keyboard skills (as needed by track) (1.5–3 units)
- Additional large ensemble (8 quarters) (4 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)
- 396 Student Teaching Colloquium (0 units)
- MUS TECH 262 Technology in the Music Classroom
- CONDUCT 340-1,2, or 3 Advanced Conducting

### **Instrumental Track (7.5 additional units)**

- 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 (6 additional 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 (5.5 additional 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 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.

**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 396-0 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*

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 academic year.

**Major Studies Requirements**

For a major in musicology, 16 course units are required beyond the core degree requirements.

- 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)
- 395 Musicology Colloquium (12 quarters, 0 units)

**Courses Open to Undergraduates**

**MUSICOL 323-0 Proseminar 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 multidisciplinary 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 335-0 Selected Topics in Musicology** Topics vary; announced before registration. May be repeated.

**MUSICOL 337-0 Improvisation and World Musicianship**

Improvisation in Western art music, jazz, Indian, and African music; performance workshops in African drumming, Indian solfeggio, and rhythmic mnemonics.

**MUSICOL 338-0 African Mbira Music** The mbira, one of the most popular and ancient melodic instruments in black Africa. Construction; development of basic playing skills. Prerequisite: consent of instructor.

**MUSICOL 340-0 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 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 Gabriellis.

**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 395-0 Musicology Colloquium (0)**

**MUSICOL 399-0 Independent Study (.5–1)**

*Music Technology*

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.

**Major Studies Requirements**

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)
  - 393 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)

## 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 393-0 Music Technology Colloquium (0)**

**MUS TECH 399-0 Independent Study (.5–1)**

## *Music Theory and Cognition*

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 Studies Requirements**

For a major in music theory or in music cognition, 16 course units are required beyond the core degree requirements.

### *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)

### *Music Cognition*

- 335 Selected Topics in Music Theory (courses in music cognition) (2 units)
- 351 Music Cognition (1 unit)
- 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)

### Courses Open to Undergraduates

**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 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 332-0 Rhythmic Analysis** Recent theoretical work on rhythm; analytical methodologies dealing with music primarily as a temporal process.

**MUS THRY 335-0 Selected Topics in Music Theory** Topics vary; announced before registration. May be repeated.

**MUS THRY 351-0 Music Cognition** Survey of issues and research methods in music cognition. Music listening, memory for music, development of skills.

**MUS THRY 355-0 Atonal Analysis** Techniques for analysis of atonal and nonfunctional tonal music, including set-theoretic, serial, 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 Colloquium** (0) Discussion of current research in music theory and cognition.

**MUS THRY 394-0 Music Cognition Colloquium** (0)

**MUS THRY 399-0 Independent Study** (.5–1)

## MUSIC PERFORMANCE

This department consists of the Conducting and Ensembles, Jazz Studies, Piano, Strings, Voice and Opera, and Wind and Percussion Programs.

### *Conducting and Ensembles*

Courses in the Conducting and Ensembles Program are available to all 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 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** (.5) 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. Final project includes a symphonic bowing analysis presented for group discussion.

**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** (0–.5) Membership by audition.

**CONDUCT 393-0 Orchestral Organizations** Membership by audition in Symphony Orchestra, Chamber Orchestra, or Philharmonia.

**CONDUCT 395-0 Baroque Music Ensemble** (0–.5) Performance of choral, solo, and instrumental music of the Middle Ages through the early baroque.

**CONDUCT 399-0 Independent Study** (.5–1)

### *Jazz Studies*

The program in jazz studies offers courses in jazz improvisation, composition/arranging, history, and ensembles.

### Courses Open to Undergraduates

**JAZZ ST 110-0 Jazz Perspectives** Overview of jazz training (history, improvisation, theory) and career development (music industry). Introduction to jazz texts and recorded resources. Prerequisite: consent of instructor.

**JAZZ ST 162-0 Applied Jazz Improvisation** (.5) Individual study focused on the practical application of melodic, rhythmic, harmonic, formal, and textural elements applied

to the aural tradition of jazz improvisation. May be repeated for credit. Prerequisite: consent of instructor.

**JAZZ ST 262-0 Applied Jazz Improvisation (.5)** Continuation of 162 for sophomores. May be repeated for credit. Prerequisite: consent of instructor.

**JAZZ ST 330-0 Writing for Jazz Ensembles** Composing and arranging for jazz ensemble. Score study and rehearsal techniques with jazz groups and stage bands.

**JAZZ ST 331-0 Advanced Jazz Writing** Continuation of 330. Emphasis on creative scoring, composition, and commercial writing.

**JAZZ ST 332-0 Jazz Improvisation for Music Educators**

Individual instruction and hands-on performing. Whether learning from scratch or improving rusty skills, everyone can improvise. Accompaniment will include a jazz trio.

**JAZZ ST 333-0 Jazz Theory** Chord symbols, melodic and harmonic structures, and other theoretical analyses as applied to jazz improvisation, composition, and arranging. Prerequisite: classical theory background.

**JAZZ ST 335-0 Selected Topics in Jazz Studies** Topics vary. May be repeated for credit as topics change.

**JAZZ ST 336-0 Basic Jazz Improvisation** Basic elements of jazz improvisation, including harmony, modes, and basic progressions. Prerequisite: consent of instructor.

**JAZZ ST 337-0 Advanced Jazz Improvisation** Continuation of development of jazz improvisation skills. Prerequisite: 336 or consent of instructor.

**JAZZ ST 361-1,2 Jazz Harmony and Keyboard (0–1)** Jazz voicing, harmonization, analysis, and technique through keyboard instruction. Prerequisites: basic keyboard proficiency and jazz performance and harmonic background.

**JAZZ ST 362-0 Applied Jazz Improvisation** Advanced elements of jazz improvisation, including harmony, modes, and progressions. Prerequisite: consent of instructor.

**JAZZ ST 370-0 Junior Recital (0)**

**JAZZ ST 377-0 Jazz Ensembles (.5)**

**JAZZ ST 380-0 Senior Recital (0)**

**JAZZ ST 391-0 Jazz Combos (.5)**

**JAZZ ST 395-0 Jazz Forum (0)**

**JAZZ ST 399-0 Independent Study (.5–1)**

### *Piano*

The Piano Program offers a major in piano performance that combines a strong musical basis for a professional career with the broad humanistic interests embodied in a liberal arts education. The course of instruction focuses on the studio and includes private lessons, studio classes, piano repertoire, piano pedagogy, and accompanying classes. Electives are available in chamber music and other areas, allowing students to tailor a program to their individual needs. 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 Studies Requirements**

For a major in piano performance, 17 course units are required beyond the core degree requirements.

- 261 Piano Performance (3 units)
- 361 Piano Performance (6 units)
- 313-1,2,3 Piano Repertoire (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)
- 370 Junior Recital (0 units)
- 380 Senior Recital (0 units)
- 391 Chamber Music or 392 Chamber Music: Trios (.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 Piano Performance**

**PIANO 255-0 Piano Sight-Reading (0)**

**PIANO 313-1,2,3 Piano Repertoire** 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 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 391-0 Chamber Music (.5)** For juniors and seniors.

**PIANO 392-0 Chamber Music: Trios (.5)**

**PIANO 399-0 Independent Study (.5–1)**

### *String Instruments*

Majors in string instruments prepare for professional performance and teaching as well as for advanced study. The curriculum is built around individual performance study and ensemble participation, including chamber music and orchestra, with orchestral 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 Studies Requirements**

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 performance study (3 units)
- 300-level performance 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)
- 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 performance study (3 units)
- 300-level performance 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)
- 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 performance study (3 units)
- 300-level performance 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 performance study (3 units)
- 300-level performance study (6 units)
- 374 Guitar Ensemble (4.5 units)
- 375-1,2,3 Lute and Guitar Literature (1.5 units)
- 376-1,2,3 Guitar Pedagogy (1.5 units)
- 380 Senior Recital (0 units)

**Courses Open to Undergraduates****STRINGS 141-0, 241-0, 341-0 Violin Performance****STRINGS 142-0, 242-0, 342-0 Viola Performance****STRINGS 143-0, 243-0, 343-0 Cello Performance****STRINGS 144-0, 244-0, 344-0 Double Bass Performance****STRINGS 151-0, 251-0, 351-0 Harp Performance****STRINGS 171-0, 271-0, 371-0 Classical Guitar Performance**

**STRINGS 311-0 Suzuki Pedagogy (.5)** Fundamental principles of Suzuki philosophy and materials. Available to violin, viola, cello, and double bass players with emphasis on application to violin.

**STRINGS 312-0 String Class Pedagogy (.5)** Group teaching strategies, program administration, materials and techniques,

and pedagogy for violin, viola, cello, and double bass. For performance and pedagogy majors; secondary instruments and pedagogical applications to school settings and/or college-level techniques classes.

**STRINGS 313-0 History of String Pedagogy (.5)** Historical survey of the major violin, viola, cello, and double bass pedagogues from the early baroque through the 20th century; study of publications and contributions of contemporary schools. Lecture and seminar format.

**STRINGS 314-0 Comprehensive String Pedagogy (.5)**

Comparative study and application of the principles of successful string teaching. Communication skills, observations, comparison of contemporary approaches of Suzuki, Rolland, Havas, et al. Lecture, discussion, and demonstration format. Open to all string players.

**STRINGS 315-1,2,3 Beginning Violin and Viola Pedagogy (.5)** Developmental approach to individual and group teaching of elementary-level violin and viola students. Includes Rolland and Suzuki approaches, apprenticeship teaching, and observations. Open to all string players.

**STRINGS 316-1,2,3 Beginning Cello and Double Bass**

**Pedagogy (.5)** Developmental approach to individual and group teaching of elementary-level cello and double bass students. Open to all string players.

**STRINGS 317-0 Principles of Advanced/College-Level Studio Teaching (.5)** In-depth analysis of individual instrument pedagogy for violin, viola, cello, or double bass according to major instrument. 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 391-0 Chamber Music (.5)** Performance of chamber ensemble literature for violin, viola, cello, double bass, and harp.

**STRINGS 399-0 Independent Study (.5–1)***Voice and Opera*

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 musicology, 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 Northwestern Opera Center is supported by a generous endowment in memory of the famous American soprano Edith Mason Ragland. The internationally acclaimed Edith Mason and William E. Ragland Opera Theater presents three opera productions each year.

**Major Studies Requirements**

For a major in voice performance, 17 course units are required beyond the core degree requirements.

- 111-1,2,3 Phonetics and Diction (0 units)
- 210 Voice Performance (3 units)
- 211 Sophomore Practicum (0 units)
- 212 Opera Crew (0 units)
- 310 Voice Performance (6 units)
- 311 Vocal Solo Class (12 quarters, 0 units)
- 323 Study of the Vocal Mechanism (.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)
- 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.

**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 Voice Performance** Lessons consist of private 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 311-0 Vocal Solo Class (0)** Weekly recital hour.

Required for any student registered for full-credit private voice lessons.

**VOICE 323-0 Study of the Vocal Mechanism (.5)** Lectures, readings, discussions, and demonstrations of basic vocal physiology, common vocal problems, and use of exercises and songs for vocal improvement. Prerequisite: major in voice with junior or senior standing, or consent of instructor.

**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 357-0 The German Lied (.5)** A performance class for singers and pianists that explores the *Lieder* repertoire by Schubert, Schumann, Brahms, Wolf, Mahler, and Strauss.

**VOICE 363-0 Chanson (.5)** A performance class for singers and pianists that explores the *mélodie* repertoire by Fauré, Duparc, Chausson, Hahn, Debussy, Ravel, and Poulenc.

**VOICE 370-0 Junior Recital (0)****VOICE 380-0 Senior Recital (0)**

**VOICE 399-0 Independent Study (.5–1)** Permission of instructor and department required.

*Wind and Percussion Instruments*

Designed to prepare students for professional performance and teaching as well as for advanced study, the major in wind and percussion instruments offers a concentrated curriculum emphasizing performance 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 Studies Requirements**

For a major in wind and percussion performance, 16.5 course units are required beyond the core degree requirements.

- 200-level performance study (3 units)
- 300-level performance study (6 units)
- Large ensemble (4.5 units)
- 380 Senior Recital (0 units)

- 391 Chamber Music (3 units)
- CONDUCT 374 Band Organizations or  
CONDUCT 393 Orchestral Organizations (4.5 units)

### **Courses Open to Undergraduates**

**WIND PER 111-0, 211-0, 311-0 Flute Performance**

**WIND PER 112-0, 212-0, 312-0 Oboe Performance**

**WIND PER 113-0, 213-0, 313-0 Clarinet Performance**

**WIND PER 114-0, 214-0, 314-0 Saxophone Performance**

**WIND PER 115-0, 215-0, 315-0 Bassoon Performance**

**WIND PER 121-0, 221-0, 321-0 Trumpet Performance**

**WIND PER 122-0, 222-0, 322-0 French Horn Performance**

**WIND PER 123-0, 223-0, 323-0 Euphonium Performance**

**WIND PER 124-0, 224-0, 324-0 Trombone Performance**

**WIND PER 125-0, 225-0, 325-0 Tuba Performance**

**WIND PER 131-0, 231-0, 331-0 Percussion Performance**

**WIND PER 335-0 Selected Topics in Winds and Percussion**

Topics vary; announced before registration. May be repeated.

**WIND PER 336-0 Woodwind Orchestral Repertoire** Wind section performance practices and performance techniques in the standard orchestra literature.

**WIND PER 338-0 Brass Orchestral Repertoire** Study of brass section performance practice and performance techniques in the 19th- and 20th-century orchestral repertoire. Limited to junior, senior, and graduate students. May be repeated once.

**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 340-0 Brass Choir** (.5)

**WIND PER 341-0 Woodwind Instrument Repertoire** Survey of woodwind literature and performance practices; solos and chamber music for various performance levels.

**WIND PER 342-0 Brass Instrument Repertoire** Brass literature and performance practices; solos, pedagogical materials, and chamber music for various levels of performance.

**WIND PER 347-0 Percussion Pedagogy and Performance** Methods, materials, and writings related to percussion playing and teaching. Prerequisite: 300-level standing in percussion performance or consent of instructor.

**WIND PER 352-0 Preparing for an Audition**

**WIND PER 354-0 Woodwind Instrument Repair**

**WIND PER 357-0 Reedmaking for Single Reed Instruments**

**WIND PER 359-0 Teaching Techniques**

**WIND PER 360-0 Bass Clarinet**

**WIND PER 370-0 Junior Recital** (0)

**WIND PER 380-0 Senior Recital** (0)

**WIND PER 391-0 Chamber Music**

**WIND PER 392-0 Studio Ensembles** (0–.5)

**WIND PER 399-0 Independent Study** (.5–1)



## Administration and Faculty

### University Administration

#### University Officials

Henry S. Bienen, PhD, *President of the University*

Eugene S. Sunshine, MPA, *Senior Vice President for Business and Finance*

William J. Banis, PhD, *Vice President for Student Affairs*

Thomas G. Cline, JD, *Vice President and General Counsel*

Alan K. Cubbage, JD, *Vice President for University Relations*

J. Larry Jameson, MD, PhD, *Vice President for Medical Affairs and Lewis Landsberg Dean of the Feinberg School of Medicine*

Marilyn McCoy, MPP, *Vice President for Administration and Planning*

William H. McLean, MBA, *Vice President and Chief Investment Officer*

C. Bradley Moore, PhD, *Vice President for Research*

Sarah R. Pearson, MFA, *Vice President for Alumni Relations and Development*

Morteza A. Rahimi, PhD, *Vice President for Information Technology*

Eugene Y. Lowe Jr., PhD, *Assistant to the President*

Ronald R. Braeutigam, PhD, *Associate Provost for Undergraduate Education*

John D. Margolis, PhD, *Associate Provost for Faculty Affairs*

Michael E. Mills, MEd, *Associate Provost for University Enrollment*

Jean E. Shedd, MBA, *Associate Provost for Budget, Facilities, and Analysis*

#### Office of the Vice President for Student Affairs

Mary K. Desler, PhD, *Associate Vice President for Student Affairs and Dean of Students*

Burgwell J. Howard, MEd, *Assistant to the Vice President for Student Affairs*

Catherine E. Whitcomb, PhD, *Assistant to the Vice President for Student Affairs*

Carretta Cooke, MEd, *Executive Director, Multicultural Student Affairs*

Richard R. Thomas, MSA, *Executive Director, Norris University Center*

Shawna Cooper-Gibson, MEd, *Director, African American Student Affairs*

Sheila Driscoll, GSBA, *Director, Business and Finance*

John Dunkle, PhD, *Director, Counseling and Psychological Services*

Lonnie J. Dunlap, PhD, *Director, University Career Services*

Mary G. Goldenberg, MEd, *Director, University Residential Life*

Dominic Greene, MEd, *Director, Fraternity and Sorority Life*

Paul Komelasky, BS, *Director, Northwestern Dining Services*

Garth Miller, BA, *Director, University Housing and Food Services and Special Events*

Donald A. Misch, MD, *Director, University Health Service*

James R. Neumeister, JD, *Director, Judicial Affairs*

Ronnie Rios, BA, *Director, Hispanic/Latino Student Affairs*

Marc Skjervem, MA, *Director, Orientation and Parent Programs*

Helen N. Wood, MS, *Director, Center for Student Involvement; Associate Director, Norris University Center*

Tausak Vanadilok, MA, *Director, Asian/Asian American Student Affairs*

Sebastian Contreras Jr., MS, *Associate Director, Norris University Center*

Mark D'Arienzo, MS, *Associate Director, University Housing and Food Services*

Dianne Siekmann, MA, *Associate Director, University Career Services*

Dannee Polomsky, MS, *Manager, Services for Students with Disabilities (Chicago)*

Margaret Roe, MEd, *Manager, Services for Students with Disabilities (Evanston)*

Timothy S. Stevens, PhD, *University Chaplain*

Erica L. Brown, MDiv, *Assistant University Chaplain*

#### Office of the Associate Provost for University Enrollment

##### Office of the Registrar

Patrick F. Martin, MA, *University Registrar*

Nedra W. Hardy, BS, *Senior Assistant Registrar for Course Teacher Evaluation*

Maria S. Munoz, BPhC, *Senior Assistant Registrar for Academic Advisement and Security Administration*

William R. Berry, *Assistant Registrar for Systems*

Oralia G. Gomez, *Assistant Registrar for Transcripts, Grading, and Verification Services*

Jacquelyn F. C. Rivera, BA, *Assistant Registrar for Scheduling and Registration*

Jason Compton, *Manager, Academic Report Services*

### **Financial Aid Office**

Carolyn V. Lindley, MA, *University Aid Director*

Patsy Myers Emery, MS, *Director, Financial Aid Operations*

Adina Andrews, MS, *Director, Student Financial Services*

Allen V. Lentino, PhD, *Senior Associate Director, Admission and Financial Aid*

Angela Yang, MS, *Associate Director*

Brian Drabik, BA, *Senior Assistant Director*

Peggy Bryant, *Assistant Director*

Aaron Hosmon, BA, *Assistant Director*

Susanna Kwan, BA, *Assistant Director*

Anne Horne, BA, *Coordinator, Federal Work-Study Program*

### **Undergraduate Admission Office**

Christopher Watson, MEd, *Dean of Undergraduate Admission*

Allen V. Lentino, PhD, *Senior Associate Director, Admission and Financial Aid*

F. Sheppard Shanley, MA, *Senior Associate Director, Admission*

Onis Cheatham, MA, *Associate Director*

Grant Thatcher, MA, *Associate Director*

Margaret Miranda, MA, *Senior Assistant Director*

William N. Haarlow, PhD, *Director, College-Admission Relations, Weinberg College*

Barb Bamburg, BA, *Operations Manager for Admission Services*

Sophie Sjöholm, MSJ, *Manager of Print Publications and Content Editor*

Lindsey Cheney, MA, *Assistant Director*

Josiah Jenkins, BA, *Assistant Director*

Shannon Kennedy, MEd, *Assistant Director*

Anne Kremer, BS, *Assistant Director*

Jessyca Latimer, BA, *Assistant Director*

Abel Ochoa, BA, *Assistant Director*

Laura A. Robinson, MS, *Assistant Director*

Tamara Stewart-Hadaway, BA, *Assistant Director*

Aaron Zdawczyk, MA, *Assistant Director*

### **Information Systems Office**

Amy M. Lammers, MA, *Director of Operations, Admission, and Financial Aid*

Robert S. Henkins, BS, *Director*

### **University Library**

Sarah Pritchard, MALS, *University Librarian and Charles Deering McCormick Distinguished Professor of Research Librarianship*

H. Frank Cervone, MEd, *Assistant University Librarian for Information Technology*

Jeffrey Garrett, MLIS, *Assistant University Librarian for Collection Management*

Laurel Minott, AMLS, *Assistant University Librarian for Public Services*

Roxanne J. Sellberg, MLS, *Assistant University Librarian for Technical Services*

### **Undergraduate Schools**

The following lists of the respective administration and faculty of the undergraduate schools were current as of summer 2007. 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**

Daniel I. Linzer, PhD

*Dean of Weinberg College and Professor of Biochemistry, Molecular Biology, and Cell Biology*

Steven L. Bates, PhD

*Associate Dean and Lecturer in English*

Craig Bina, PhD

*Associate Dean and Professor of Earth and Planetary Sciences*

Mary E. Finn, PhD

*Associate Dean and College Lecturer in English*

Marie Thourson Jones, PhD

*Associate Dean and Lecturer in Political Science*

Marvin J. Lofquist, PhD

*Associate Dean and Senior Lecturer in Chemistry*

John McLane, PhD

*Associate Dean and Professor Emeritus of History*

Lane Fenrich, PhD

*Assistant Dean for Freshmen and Senior Lecturer in History*

Mark Sheldon, PhD

*Assistant Dean and College Lecturer in Philosophy*

Richard P. Weimer, MA

*Assistant Dean*

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; 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*

Michael Kramer, PhD  
*College Adviser and Lecturer in History and American Studies*

Hilarie H. Lieb, PhD  
*College Adviser and Senior Lecturer in Economics*

Joan A. W. Linsenmeier, PhD  
*College Adviser and Senior Lecturer in Psychology*

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*

Monica Russel y Rodriguez, PhD  
*College Adviser and Senior Lecturer in Anthropology*

William Savage, PhD  
*College Adviser and Senior Lecturer in English*

Elizabeth Fekete Trubey, PhD  
*College Adviser and Senior Lecturer in English*

### ***African American Studies***

Richard J. Iton (PhD Johns Hopkins)  
*Associate Professor and Chair; also Political Science*

Henry C. Binford (PhD Harvard)  
*Associate Professor; also History*

Martha Biondi (PhD Columbia)  
*Associate Professor; also History, Political Science*

Jennifer DeVere Brody (PhD Pennsylvania)  
*Associate Professor; also English, Performance Studies*

Sherwin Bryant (PhD Ohio State)  
*Assistant Professor; also History*

Huey G. Copeland (PhD UC Berkeley)  
*Assistant Professor; also Art History*

Dilip P. Gaonkar (PhD Pittsburgh)  
*Associate Professor; also Communication Studies*

Doris L. Garraway (PhD Duke)  
*Associate Professor; also French and Italian*

Geraldine Henderson (PhD Northwestern)  
*Associate Professor; also Journalism*

Barnor Hesse (PhD Essex)  
*Associate Professor; also Political Science, Sociology*

Darlene Clark Hine (PhD Kent State)  
*Board of Trustees Professor in African American Studies; also History*

Sharon Holland (PhD Michigan)  
*Associate Professor; also English*

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*

Nancy K. MacLean (PhD Wisconsin)  
*Professor; also History, Institute for Policy Research*

D. Soyini Madison (PhD Northwestern)  
*Associate Professor; also Performance Studies*

John Marquez (PhD UC San Diego)  
*Assistant Professor*

Kate Masur (PhD Michigan)  
*Assistant Professor; also History*

Charles Mills (PhD Toronto)  
*Professor; John Evans Professor in Philosophy (Philosophy)*

Toni-Marie Montgomery (PhD Michigan)  
*Professor; Dean and Professor, 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)  
*Associate Professor; also Institute for Policy Research, Psychology*

Dorothy Roberts (JD Harvard)  
*Professor; Kirkland & Ellis Professor of Law; also Institute for Policy Research*

Reuel R. Rogers (PhD Princeton)  
*Associate Professor; also Political Science*

Juan Onésimo Sandoval (PhD UC Berkeley)  
*Assistant Professor; also Sociology, Transportation Center*

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)  
*Assistant Professor; also Art History*

Tracy Vaughn (PhD Massachusetts)

*Lecturer*

Rudolph (Butch) Ware (PhD Pennsylvania)

*Assistant Professor; also History*

Celeste Watkins-Hayes (PhD Harvard)

*Assistant Professor; also Institute for Policy Research, Sociology*

Alexander G. Weheliye (PhD Rutgers)

*Associate Professor; also English, German*

Harvey Young (PhD Cornell)

*Assistant Professor; also Performance Studies, Radio/Television/  
Film, Theatre*

### ***African and Asian Languages***

Licheng Gu (PhD Oregon)

*College Lecturer and Director*

Mohammad Abdeljaber (BA Northwestern)

*Lecturer*

Kagan Arik (PhD Chicago)

*Lecturer*

Mika Changet (MA Illinois Chicago)

*Lecturer*

Edna G. Grad (PhD Texas)

*College Lecturer*

Hong Jiang (MEd Cincinnati, MA Zhongshan)

*Senior Lecturer*

Bruce Knickerbocker (MA Wisconsin)

*Lecturer*

Eunmi Lee (MA Indiana)

*Senior Lecturer*

Richard Lepine (PhD Wisconsin)

*Senior Lecturer*

Hsiu-ling Lin (EdD Massachusetts)

*Senior Lecturer*

Phyllis I. Lyons (PhD Chicago)

*Associate Professor*

Rami Nair (PhD Northwestern)

*Senior Lecturer*

Junko Sato (MEd Massachusetts)

*Senior Lecturer*

Yumi Shiojima (MEd Pennsylvania)

*Senior Lecturer*

Jili Sun (PhD Sorbonne Nouvelle)

*Lecturer*

Noriko Taira (MEd Massachusetts)

*Senior Lecturer*

Lynn Whitcomb (PhD Northwestern)

*Senior Lecturer*

Judith Wilks (PhD Chicago)

*Lecturer*

Guofang Yuan (MA Yunnan Nationality)

*Lecturer*

### ***Anthropology***

William R. Leonard (PhD Michigan)

*Professor and Chair; also Neurobiology and Physiology*

Ana Aparicio (PhD CUNY)

*Assistant Professor*

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*

Katherine E. Hoffman (PhD Columbia)

*Assistant Professor*

John C. Hudson (PhD Iowa)

*Professor*

William Irons (PhD Michigan)

*Professor*

Christopher Kuzawa (PhD Emory)

*Assistant Professor; also Institute for Policy Research*

Robert G. Launay (PhD Cambridge)

*Professor*

Thomas McDade (PhD Emory)

*Associate Professor; Weinberg College Board of Visitors Research*

*and Teaching Professor; also Education and Social Policy,*

*Institute for Policy Research*

Cynthia Robin (PhD Pennsylvania)

*Associate Professor*

Monica Russel y Rodriguez (PhD UCLA)

*Senior Lecturer and College Adviser*

Helen B. Schwartzman (PhD Northwestern)

*Professor*

Shalini Shankar (PhD NYU)

*Assistant Professor*

Kearsley Stewart (PhD Florida)

*Senior Lecturer*

Mary J. Weismantel (PhD Illinois)

*Professor*

### ***Art History***

Claudia Swan (PhD Columbia)

*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 G. 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*

Cecily Hilsdale (PhD Chicago)  
*Assistant Professor*

Christina Kiaer (PhD UC Berkeley)  
*Associate Professor*

Hamid Naficy (PhD UCLA)  
*Professor; also Radio/Television/Film*

Christopher Pinney (PhD London School of Economics)  
*Mary Jane Crowe Professor*

Marco Ruffini (PhD UC Berkeley)  
*Assistant Professor; also French and Italian*

David Alan Robertson (PhD Pennsylvania)  
*Lecturer; Ellen Philips Katz Director, Mary and Leigh Block Museum of Art*

Sarah E.. Teasley (PhD Tokyo)  
*Assistant Professor*

Krista A. Thompson (PhD Emory)  
*Assistant Professor; also African American Studies*

David T. Van Zanten (PhD Harvard)  
*Mary Jane Crowe Professor of Art and Architecture*

### ***Art Theory and Practice***

Jeanne Dunning (MFA Art Institute Chicago)  
*Professor and Chair*

Pamela Bannos (MFA Illinois)  
*Senior Lecturer*

Daniel J. Devening (MFA Illinois)  
*Senior Lecturer*

Kelly Kaczynski (MFA Bard)  
*Assistant Professor*

Judy Ledgerwood (MFA Art Institute Chicago)  
*Associate Professor*

Marlena Novak (MFA Northwestern)  
*Lecturer*

Michael Rakowitz (MS MIT)  
*Associate Professor*

Steve Reinke (MFA Nova Scotia)  
*Associate Professor*

Lane Relyea (PhD Texas)  
*Assistant Professor*

James R. Valerio (MFA Art Institute Chicago)  
*Professor*

### ***Biochemistry, Molecular Biology, and Cell Biology***

Kelly E. Mayo (PhD Washington)  
*Professor and Chair; also Neurobiology and Physiology*

Ravi Allada (MD Michigan)  
*Associate Professor; also Neurobiology and Physiology, Pathology*

Hamid Band (MD Medical College of Srinagar, PhD All-India Institute of Medical Sciences)  
*Professor; also Medicine*

Vimla Band (PhD All-India Institute of Medical Sciences)  
*Professor; also Medicine*

Gregory J. Beitel (PhD MIT)  
*Associate Professor*

Jason Brickner (PhD Stanford)  
*Assistant Professor*

Richard Carthew (PhD MIT)  
*Owen L. Coon Professor of Molecular Biology*

Andrew Dudley (PhD Harvard)  
*Assistant Professor*

Lawrence B. Dumas (PhD Wisconsin)  
*Professor*

Heike Fölsch (PhD Ludwig-Maximilians)  
*Assistant Professor*

Richard F. Gaber (PhD Wisconsin)  
*Professor; also Biological Sciences*

Erwin Goldberg (PhD Iowa)  
*Professor*

Linda Hicke (PhD UC Berkeley)  
*Soretta and Henry Shapiro Research Professor*

Brian M. Hoffman (PhD Caltech)  
*Professor; also Chemistry*

Robert A. Holmgren (PhD Harvard)  
*Professor and Associate Chair; also Neurobiology and Physiology*

Curt Horvath (PhD Northwestern)  
*Professor; also Medicine*

Theodore S. Jardetzky (PhD Basel)  
*Professor*

Carole LaBonne (PhD Harvard)  
*Associate Professor*

Laimonis Laimins (PhD Chicago)  
*Professor; also Microbiology and Immunology*

Robert A. Lamb (PhD Cambridge)  
*John Evans Professor in Molecular and Cellular Biology and Howard Hughes Medical Investigator*

Daniel I. Linzer (PhD Princeton)  
*Professor; Dean, Weinberg College*

Paul A. Loach (PhD Yale)  
*Professor; also Chemistry*

Robert C. MacDonald (PhD UCLA)  
*Professor*

John Marko (PhD UC Berkeley)  
*Professor; also Physics and Astronomy*

Andreas Matouschek (PhD Cambridge)

*Professor*

Thomas J. Meade (PhD Ohio State)

*Eileen Foell Professor; also Chemistry, Neurobiology and Physiology, Radiology*

Alfonso Mondragón (PhD Chicago)

*Professor*

Richard I. Morimoto (PhD Chicago)

*Bill A. and Gayle Cook Professor in Biological Sciences*

Thomas V. O'Halloran (PhD Columbia)

*Charles E. and Emma H. Morrison Professor; also Chemistry*

Ishwar Radhakrishnan (PhD Columbia)

*Associate Professor*

Amy Rosenzweig (PhD MIT)

*Professor; also Chemistry*

Joshua Schnell (PhD Northwestern)

*Lecturer and Assistant Chair*

Richard B. Silverman (PhD Harvard)

*Professor; also Chemistry*

Erik Sontheimer (PhD Yale)

*Associate Professor; Irving M. Klotz Research Professor in Chemistry (Chemistry)*

Olke Uhlenbeck (PhD Harvard)

*Professor; also Chemistry*

Xiaozhong (Alec) Wang (PhD NYU School of Medicine)

*Assistant Professor*

Eric Weiss (PhD Colorado)

*Assistant Professor*

Jonathan Widom (PhD Stanford)

*William Deering Professor in Biological Science; also Chemistry*

Teresa Woodruff (PhD Northwestern)

*Professor; also Obstetrics and Gynecology*

Tai Te Wu (PhD Harvard)

*Professor; also Biomedical Engineering*

### **Biological Sciences, Program in**

Richard F. Gaber (PhD Wisconsin)

*Professor and Director; also Biochemistry, Molecular Biology, and Cell Biology*

Roberta W. Ellington (BA Barat)

*Lecturer*

Gary J. Galbreath (PhD Chicago)

*College Lecturer and Associate Director*

Tracy M. Hodgson (PhD Pittsburgh)

*Lecturer*

Teresa H. Horton (PhD Utah)

*Lecturer*

John C. Mordacq (PhD Northwestern)

*College Lecturer and Director of Undergraduate Laboratories*

Laura J. Panko (PhD Chicago)

*Lecturer and College Adviser*

Christina T. Russin (PhD Wisconsin)

*Senior Lecturer*

David W. Taylor (PhD Michigan)

*Lecturer*

Joseph Walsh (PhD Chicago)

*Lecturer*

### **Chemistry**

Joseph T. Hupp (PhD Michigan State)

*Charles E. and Emma H. Morrison Professor and Chair*

Yuri A. Berlin (PhD Moscow Institute for Physics and Technology)

*Research Professor*

Lin Chen (PhD Chicago)

*Professor*

Barry A. Coddens (PhD Wayne State)

*Senior Lecturer*

Theresa A. Collins (PhD Vermont)

*Lecturer and Assistant Chair*

Peter Doan (PhD Illinois)

*Research Professor*

Donald E. Ellis (PhD MIT)

*Professor; also Physics and Astronomy*

Antonio F. Facchetti (PhD Milan)

*Research Assistant Professor*

Franz F. Geiger (PhD Georgetown)

*Assistant Professor; Dow Chemical Company Research Professor*

Wenxin Gu (PhD Lanzhou)

*Research Assistant Professor*

Shelby L. Hatch (PhD Rochester)

*Lecturer*

Brian M. Hoffman (PhD Caltech)

*Professor; also Biochemistry, Molecular Biology, and Cell Biology*

James A. Ibers (PhD Caltech)

*Charles E. and Emma H. Morrison Professor*

Mercouri G. Kanatzidis (PhD Iowa)

*Charles E. and Emma H. Morrison Professor*

Joseph B. Lambert (PhD Caltech)

*Clare Hamilton Hall Professor*

Frederick D. Lewis (PhD Rochester)

*Professor*

Paul A. Loach (PhD Yale)

*Professor; also Biochemistry, Molecular Biology, and Cell Biology*

Marvin J. Lofquist (PhD Northwestern)

*Senior Lecturer; Associate Dean, Weinberg College*

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 Biochemistry, Molecular Biology, and Cell Biology, Neurobiology and Physiology, Radiology*

Chad A. Mirkin (PhD Penn State)

*George B. Ratbmann Professor; also Materials Science and Engineering*

Vladimiro Mujica (PhD Uppsala)

*Research Professor*

C. Bradley Moore (PhD UC Berkeley)

*Professor; Vice President for Research, Northwestern University*

SonBinh T. Nguyen (PhD Caltech)

*Associate Professor; Charles Deering McCormick Professor of Teaching Excellence*

Frederick J. Northrup (PhD Toronto)

*Senior Lecturer*

Teri W. Odom (PhD Harvard)

*Assistant Professor*

Andrew Ott (PhD Colorado)

*Research Professor*

Thomas V. O'Halloran (PhD Columbia)

*Charles E. and Emma H. Morrison Professor; also Biochemistry, Molecular Biology, and Cell Biology*

Kenneth R. Poeppelmeier (PhD Iowa State)

*Professor*

Owen P. Priest (PhD Minnesota)

*Senior Lecturer*

Mark A. Ratner (PhD Northwestern)

*Charles E. and Emma H. Morrison Professor*

Amy Rosenzweig (PhD MIT)

*Professor; also Biochemistry, Molecular Biology, and Cell Biology*

George C. Schatz (PhD Caltech)

*Charles E. and Emma H. Morrison Professor*

Karl A. Scheidt (PhD Indiana)

*Assistant Professor*

Tamar Seideman (PhD Weizmann Institute)

*Professor; also Physics and Astronomy*

Richard B. Silverman (PhD Harvard)

*Professor; also Biochemistry, Molecular Biology, and Cell Biology*

Erik Sontheimer (PhD Yale)

*Associate Professor and Irving M. Klotz Research Professor in Chemistry; also Biochemistry, Molecular Biology, and Cell Biology*

Kenneth G. Spears (PhD Chicago)

*Professor; also Biomedical Engineering*

Peter C. Stair (PhD UC Berkeley)

*Professor; Director, Center for Catalysis and Surface Science*

Samuel I. Stupp (PhD Northwestern)

*Board of Trustees Professor of Materials Science and Engineering, Chemistry, and Medicine; also Biomedical Engineering*

Regan J. Thomson (PhD Australian National)

*Assistant Professor*

Larry S. Trzupek (PhD MIT)

*Senior Lecturer*

Olke Uhlenbeck (PhD Harvard)

*Professor; also Biochemistry, Molecular Biology, and Cell Biology*

Richard P. Van Duyne (PhD North Carolina)

*Charles E. and Emma H. Morrison Professor*

Michael R. Wasielewski (PhD Chicago)

*Professor*

Eric Weitz (PhD Columbia)

*Professor*

Jonathan Widom (PhD Stanford)

*William Deering Professor in Biological Science; also Biochemistry, Molecular Biology, and Cell Biology*

### **Classics**

Richard Kraut (PhD Princeton)

*Charles and Emma Morrison Professor in the Humanities and Chair; also Philosophy*

Kathryn Boshier (PhD Michigan)

*Assistant Professor*

Daniel H. Garrison (PhD UC Berkeley)

*Professor*

Reginald Gibbons (PhD Stanford)

*Professor; also English*

Marianne Hopman (PhD Harvard, Sorbonne)

*Assistant Professor*

S. Sara Monoson (PhD Princeton)

*Associate Professor; also Political Science*

Martin Mueller (PhD Indiana)

*Professor; also English*

Helmut Müller-Sievers (PhD Stanford)

*Professor; also German*

Barbara J. Newman (PhD Yale)

*Dorothy Ann and Clarence L. Ver Steeg Distinguished Research Fellow; John Evans Professor in the Latin Language and Literature; also English, Religion*

Jeanne R. Ravid (MA Northwestern)

*Senior Lecturer and College Adviser*

Francesca Tataranni (PhD Pisa)

*Lecturer*

William Tortorelli (PhD Brown)

*Lecturer*

Robert W. Wallace (PhD Harvard)

*Professor*

John Wynne (PhD Cornell)

*Assistant Professor*

### **Earth and Planetary Sciences**

Bradley B. Sageman (PhD Colorado)

*Professor and Chair*

Craig R. Bina (PhD Northwestern)

*Wayne V. Jones II Professor of Earth and Planetary Sciences*

Jean-François Gaillard (DSc Paris)

*Associate Professor; also Civil and Environmental Engineering*

Youngsook Huh (PhD MIT)

*Adjunct Assistant Professor*

Matthew T. Hurtgen (PhD Penn State)

*Assistant Professor*

Steven D. Jacobsen (PhD Colorado)

*Assistant Professor*

Andrew D. Jacobson (PhD Michigan)

*Assistant Professor*

Donna M. Jurdy (PhD Michigan)

*Professor*

Abraham Lerman (PhD Harvard)

*Professor*

Emile André Okal (PhD Caltech)

*Professor*

Francesca A. Smith (PhD Chicago)

*Assistant Professor*

Seth A. Stein (PhD Caltech)

*William Deering Professor of Earth and Planetary Sciences*

Suzan Van der Lee (PhD Princeton)

*Assistant Professor*

### **Economics**

Charles F. Manski (PhD MIT)

*Board of Trustees Professor and Chair; also Statistics, Institute for Policy Research*

David A. Austen-Smith (PhD Cambridge)

*Professor; Earl Dean Howard Distinguished Professor of Political Economy (Managerial Economics and Decision Sciences)*

Lori A. Beaman (PhD Yale)

*Assistant Professor*

Ronald R. Braeutigam (PhD Stanford)

*Harvey Kapnick Professor of Business Institutions; Associate Provost for Undergraduate Education, Northwestern University*

Francisco Buera (PhD Chicago)

*Assistant Professor*

Lawrence J. Christiano (PhD Columbia)

*Alfred W. Chase Professor of Business Institutions*

Matthias Doepke (PhD Chicago)

*Associate Professor*

David Dranove (PhD Stanford)

*Professor; Walter J. McNerney Professor in Health Industry Management (Management and Strategy)*

Eddie Dekel (PhD Harvard)

*William R. Kenan Jr. Professor*

Martin Eichenbaum (PhD Minnesota)

*Ethel and John Lindgren Professor*

Jeffrey C. Ely (PhD UC Berkeley)

*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)

*Lecturer*

David Haddock (PhD Chicago)

*Professor; also School of Law*

Igal Hendel (PhD Harvard)

*Professor*

Joel Horowitz (PhD Cornell)

*Charles E. and Emma H. Morrison Professor in Market Economics*

Thomas Hubbard (PhD Stanford)

*Associate Professor; also Management and Strategy*

Lillian Kamal (PhD West Virginia)

*Lecturer*

Lynne Kiesling (PhD Northwestern)

*Senior Lecturer*

Hilarie H. Lieb (PhD Northwestern)

*Senior Lecturer and College Adviser*

Kiminori Matsuyama (PhD Harvard)

*Professor*

Joel Mokyr (PhD Yale)

*Robert H. Strotz Professor of Arts and Sciences; also History*

Chiaki Moriguchi (PhD Stanford)

*Assistant Professor*

Dale T. Mortensen (PhD Carnegie Mellon)

*Ida C. Cook Professor of Consumer Economics*

Éva Nagypál (PhD Stanford)

*Assistant Professor; also Institute for Policy Research*

Aviv Nevo (PhD Harvard)

*Professor*

Wojciech Olszewski (PhD Warsaw and Princeton)

*Associate Professor*

John C. Panzar (PhD Stanford)

*Professor*

Alessandro Pavan (PhD Toulouse)

*Assistant Professor*

Robert H. Porter (PhD Princeton)

*William R. Kenan Jr. Professor*

Giorgio Primiceri (PhD Princeton)

*Assistant Professor*

Sergio T. Rebelo (PhD Rochester)

*Professor; Tokai Bank Professor in Finance (Finance)*

William P. Rogerson (PhD Caltech)

*Professor*

Todd D. Sarver (PhD Boston)

*Assistant Professor*

Mark A. Satterthwaite (PhD Wisconsin)

*Professor; A. C. Buehler Professor in Hospital and Health Services Management (Management and Strategy)*

Ian P. Savage (PhD Leeds)

*College Lecturer and Associate Chair; Director, Transportation and Logistics Program*

Eric G. Schulz (PhD Northwestern)

*College Lecturer*



Ron Siegel (PhD Stanford)

*Assistant Professor*

Marciano Siniscalchi (PhD Stanford)

*Associate Professor*

Elie Tamer (PhD Northwestern)

*HSBC Professor*

Sergio Urzúa (PhD Chicago)

*Assistant Professor*

Richard Walker (PhD London School of Economics)

*Lecturer*

Burton Weisbrod (PhD Northwestern)

*John Evans Professor in Economics; also Institute for Policy Research*

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)

*College Lecturer; Director, Business Institutions Program*

Asher Wolinsky (PhD Stanford)

*Gordon Scott Fulcher Professor in Decision Making*

Martin Zelder (PhD Chicago)

*Senior Lecturer*

### **English**

Wendy Wall (PhD Pennsylvania)

*Professor and Chair*

Kevin Bell (PhD NYU)

*Associate Professor*

Brian Bouldrey (MFA Warren Wilson)

*Senior Lecturer*

Katharine H. Breen (PhD UC Berkeley)

*Assistant Professor*

Paul Breslin (PhD Virginia)

*Professor*

Jennifer DeVere Brody (PhD Pennsylvania)

*Associate Professor; also African American Studies, Performance Studies*

Nicholas Davis (PhD Cornell)

*Assistant Professor; also Gender Studies*

Tracy Davis (PhD Warwick)

*Professor; Ethel M. Barber Professor of Performing Arts; Director, Interdisciplinary PhD Program in Theatre and Drama; also Performance Studies, 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)

*College Lecturer; Associate Dean, Weinberg College*

Christine Froula (PhD Chicago)

*Professor*

Reginald Gibbons (PhD Stanford)

*Professor; also Classics*

Susannah Gottlieb (PhD Chicago)

*Associate Professor*

Wendy Griswold (PhD Harvard)

*Arthur E. Andersen Teaching and Research Professor; also Sociology*

Jay A. Grossman (PhD Pennsylvania)

*Associate Professor*

Christopher C. Herbert (PhD Yale)

*Chester D. Tripp Professor in the Humanities*

Sharon Holland (PhD Michigan)

*Associate Professor; also African American Studies*

John Keene (MFA NYU)

*Associate Professor; also African American Studies*

Mary Kinzie (PhD Johns Hopkins)

*Professor*

Christopher Lane (PhD London)

*Herman and Beulah Pearce Miller Research Professor in Literature*

Jules David Law (PhD Johns Hopkins)

*Associate Professor; Charles Deering McCormick Professor of Teaching Excellence*

Susan A. Manning (PhD Columbia)

*Professor; also Performance Studies, Theatre*

John D. Margolis (PhD Princeton)

*Professor; Associate Provost for Faculty Affairs, Northwestern University*

Jeffrey Masten (PhD Pennsylvania)

*Associate Professor; Charles Deering McCormick Professor of Teaching Excellence*

Martin Mueller (PhD Indiana)

*Professor; also Classics*

Evan Mwangi (PhD Nairobi)

*Assistant Professor*

Barbara J. Newman (PhD Yale)

*Dorothy Ann and Clarence L. Ver Steeg Distinguished Research Fellow; Professor; John Evans Professor in the Latin Language and Literature (Classics); also Religion*

Susan E. Phillips (PhD Harvard)

*Associate Professor*

William Savage (PhD Northwestern)

*Senior Lecturer and College Adviser*

Regina M. Schwartz (PhD Virginia)

*Professor; also Religion*

Carl S. Smith (PhD Yale)

*Franklyn Bliss Snyder Professor in English Literature; also History*

Vivasvan Soni (PhD Duke)

*Assistant Professor*

Regina M. Schwartz (PhD Virginia)

*Professor; also Religion*

Julia Stern (PhD Columbia)

*Associate Professor*

Helen F. Thompson (PhD Duke)

*Associate Professor*

Elizabeth Fekete Trubey (PhD Northwestern)

*Senior Lecturer and College Adviser*

Alexander G. Weheliye (PhD Rutgers)

*Associate Professor; also African American Studies, German*

William N. West (PhD Michigan)

*Associate Professor*

### ***French and Italian***

Jane Winston (PhD Duke)

*Associate Professor and Chair; also Gender Studies*

Christopher P. Bush (PhD UCLA)

*Assistant Professor*

Marie-Thérèse Cunningham (MA Grenoble III)

*Senior Lecturer*

Margaret Mary Dempster (MA Illinois)

*Lecturer*

Scott Durham (PhD Yale)

*Associate Professor*

Bernadette Fort (PhD Sorbonne)

*Professor; also Art History*

Doris L. Garraway (PhD Duke)

*Associate Professor; also African American Studies*

Michal P. Ginsburg (PhD Yale)

*Professor*

Giulia Guidotti (MEd American)

*Senior Lecturer*

Phyllis Horn-Liparini (MA Northwestern)

*Lecturer*

Jean A. Mainil (PhD Michigan)

*Professor*

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*

William D. Paden (PhD Yale)

*Professor*

Marie-Simone Pavlovich (PhD Northwestern)

*Senior Lecturer*

Nasrin Qader (PhD Wisconsin)

*Assistant Professor*

Stella Radulescu (PhD Bucharest)

*Lecturer*

Aude Raymond (MA Illinois)

*Lecturer*

Christiane Rey (Licence en Droit Liège)

*Lecturer*

Sylvie Romanowski (PhD Yale)

*Professor*

Marco Ruffini (PhD UC Berkeley)

*Assistant Professor; also Art History*

Thomas H. Simpson (PhD Chicago)

*College Lecturer*

Margaret Sinclair (PhD UC Berkeley)

*College Lecturer*

Janine W. Spencer (PhD Northwestern)

*College Lecturer*

Domietta Torlasco (PhD UC Berkeley)

*Assistant Professor*

### ***Gender Studies***

Jeffrey Masten (PhD Pennsylvania)

*Associate Professor and Director; Charles Deering McCormick*

*Professor of Teaching Excellence; also English*

Nicola K. Beisel (PhD Michigan)

*Associate Professor; also Sociology*

Nicholas Davis (PhD Cornell)

*Assistant Professor; also English*

Mary G. Dietz (PhD UC Berkeley)

*Professor; also Political Science*

Jillana Enteen (PhD Rutgers)

*Senior Lecturer*

Tessie P. Liu (PhD Michigan)

*Associate Professor; also History*

Alexandra Owen (PhD Sussex)

*Professor; also History*

Frances Freeman Paden (PhD Northwestern)

*College Lecturer; also Writing Program*

Ann S. Orloff (PhD Princeton)

*Professor; also Institute for Policy Research, Political Science, Sociology*

Jane Winston (PhD Duke)

*Associate Professor and Chair; also French and Italian*

Linda M. G. Zerilli (PhD UC Berkeley)

*Professor; also German, Political Science*

**German**

Peter F. Hayes (PhD Yale)

*Charles Deering McCormick Professor of Teaching Excellence and Chair; also Theodore Z. Weiss Professor in Holocaust Studies (History)*

Volker Dürr (PhD Princeton)  
*Professor*

Peter D. Fenves (PhD Johns Hopkins)  
*Joan E. and Sarepta Harrison Professor in Rhetorical Composition; also Philosophy, Political Science*

Jeffrey B. Garrett (MLIS UC Berkeley)  
*Lecturer; Assistant University Librarian for Collection Management*

Stefanie Harris (PhD Emory)  
*Assistant Professor*

Martina Kerlova (MA Charles University Prague)  
*Lecturer*

Jörg Kreienbrock (PhD NYU)  
*Assistant Professor*

Franziska B. Lys (PhD Northwestern)  
*Associate Professor; Alumnae of Northwestern Teaching Professor*

Denise M. Meuser (MA Indiana)  
*Senior Lecturer*

Marcus Moseley (PhD Oxford)  
*Associate Professor*

Helmut Müller-Sievers (PhD Stanford)  
*Professor; also Classics*

John Paluch (MA Illinois)  
*Senior Lecturer*

Rainer Rumold (PhD Stanford)  
*Professor*

Bernhard Streitwieser (PhD Columbia)  
*Lecturer*

Kristine Thorsen (PhD Northwestern)  
*Adjunct Lecturer*

Katrin Völkner (PhD Duke)  
*Lecturer*

Samuel Weber (PhD Cornell)  
*Avalon Foundation Professor in the Humanities*

Alexander G. Weheliye (PhD Rutgers)  
*Associate Professor; also African American Studies, English*

Ingrid Zeller (MA Columbia)  
*Senior Lecturer*

Linda M. G. Zerilli (PhD UC Berkeley)  
*Professor; also Gender Studies, Political Science*

**History**

Nancy K. MacLean (PhD Wisconsin)  
*Professor and Chair; also African American Studies, Institute for Policy Research*

Kenneth L. Alder (PhD Harvard)

*Milton H. Wilson Professor in the Humanities*

Josef J. Barton (PhD Michigan)  
*Associate 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)  
*Assistant Professor*

Mark Bradley (PhD Harvard)  
*Associate Professor*

Timothy H. Breen (PhD Yale)  
*William Smith Mason Professor of American History*

Sherwin Bryant (PhD Ohio State)  
*Assistant Professor; also African American Studies*

John S. Bushnell (PhD Indiana)  
*Professor*

Peter J. Carroll (PhD Yale)  
*Associate Professor*

S. Hollis Clayson (PhD UCLA)  
*Bergen Evans Professor in the Humanities; also Art History*

Dyan Elliott (PhD Toronto)  
*John Evans Professor in History*

Lane Fenrich (PhD Northwestern)

*Senior Lecturer; Assistant Dean for Freshmen, Weinberg College*

Brodwyn Fischer (PhD Harvard)  
*Assistant Professor*

Benjamin Frommer (PhD Harvard)  
*Associate Professor*

Regina Grafe (PhD London School of Economics)  
*Assistant Professor*

Jonathon P. Glassman (PhD Wisconsin)  
*Associate Professor*

Peter F. Hayes (PhD Yale)  
*Theodore Z. Weiss Professor in Holocaust Studies; Charles Deering McCormick Professor of Teaching Excellence; also German*

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 (Religion)*

Rajeev K. Kinra (PhD Chicago)  
*Assistant Professor*

Michael Kramer (PhD North Carolina)  
*Lecturer and College Adviser*

Jacob Lassner (PhD Yale)

*Philip M. and Ethel Klutznick Professor in Jewish Civilization; also Religion*

Robert E. Lerner (PhD Princeton)

*Peter B. Ritzma Professor in the Humanities*

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)*

Edward W. Muir (PhD Rutgers)

*Professor and Associate Chair; Clarence L. Ver Steeg Professor in the Arts and Sciences; Charles Deering McCormick Professor of Teaching Excellence; also French and Italian*

Robert Orsi (PhD Yale)

*Professor; also Grace Craddock Nagle Professor in Catholic Studies (Religion)*

Alexandra Owen (PhD Sussex)

*Professor; also Gender Studies*

Sarah Pearsall (PhD Harvard)

*Assistant Professor*

Susan Pearson (PhD North Carolina)

*Assistant Professor*

Dylan Penningroth (PhD Johns Hopkins)

*Associate Professor; also African American Studies*

Yohanan Petrovsky-Shtern (PhD Brandeis)

*Assistant Professor*

Carl F. Petry (PhD Michigan)

*Professor*

Jeffrey Rice (MSc Edinburgh)

*Senior Lecturer and College Adviser*

Frank R. Safford (PhD Columbia)

*Professor*

David L. Schoenbrun (PhD UCLA)

*Associate Professor*

Ethan Shagan (PhD Princeton)

*Associate Professor and Wayne V. Jones Research Professor; also Religion*

Michael S. Sherry (PhD Yale)

*Richard W. Leopold Professor*

Carl S. Smith (PhD Yale)

*Professor; also Franklyn Bliss Snyder Professor in English Literature (English)*

Amy Stanley (PhD Harvard)

*Assistant Professor*

Ruldolph (Butch) Ware (PhD Pennsylvania)

*Assistant Professor; also African American Studies*

Ji-Yeon Yuh (PhD Princeton)

*Associate Professor*

### ***Linguistics***

Ann R. Bradlow (PhD Cornell)

*Associate Professor and Chair*

Brady Clark (PhD Stanford)

*Assistant Professor*

Matthew A. Goldrick (PhD Johns Hopkins)

*Assistant Professor*

Robert A. Gundlach (PhD Northwestern)

*Professor; also Director, Writing Program*

Stefan Kaufmann (PhD Stanford)

*Assistant Professor*

Julia Moore (PhD Northwestern)

*Lecturer*

Janet B. Pierrehumbert (PhD MIT)

*Wender-Lewis Research and Teaching Professor*

Gregory Ward (PhD Pennsylvania)

*Professor*

### ***Mathematics***

John M. Franks (PhD UC Berkeley)

*Professor and Chair*

Martina Bode (PhD Brandeis)

*Senior Lecturer; Charles Deering McCormick University*

*Distinguished Lecturer*

Keith H. Burns (PhD Warwick)

*Professor*

Frank Calegari (PhD UC Berkeley)

*Assistant Professor*

Gui-Qiang Chen (PhD Academia Sinica)

*Professor*

Kevin Costello (PhD Cambridge)

*Assistant Professor*

Matthew J. Emerton (PhD Harvard)

*Associate Professor*

Stephen D. Fisher (PhD Wisconsin)

*Professor*

Eric M. Friedlander (PhD MIT)

*Henry Sanborn Noyes Professor*

Ezra Getzler (PhD Harvard)

*Professor*

Paul G. Goerss (PhD MIT)

*Professor*

Elton Pei Hsu (PhD Stanford)

*Professor*

Joseph W. Jerome (PhD Purdue)

*Professor*

Bryna Kra (PhD Stanford)

*Professor*

Chiu-Chu Melissa Liu (PhD Harvard)

*Associate Professor*

Yuri I. Manin (PhD Steklov Institute)

*Board of Trustees Professor*

W. Edward Olmstead (PhD Northwestern)

*Professor; also Engineering Sciences and Applied Mathematics*

David Nadler (PhD Princeton)

*Assistant Professor*

Mark A. Pinsky (PhD MIT)

*Professor*

Stewart B. Priddy (PhD MIT)

*Professor*

R. Clark Robinson (PhD UC Berkeley)

*Professor*

Michael R. Stein (PhD Columbia)

*Professor*

Andrei A. Suslin (PhD St. Petersburg)

*Board of Trustees Professor*

Dmitry Tamarkin (PhD Penn State)

*Associate Professor*

Boris Tsygan (PhD Moscow State)

*Professor*

Kari K. Vilonen (PhD Brown)

*Professor*

Amie Wilkinson (PhD UC Berkeley)

*Professor*

Jared Wunsch (PhD Harvard)

*Associate Professor*

Zhihong Jeff Xia (PhD Northwestern)

*Arthur and Gladys Pancoe Professor*

Sandy L. Zabell (PhD Harvard)

*Professor; also Statistics*

Eric Zaslow (PhD Harvard)

*Professor*

### ***Neurobiology and Physiology***

David L. Ferster (PhD Harvard)

*Professor and Chair*

Ravi Allada (MD Michigan)

*Associate Professor; also Biochemistry, Molecular Biology, and Cell Biology, Pathology*

Joe Bass (MD, PhD Medical College of Pennsylvania)

*Assistant Professor*

Thomas Bozza (PhD Tufts)

*Assistant Professor*

Jianhua Cang (PhD Virginia)

*Assistant Professor*

Peter Dallos (PhD Northwestern)

*John Evans Professor in Neuroscience; also Biomedical Engineering, Communication Sciences and Disorders, Otolaryngology*

Robert A. Holmgren (PhD Harvard)

*Professor; also Biochemistry, Molecular Biology, and Cell Biology*

William L. Kath (PhD Caltech)

*Professor; also Engineering Sciences and Applied Mathematics*

William L. Klein (PhD UCLA)

*Professor*

Nina Kraus (PhD Northwestern)

*Professor; Hugh Knowles Professor in Audiology and Hearing Sciences (Communication Sciences and Disorders); also Otolaryngology*

William R. Leonard (PhD Michigan)

*Professor; also Anthropology*

Jon E. Levine (PhD Illinois)

*Professor*

Robert A. Linsenmeier (PhD Northwestern)

*Professor; also Biomedical Engineering*

Malcolm A. MacIver (PhD Illinois)

*Assistant Professor; also Biomedical Engineering, Mechanical Engineering*

Kelly E. Mayo (PhD Washington)

*Professor; also Biochemistry, Molecular Biology, and Cell Biology*

Thomas J. Meade (PhD Ohio State)

*Eileen Foell Professor; also Biochemistry, Molecular Biology, and Cell Biology, Chemistry, Radiology*

Lawrence H. Pinto (PhD Northwestern)

*Professor*

Indira Raman (PhD Wisconsin)

*Associate Professor*

Aryeh Routtenberg (PhD Michigan)

*Professor; also Psychology*

Mark A. Segraves (PhD Pennsylvania)

*Associate Professor*

Jonathan Siegel (PhD Washington St. Louis)

*Associate Professor; also Communication Sciences and Disorders*

Nelson Spruston (PhD Baylor)

*Professor*

Joseph S. Takahashi (PhD Oregon)

*Walter and Mary Elizabeth Glass Professor in Life Sciences*

Fred W. Turek (PhD Stanford)

*Charles E. and Emma H. Morrison Professor; also Psychology, Psychiatry and Neurology (Medicine)*

Catherine Woolley (PhD Rockefeller)

*Associate Professor*

Alice Wyrwicz (PhD Illinois)

*Associate Professor; also Anesthesiology (Medicine)*

Phyllis C. Zee (MD, PhD Chicago Medical)

*Professor; also Neurology*

**Philosophy**

Kenneth R. Seeskin (PhD Yale)

*John Evans Professor in Philosophy and Chair*

Penelope Deutscher (PhD New South Wales)

*Associate Professor*

Souleymane Bachir Diagne (PhD Sorbonne)

*Martin and Patricia Koldyke Professor; also Religion*

Kyla Ebels Duggan (PhD Harvard)

*Assistant Professor*

Sean Ebels Duggan (PhD UC Irvine)

*Assistant Professor*

Peter D. Fenves (PhD Johns Hopkins)

*Professor; Joan E. and Sarepta Harrison Professor in Rhetorical Composition (German); also Political Science*

Jonathan Garthoff (PhD UCLA)

*Assistant Professor*

Sanford Goldberg (PhD Columbia)

*Professor*

Richard Kraut (PhD Princeton)

*Professor; also Classics*

Jennifer Lackey (PhD Brown)

*Associate Professor*

Cristina Lafont (PhD Frankfurt)

*Professor*

Charles Mills (PhD Toronto)

*John Evans Professor in Philosophy; also African American Studies*

Axel Mueller (PhD Frankfurt)

*Assistant Professor*

Baron Reed (PhD Brown)

*Assistant Professor*

Mark Sheldon (PhD Brandeis)

*College Lecturer; Assistant Dean, Weinberg College; also Feinberg School of Medicine*

Charles Taylor (PhD Oxford)

*Professor; also School of Law*

Brook Ziporyn (PhD Michigan)

*Associate Professor; also Religion*

Rachel Zuckert (PhD Chicago)

*Assistant Professor*

**Physics and Astronomy**

Venkat Chandrasekhar (PhD Yale)

*Professor and Chair*

Michael J. Bedzyk (PhD SUNY Albany)

*Professor; also Materials Science and Engineering*

Deborah A. Brown (PhD Northwestern)

*Senior Lecturer*

David A. Buchholz (PhD Pennsylvania)

*Professor*

Hui Cao (PhD Stanford)

*Professor*

André de Gouvêa (PhD UC Berkeley)

*Assistant Professor*

Pulak Dutta (PhD Chicago)

*Professor*

Donald E. Ellis (PhD MIT)

*Professor; also Chemistry*

Arthur J. Freeman (PhD MIT)

*Charles E. and Emma H. Morrison Professor in Physics; also Materials Science and Engineering*

Anupam K. Garg (PhD Cornell)

*Professor*

Bruno Gobbi (PhD Swiss Federal Tech)

*Professor*

William P. Halperin (PhD Cornell)

*John Evans Professor in Physics*

Vassiliki Kalogera (PhD Illinois)

*Associate Professor*

John B. Ketterson (PhD Chicago)

*Fayerweather Professor in Physics; also Electrical Engineering and Computer Science*

Prem Kumar (PhD SUNY Buffalo)

*Professor; AT&T Communications Professor of Information Technology (Electrical Engineering and Computer Science)*

Ian Low (PhD Carnegie Mellon)

*Assistant Professor*

John Marko (PhD MIT)

*Professor; also Biochemistry, Molecular Biology, and Cell Biology*

David M. Meyer (PhD UCLA)

*Professor*

Adilson Motter (PhD Campinas)

*Assistant Professor*

Giles A. Novak (PhD Chicago)

*Associate Professor*

Robert J. Oakes (PhD Minnesota)

*Professor*

Frederic Rasio (PhD Cornell)

*Professor*

Andrew Rivers (PhD New Mexico)

*Senior Lecturer and College Adviser*

Jerome L. Rosen (PhD Columbia)

*Professor*

James A. Sauls (PhD SUNY Stony Brook)

*Professor*

Heidi Schellman (PhD UC Berkeley)

*Professor*

Arthur G. Schmidt (PhD Notre Dame)

*College Lecturer*

Michael H. Schmitt (PhD Harvard)

*Associate Professor*

Tamar Seideman (PhD Weizmann Institute)

*Professor; also Chemistry*

Kamal K. Seth (PhD Pittsburgh)  
*Professor*

Michael Smutko (PhD Chicago)  
*Senior Lecturer*

Sara Solla (PhD Washington)  
*Professor; also Physiology*

Ronald E. Taam (PhD Columbia)  
*Professor*

Timothy Tait (PhD Michigan State)  
*Assistant Professor*

David E. Taylor (PhD Maryland)  
*Lecturer and Assistant Chair*

Melville P. Ulmer (PhD Wisconsin)  
*Professor*

Mayda M. Velasco (PhD Northwestern)  
*Associate Professor*

Horace P. Yuen (PhD MIT)  
*Professor; also Electrical Engineering and Computer Science*

Farhad Yusef-Zadeh (PhD Columbia)  
*Professor*

### **Political Science**

Hendrik Spruyt (PhD UC San Diego)  
*Norman Dwight Harris Professor in International Relations and Chair*

Karen Alter (PhD MIT)  
*Associate Professor*

David A. Austen-Smith (PhD Cambridge)  
*Professor; also Managerial Economics and Decision Sciences*

Henry S. Bienen (PhD Chicago)  
*Professor; President, Northwestern University*

Martha Biondi (PhD Columbia)  
*Associate Professor; also African American Studies, History*

Risa Brooks (PhD UC San Diego)  
*Assistant Professor*

Traci R. Burch (PhD Harvard)  
*Assistant Professor*

Dennis Chong (PhD UC Berkeley)  
*John D. and Catherine T. MacArthur Professor*

Fay Lomax Cook (PhD Chicago)  
*Professor; also Education and Social Policy; Director, Institute for Policy Research*

Victoria DeFrancesco-Soto (PhD Duke)  
*Assistant Professor*

Daniel Diermeier (PhD Rochester)  
*Professor; IBM Professor in Regulation and Competitive Practices (Managerial Economics and Decision Sciences)*

Mary Dietz (PhD UC Berkeley)  
*Professor; also Gender Studies*

Jaime Dominguez (PhD Illinois Chicago)  
*Lecturer and College Adviser*

James Druckman (PhD UC San Diego)  
*Associate Professor; also Institute for Policy Research*

Lee Epstein (PhD Emory)  
*Professor; Beatrice Kuhn Professor of Law (School of Law)*

James Farr (PhD Minnesota)  
*Professor*

Timothy Feddersen (PhD Rochester)  
*Professor; also Managerial Economics and Decision Sciences*

Peter D. Fennes (PhD Johns Hopkins)  
*Professor; Joan E. and Sarepta Harrison Professor in Rhetorical Composition (German); also Philosophy*

H. Paul Friesema (PhD Iowa)  
*Professor*

Dan Galvin (PhD Yale)  
*Assistant Professor*

Edward L. Gibson (PhD Columbia)  
*Associate Professor*

Jerry Goldman (PhD Johns Hopkins)  
*Professor*

Devora Grynspan (PhD Northwestern)  
*Lecturer; Director, Office of International Program Development*

Barnor Hesse (PhD Essex)  
*Associate Professor; also African American Studies, Sociology*

Bonnie Honig (PhD Johns Hopkins)  
*Professor*

Elizabeth Hurd (PhD Johns Hopkins)  
*Assistant Professor*

Ian Hurd (PhD Yale)  
*Assistant Professor*

Mark Iris (PhD Northwestern)  
*Lecturer*

Richard J. Iton (PhD Johns Hopkins)  
*Associate Professor; also African American Studies*

Marie Thourson Jones (PhD Princeton)  
*Lecturer; Associate Dean, Weinberg College*

Richard Joseph (DPhil Oxford)  
*John Evans Professor in Political Science*

Andrew Koppelman (PhD, JD Yale)  
*Professor; also Law*

Michael M. Loriaux (PhD Princeton)  
*Associate Professor*

James Mahoney (PhD UC Berkeley)  
*Professor; also Sociology*

S. Sara Monoson (PhD Princeton)  
*Associate Professor; also Classics*

Ann S. Orloff (PhD Princeton)  
*Professor; also Gender Studies, Institute for Policy Research, Sociology*

Benjamin I. Page (PhD Stanford)  
*Gordon Scott Fulcher Professor; also Communication Studies*

William S. Reno (PhD Wisconsin)

*Associate Professor*

Andrew Roberts (PhD Princeton)

*Assistant Professor; also Institute for Policy Research*

Reuel R. Rogers (PhD Princeton)

*Associate Professor; also African American Studies*

Anne Sartori (PhD Michigan)

*Associate Professor*

Ben Ross Schneider (PhD UC Berkeley)

*Professor*

Jason Seawright (PhD UC Berkeley)

*Assistant Professor*

Victor Shih (PhD Harvard)

*Assistant Professor*

Wesley G. Skogan (PhD Northwestern)

*Professor; also Institute for Policy Research*

Lawrence L. Stuelpnagel (MA Cal State Chico)

*College Lecturer; also Journalism*

Kathleen A. Thelen (PhD UC Berkeley)

*Payson S. Wild Professor; also Institute for Policy Research*

Lars Toender (PhD Johns Hopkins)

*Assistant Professor*

Keith Topper (PhD UCLA)

*Associate Professor; also Communication Studies*

Jeffrey A. Winters (PhD Yale)

*Associate Professor*

Yael Wolinsky (PhD Chicago)

*Senior Lecturer and Associate Chair*

Albert Yoon (PhD Stanford)

*Associate Professor; also Law*

Linda M. G. Zerilli (PhD UC Berkeley)

*Professor; also Gender Studies, German*

### **Psychology**

Alice H. Eagly (PhD Michigan)

*James Padilla Professor of Arts and Sciences and Chair; also*

*Institute for Policy Research*

Emma K. Adam (PhD Minnesota)

*Assistant Professor; also Education and Social Policy, Institute for Policy Research*

J. Michael Bailey (PhD Texas)

*Professor*

Galen Bodenhausen (PhD Illinois)

*Professor*

Amy E. Booth (PhD Pittsburgh)

*Assistant Professor; also Communication Sciences and Disorders*

James R. Booth (PhD Maryland)

*Associate Professor; JoAnn G. and Peter F. Dolle Associate*

*Professor of Learning Disabilities (Communication Sciences and Disorders)*

Sara C. Broaders (PhD Chicago)

*Lecturer*

Joan Chiao (PhD Harvard)

*Assistant Professor*

Thomas D. Cook (PhD Stanford)

*Professor; Joan E. and Sarepta Harrison Professor in Ethics and Justice (Sociology); also Education and Social Policy, Institute for Policy Research*

Amy Cuddy (PhD Princeton)

*Assistant Professor; also Management and Organizations*

Shari Diamond (PhD Northwestern)

*Professor; Howard J. Trienens Professor of Law (Law)*

John F. Disterhoft (PhD Fordham)

*Professor; also Physiology (Medicine)*

C. Emily Durbin (PhD SUNY Stony Brook)

*Assistant Professor; also Kovler Scholar of the Family Institute*

Renee Engeln-Maddox (PhD Loyola Chicago)

*Lecturer*

Eli J. Finkel (PhD North Carolina)

*Assistant Professor*

Steven Franconeri (PhD Harvard)

*Assistant Professor*

Adam Galinsky (PhD Princeton)

*Associate Professor; also Management and Organizations*

Wendi Gardner (PhD Ohio State)

*Associate Professor*

Dedre Gentner (PhD UC San Diego)

*Professor; also Education and Social Policy*

Jay A. Gottfried (PhD, MD NYU)

*Assistant Professor; also Neurology*

Marcia Grabowecky (PhD UC Berkeley)

*Lecturer and Research Assistant Professor*

Linda Liu Hand, (PhD Northwestern)

*Research Assistant Professor*

Susan J. Hespos (PhD Emory)

*Assistant Professor*

William Sidney Horton (PhD Chicago)

*Assistant Professor*

Mark Jung-Beeman (PhD Oregon)

*Associate Professor*

Angela Y. Lee (PhD Toronto)

*Professor; PepsiCo Professor of International Marketing (Marketing)*

Joan A. W. Linsenmeier (PhD Northwestern)

*Senior Lecturer and College Adviser*

Viorica Marian (PhD Cornell)

*Assistant Professor; also Communication Sciences and Disorders*

Dan P. McAdams (PhD Harvard)

*Professor; also Education and Social Policy; Director, Foley Center for the Study of Lives*



Douglas L. Medin (PhD South Dakota)  
*Louis W. Menk Professor; also Education and Social Policy*

David M. Messick (PhD North Carolina)  
*Professor; Morris and Alice Kaplan Professor in Ethics and Decision in Management (Management and Organizations)*

Marsel Mesulam (PhD Harvard)  
*Professor; Ruth and Evelyn Dunbar Professor of Neurology and Psychiatry (Medicine)*

Susan Mineka (PhD Pennsylvania)  
*Professor; also Psychiatry and Behavioral Sciences, Family Institute*

Daniel C. Molden (PhD Columbia)  
*Assistant Professor*

Donald A. Norman (PhD Pennsylvania)  
*Professor; also Cognitive Science, Electrical Engineering and Computer Science; also Professor Emeritus University of California, San Diego*

Andrew Ortony (PhD London)  
*Professor; also Education and Social Policy, Electrical Engineering and Computer Science*

Ken A. Paller (PhD UC San Diego)  
*Professor*

Ann Ragin (PhD Northwestern)  
*Research Associate Professor; also Radiology*

David Rapp (PhD SUNY Stony Brook)  
*Assistant Professor; also Education and Social Policy*

Paul J. Reber (PhD Carnegie Mellon)  
*Associate Professor*

William R. Revelle (PhD Michigan)  
*Professor*

Jennifer Richeson (PhD Harvard)  
*Associate Professor; also African American Studies, Institute for Policy Research*

Lance J. Rips (PhD Stanford)  
*Professor*

J. Peter Rosenfeld (PhD Iowa)  
*Professor*

Aryeh Routtenberg (PhD Michigan)  
*Professor; also Neurobiology and Physiology*

Alan R. Sanders (MD Baylor)  
*Associate Professor; also Psychiatry and Behavioral Sciences*

Satoru Suzuki (PhD Harvard)  
*Associate Professor*

Leigh Thompson (PhD Northwestern)  
*Professor; J. Jay Gerber Professor in Dispute Resolution and Organizational Behavior (Management and Organizations)*

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*

Sandra R. Waxman (PhD Pennsylvania)  
*Professor; also Education and Social Policy*

Richard E. Zinbarg (PhD Northwestern)  
*Associate Professor; Patricia M. Nielsen Research Professor of the Family Institute; also Psychiatry and Behavioral Sciences*

### **Religion**

Richard Kieckhefer (PhD Texas)  
*John Evans Professor in Religion and Chair; also History*

George D. Bond (PhD Northwestern)  
*Professor*

Souleymane Bachir Diagne (PhD Sorbonne)  
*Professor; also Philosophy*

Christine Helmer (PhD Yale)  
*Professor*

Jacob Lassner (PhD Yale)  
*Professor; Philip M. and Ethel Klutznick Professor in Jewish Civilization (History)*

Eugene Y. Lowe Jr. (PhD Union Theological)  
*Senior Lecturer; Assistant to the President, Northwestern University*

Beverly Mortensen (PhD Northwestern)  
*Adjunct Lecturer*

Barbara J. Newman (PhD Yale)  
*Professor; Dorothy Ann and Clarence L. Ver Steeg Distinguished Research Fellow; 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*

Stuart Sarbacker (PhD Wisconsin)  
*Senior Lecturer*

Regina M. Schwartz (PhD Virginia)  
*Professor; also English*

Rüdiger Seesemann (PhD Mainz)  
*Assistant Professor*

Ethan Shagan (PhD Princeton)  
*Associate Professor; also History*

Benjamin D. Sommer (PhD Chicago)  
*Associate Professor*

Sarah M. Taylor (PhD UC Santa Barbara)  
*Assistant Professor*

Cristina L. H. Traina (PhD Chicago)  
*Harold H. and Virginia Anderson Associate Professor*

Sara A. Vaux (PhD Rice)  
*Lecturer*

Barry Wimpfheimer (PhD Columbia)  
*Assistant Professor; also Law*

Brook Ziporyn (PhD Michigan)  
*Associate Professor; also Philosophy*

Laurie Zoloth (PhD Graduate Theological Union)  
*Professor; also Feinberg School of Medicine*

**Slavic Languages and Literatures**

Gary Saul Morson (PhD Yale)  
*Frances Hooper Professor in the Arts and Humanities and Chair*

Clare Cavanagh (PhD Harvard)  
*Associate Professor*

Elisabeth Elliott (PhD Toronto)  
*Senior Lecturer*

Nina Gourianova (PhD Moscow State, PhD Columbia)  
*Assistant Professor*

Ilya Kutik (PhD Stockholm)  
*Associate Professor*

Susan McReynolds Oddo (PhD Harvard)  
*Assistant Professor*

Natalia Moriakova (MA Moscow State)  
*Lecturer*

Seamas O'Driscoll (PhD Harvard)  
*Assistant Professor*

Andrew Wachtel (PhD UC Berkeley)  
*Bertha and Max Dressler Professor in the Humanities; Dean, the Graduate School*

**Sociology**

Mary Pattillo (PhD Chicago)  
*Professor and Chair; also African American Studies*

Nicola K. Beisel (PhD Michigan)  
*Associate Professor; also Gender Studies*

Charles Camic (PhD Chicago)  
*John Evans Professor in Sociology*

Bruce G. Carruthers (PhD Chicago)  
*Gerald and Marjorie G. Fitzgerald Junior Professor of Economic History*

Carolyn Chen (PhD UC Berkeley)  
*Assistant 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, Institute for Policy Research, Psychology*

Georgi M. Derluguian (PhD SUNY Binghamton)  
*Associate Professor*

Thomas Durkin (PhD Chicago)  
*Lecturer*

Wendy N. Espeland (PhD Chicago)  
*Associate Professor*

Gary A. Fine (PhD Chicago)  
*John Evans Professor in Sociology*

Jeremy Freese (PhD Iowa)  
*Professor; also Institute for Policy Research*

Wendy Griswold (PhD Harvard)  
*Arthur E. Andersen Teaching and Research Professor; also English*

John Hagan (PhD Alberta)  
*John D. MacArthur Professor*

Eszter Hargittai (PhD Princeton)  
*Assistant Professor; also Communication Studies*

Carol A. Heimer (PhD Chicago)  
*Professor*

Barnor Hesse (PhD Essex)  
*Associate Professor; also African American Studies, Political Science*

Albert D. Hunter (PhD Chicago)  
*Professor; also Transportation Center*

James Mahoney (PhD UC Berkeley)  
*Professor; also Political Science*

Leslie McCall (PhD Wisconsin)  
*Associate Professor; also Institute for Policy Research*

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)  
*Assistant Professor; also Legal Studies*

Ann S. Orloff (PhD Princeton)  
*Professor; also Gender Studies, Institute for Policy Research, Political Science*

Mary Jane Osa (PhD Chicago)  
*Lecturer*

Alberto Palloni (PhD Washington)  
*Board of Trustees Professor; also Institute for Policy Research*

Monica Prasad (PhD Chicago)  
*Assistant Professor; also Institute for Policy Research*

Lincoln Quillian (PhD Harvard)  
*Associate Professor; also Institute for Policy Research*

James E. Rosenbaum (PhD Harvard)  
*Professor; also Education and Social Policy, Institute for Policy Research*

Juan Onésimo Sandoval (PhD UC Berkeley)  
*Assistant Professor; also African American Studies, Transportation Center*

Karrie Ann Snyder (PhD NYU)  
*Lecturer*

Susan Thistle (PhD UC Berkeley)  
*Senior Lecturer and Associate Chair*

Celeste Watkins-Hayes (PhD Harvard)  
*Assistant Professor; also African American Studies, Institute for Policy Research*

**Spanish and Portuguese**

Josef Barton (PhD Michigan)  
*Associate Professor (History) and Chair*

Stewart I. M. Adams (PhD St. Andrews)  
*Lecturer*

Elisa Baena (PhD Illinois 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)

*Senior Lecturer*

Rifka Cook (MA Pedagógica Libertador)

*Lecturer*

Jorge Coronado (PhD Columbia)

*Assistant Professor*

Anna Diakow (PhD Chicago)

*Lecturer*

Gonzalo Díaz-Migoyo (PhD NYU)

*Professor*

Patricia N. Fahey (PhD Wisconsin)

*Lecturer*

Darío Fernández-Morera (PhD Harvard)

*Associate Professor*

Shelly Hubman (MA Boston College)

*Lecturer*

Jeannie Jacob (MA Illinois Chicago)

*Lecturer*

Lucille Kerr (PhD Yale)

*Professor*

Elena Lanza (MA Illinois Chicago)

*Lecturer*

Elisa Martí-López (PhD NYU)

*Associate Professor*

Shannon Millikin (MA Illinois Chicago)

*Lecturer*

Susan D. Pechter (MA Northwestern)

*Senior Lecturer*

Yarí Pérez Marín (PhD Brown)

*Assistant Professor*

Rosalba Pimentel (MA San Diego State)

*Lecturer*

Deborah Skolnik Rosenberg (PhD Chicago)

*Lecturer*

Tasha Seago-Ramaly (MA Delaware)

*Senior Lecturer*

Benay Stein (MBA DePaul)

*Lecturer*

Vera R. Teixeira (MPhil Yale)

*College Lecturer*

María Teresa Villanueva (MA Loyola Chicago)

*Lecturer*

Nelida Zepeda-Aubeneau (MA Loyola Chicago)

*Lecturer*

### **Statistics**

Bruce D. Spencer (PhD Yale)

*Professor and Chair; also Education and Social Policy, Institute for Policy Research*

M. Elizabeth Andrews (PhD Colorado State)

*Assistant Professor*

Lawrence V. Hedges (PhD Stanford)

*Board of Trustees Professor of Statistics and Social Policy; also Education and Social Policy, Institute for Policy Research*

Hongmei Jiang (PhD Purdue)

*Assistant Professor*

Wenxin Jiang (PhD Cornell)

*Associate Professor*

Charles F. Manski (PhD MIT)

*Professor; also Economics, Institute for Policy Research*

Noelle I. Samia (PhD Iowa)

*Assistant Professor*

Thomas Severini (PhD Chicago)

*Professor*

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)

*Assistant 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 Institute for Design Engineering and Applications*

Marcia B. Gealy (PhD Ohio State)

*College Lecturer; also Jewish Studies*

Jeanne Herrick (PhD Illinois)

*Lecturer*

Penny L. Hirsch (PhD Northwestern)

*College Lecturer; also McCormick School*

Phyllis Lassner (PhD Wayne State)

*College Lecturer; also Jewish Studies*

James O'Laughlin (MA Northwestern)

*Senior Lecturer and College Adviser*

Frances Freeman Paden (PhD Northwestern)

*College Lecturer; also Gender Studies*

Barbara Shwom (PhD Northwestern)

*College Lecturer; also McCormick School*

Edith Skom (PhD Northwestern)

*College Lecturer*

Ellen F. Wright (PhD Indiana)

*College Lecturer*

Charles Yarnoff (PhD Northwestern)  
*College Lecturer*

## **School of Communication**

### **Administration**

Barbara J. O'Keefe, PhD  
*Dean of the School of Communication and Professor of  
Communication Studies*

Rick G. Morris, LLM  
*Associate Dean for Finance and Administration and Associate  
Professor of Communication Studies and Radio/Television/Film*

Jane L. Rankin, PhD  
*Associate Dean for Research and Senior Lecturer in  
Communication Sciences and Disorders*

Mimi White, PhD  
*Associate Dean for Graduate Programs and Professor of Radio/  
Television/Film*

Susan Dun, PhD  
*Assistant Dean for Undergraduate Advising and Student Affairs  
and Senior Lecturer in Communication Studies*

Dennis Glenn, MFA  
*Assistant Dean for Distributed Education*

Gaye Markov  
*Assistant Dean, Business and Finance*

Harold E. Gulley, PhD  
*Adviser and Lecturer in Communication Studies*

Lynn Kelso, MFA  
*Adviser and Lecturer in Theatre*

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)  
*Assistant Professor; also Psychology*

James R. Booth (PhD Maryland)  
*JoAnn G. and Peter F. Dolle Associate 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)  
*Assistant Professor*

Kristine E. Erickson (AuD Central Michigan)  
*Lecturer*

Susan F. Erler (PhD Northwestern)  
*Associate Professor*

Pamela Fiebig (MA Northwestern)  
*Senior Lecturer*

Rebecca Field (MS Rush)  
*Lecturer*

Kimberly Fisher (PhD Oklahoma)  
*Associate Professor*

Dean C. Garstecki (PhD Illinois)  
*Professor; also Otolaryngology*

Belma Hadziselimovic (MS Columbia)  
*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)  
*Assistant Professor; also Psychology*

Jessica Maye (PhD Rochester)  
*Assistant Professor*

Lowery A. Mayo (AuD Florida)  
*Lecturer*

Carrie A. McBreen (MS Wisconsin)  
*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 (MA 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*

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*

Anna Pistorio Wagner (MA Northwestern)  
*Lecturer*

Aaron Wilkins (MS St. Xavier)  
*Lecturer*

Patrick C. M. Wong (PhD Texas)  
*Assistant Professor*

Beverly A. Wright (PhD Texas)  
*Associate 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*

Pablo J. Boczkowski (PhD Cornell)  
*Associate Professor*

Justine Cassell (PhD Chicago)  
*AT&T Research Professor; also Education and Social Policy,  
Electrical Engineering and Computer Science*

Noshir Contractor (PhD USC)  
*Professor; also Industrial Engineering and Management Sciences*

L. Scott Deatherage (PhD Northwestern)  
*Senior Lecturer and Director of Forensics*

Jason DeSanto (JD Pennsylvania)  
*Visiting Assistant Professor of First Amendment Studies*

Susan Dun (PhD Illinois)  
*Senior Lecturer; Assistant Dean for Undergraduate Advising  
and Student Affairs*

James S. Ettema (PhD Michigan)  
*Professor*

Kathleen M. Galvin (PhD Northwestern)  
*Professor*

Dilip P. Gaonkar (PhD Pittsburgh)  
*Associate Professor; also African American Studies*

Darren Gergle (PhD Carnegie Mellon)  
*Assistant Professor*

Harold E. Gulley (PhD London)  
*Lecturer and Adviser*

Eszter Hargittai (PhD Princeton)  
*Assistant 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*

Gregory T. Makoul (PhD Northwestern)  
*Assistant Professor; also Medicine*

Maria Mastronardi (PhD Illinois)  
*Associate Professor*

Thomas A. McCarthy (PhD Notre Dame)  
*Professor; John C. Shaffer Professor in the Humanities  
(Philosophy)*

Peter V. Miller (PhD Michigan)  
*Associate Professor and Chair*

Rick G. Morris (JD Kansas, LLM NYU)  
*Associate Professor; also Radio/Television/Film;  
Associate Dean for Finance and Administration*

Barbara J. O'Keefe (PhD Illinois)  
*Professor; Dean, School of Communication*

Daniel O'Keefe (PhD Illinois)  
*Professor*

Benjamin I. Page (PhD Stanford)  
*Professor; Gordon Scott Fulcher Professor in Decision Making  
(Political Science)*

Angela Ray (PhD Minnesota)  
*Assistant Professor*

Irving J. Rein (PhD Pittsburgh)  
*Professor*

Richard A. Roe (MS Dayton, MA Northwestern)  
*Senior Lecturer*

Michael E. Roloff (PhD Michigan State)  
*Professor*

James Schwoch (PhD Northwestern)  
*Associate Professor*

Keith Topper (PhD UCLA)  
*Assistant Professor; also Political Science*

Debra Webster (MA Ohio)  
*Lecturer; Coordinator of Undergraduate Studies, and Adviser*

James G. Webster (PhD Indiana)  
*Professor*

Elaine M. Wong (PhD UC Berkeley)  
*Assistant Professor*

David Zarefsky (PhD Northwestern)  
*Owen L. Coon Professor of Argumentation and Debate*

**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*

Micaela di Leonardo (PhD UC Berkeley)  
*Professor; also Anthropology*

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, Theatre*

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)  
*Assistant Professor; also African American Studies, Performance Studies, Radio/Television/Film, Theatre*

Mary Zimmerman (PhD Northwestern)  
*Professor*

**Radio/Television/Film**

Lynn Spigel (PhD UCLA)  
*Frances E. Willard Professor of Screen Cultures and Chair*

Jason Betke (MFA Columbia Chicago)  
*Lecturer*

Bill Bleich (MFA UCLA and JD UC Berkeley)  
*Assistant Professor and Assistant Director, MFA Program, Writing for Screen and Stage*

M. Scott Curtis (PhD Iowa)  
*Assistant Professor*

Rebecca Gilman (MFA Iowa)  
*Assistant Professor*

Dana H. Hodgdon (MA Northwestern)  
*Associate Professor*

Laura Kipnis (MFA Nova Scotia College of Art and Design)  
*Professor*

Chuck Kleinhans (PhD Indiana)  
*Associate Professor*

Lawrence W. Lichty (PhD Ohio State)  
*Professor*

Rick Morris (JD Kansas, LLM NYU)  
*Associate Professor; also Communication Studies; Associate Dean for Finance and Administration*

Hamid Naficy (PhD UCLA)  
*John Evans Professor in Communication*

Eric Patrick (MFA California Institute of Arts)  
*Assistant Professor*

Jeffrey Sconce (PhD Wisconsin)  
*Associate Professor; also Performance Studies*

Roberta Stack (MA Pennsylvania)  
*Lecturer, Adviser, and Director of Undergraduate Programs*

Jacqueline Stewart (PhD Chicago)  
*Associate Professor; also African American Studies*

David Tolchinsky (MFA Southern California)  
*Associate Professor*

Debra Tolchinsky (MFA Art Institute of Chicago)  
*Assistant Professor*

Mimi White (PhD Iowa)  
*Professor and Associate Dean for Graduate Programs*

**Theatre**

Rives Collins (MFA Arizona State)  
*Associate Professor and Chair*

Joseph Appelt (MA Michigan)  
*Professor and Director, MFA Program, Design*

David Bell (MA Virginia)  
*Associate Professor*

Bud Beyer (BS Northwestern)  
*Professor*

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*

Amanda Dehnert (BFA Illinois Wesleyan)  
*Assistant Professor*

Shawn Douglass (MFA Missouri)  
*Lecturer*

David A. Downs (MA Loyola Chicago)  
*Associate Professor and Charles Deering McCormick Professor of Teaching Excellence*

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*

Craig D. Kinzer (MFA NYU)

*Associate Professor*

Ana Kuzmanic (MFA Northwestern)

*Assistant Professor*

Susan A. Lee (PhD Northwestern)

*Professor; Dance Program; also Education and Social Policy*

Susan A. Manning (PhD Columbia)

*Professor; also English, Performance Studies*

Sandra Marquez (MFA Illinois)

*Adjunct Lecturer*

Joseph Mills (PhD Temple)

*Associate Professor and Director; Dance Program*

Dominic E. Missimi (MA Wayne State)

*Professor and Donald G. Robertson Director in Music Theatre; also Voice and Opera*

Dawn Mora (MA San Diego State)

*Senior Lecturer*

Dan Ostling (MFA Northwestern)

*Associate Professor*

Penny Penniston (BS Northwestern)

*Adjunct Lecturer*

Mary Poole (PhD Northwestern)

*Senior Lecturer*

Ana Puga (DFA Yale)

*Assistant Professor*

Sandra L. Richards (PhD Stanford)

*Professor; also African American Studies, Performance Studies*

Linda Roethke (MFA Iowa)

*Associate Professor*

Michael Rohd (MFA Virginia Tech)

*Visiting Assistant Professor*

Todd Rosenthal (MFA Yale)

*Assistant Professor*

Anna D. Shapiro (MFA Yale)

*Associate Professor and Director; MFA Program, Directing*

Gail Shapiro (MFA Yale)

*Lecturer*

Billy Siegenfeld (MA NYU)

*Professor*

Joel Valentin-Martinez (BA SUNY Buffalo)

*Senior Lecturer*

Ann E. Woodworth (MA Northwestern)

*Associate Professor*

Harvey Young (PhD Cornell)

*Assistant Professor; also African American Studies, Performance Studies, Radio/Television/Film*

## **School of Education and Social Policy**

### **Administration**

Penelope L. Peterson, PhD

*Dean of the School of Education and Social Policy and Eleanor R. Baldwin Professor of Education*

Coleen T. Coleman, MS

*Associate Dean*

Mark P. Hoffman, MS

*Academic Adviser for Social Policy*

Jeanne M. Hughes, BA

*Assistant Dean*

Jessie L. Blank, BA

*Academic Adviser for Learning and Organizational Change*

Susan E. Olson, MA

*Assistant Dean for Student Affairs and Academic Adviser for Human Development and Psychological Services*

Margaret G. Kreuser, BS

*Academic Adviser for Secondary Education*

James L. Webb, MM

*Director of Information Technology*

### **Faculty**

Emma K. Adam (PhD Minnesota)

*Assistant Professor; also Psychology, Institute for Policy Research*

Lawrence A. Birnbaum (PhD Yale)

*Associate Professor; also Electrical Engineering and Computer Science*

Justine Cassell (PhD Chicago)

*Professor; AT&T Research Professor (Communication Studies), also Electrical Engineering and Computer Science*

P. Lindsay Chase-Lansdale (PhD Michigan)

*Professor; also Institute for Policy Research*

Jeanette Colyvas (PhD Stanford)

*Assistant Professor*

Fay Lomax Cook (PhD Chicago)

*Professor; Director, Institute for Policy Research*

Thomas D. Cook (PhD Stanford)

*Professor; Joan E. and Sarepta Harrison Professor in Ethics and Justice (Sociology); also Psychology, Institute for Policy Research*

Solomon Cytrynbaum (PhD Michigan)

*Professor; also Psychiatry*

Greg J. Duncan (PhD Michigan)

*Edwina S. Tarry Professor in Education; also Institute for Policy Research*

Daniel C. Edelson (PhD Northwestern)

*Associate Professor; also Electrical Engineering and Computer Science*

Kenneth D. Forbus (PhD MIT)

*Professor; Walter P. Murphy Professor (Electrical Engineering and Computer Science)*

Wendi Gardner (PhD Ohio State)

*Associate Professor; also Psychology*

Dedre Gentner (PhD UC San Diego)

*Professor; also Psychology*

Louis M. Gomez (PhD UC Berkeley)

*Aon Professor in the Learning Sciences; also Electrical Engineering and Computer Science*

Kristian J. Hammond (PhD Yale)

*Professor; also Electrical Engineering and Computer Science*

Sophie Haroutunian-Gordon (PhD Chicago)

*Professor and Director, MSED Program*

Lawrence V. Hedges (PhD Stanford)

*Board of Trustees Professor of Statistics and Social Policy; also Institute for Policy Research, Statistics*

Phillip Herman (PhD North Carolina)

*Research Assistant Professor*

Barton J. Hirsch (PhD Oregon)

*Professor*

Kemi Jona (PhD Northwestern)

*Research Associate Professor*

Spyros Konstantopoulos (PhD Chicago)

*Assistant Professor*

John P. Kretzmann (PhD Northwestern)

*Research Associate Professor*

Eva Lam (PhD UC Berkeley)

*Assistant Professor; also Asian American Studies*

Carol D. Lee (PhD Chicago)

*Professor; also African American Studies*

Seon-Young Lee (PhD Georgia)

*Research Assistant Professor*

Susan A. Lee (PhD Northwestern)

*Professor; also Theatre*

Dan A. Lewis (PhD UC Santa Cruz)

*Professor; also Institute for Policy Research*

Gregory Light (PhD London)

*Associate Professor; Director, Searle Center for Teaching Excellence*

Jelani Mandara (PhD UC Riverside)

*Assistant Professor*

Dan P. McAdams (PhD Harvard)

*Professor; Director, Foley Center for the Study of Lives; also Psychology*

Thomas McDade (PhD Emory)

*Associate Professor; also Weinberg College Board of Visitors Research and Teaching Professor; also Anthropology, Institute for Policy Research*

Steven McGee (PhD Northwestern)

*Research Associate Professor*

Ann McKenna (PhD UC Berkeley)

*Assistant Professor; also Mechanical Engineering*

Douglas L. Medin (PhD South Dakota)

*Professor; Louis W. Menk Professor (Psychology)*

Brad Olson (PhD Iowa)

*Research Assistant Professor*

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, School of Education and Social Policy*

William M. Pinsof (PhD York)

*Professor; also Family Institute*

Carla Pugh (MD Howard, PhD Stanford)

*Assistant Professor; also Medicine*

David Rapp (PhD SUNY Stony Brook)

*Assistant Professor; also Psychology*

Michelle Reininger (PhD Stanford)

*Assistant Professor; also Institute for Policy Research*

Brian J. Reiser (PhD Yale)

*Professor*

Christopher K. Riesbeck (PhD Stanford)

*Associate Professor; also Electrical Engineering and Computer Science*

James E. Rosenbaum (PhD Harvard)

*Professor; also Institute for Policy Research, Sociology*

Kimberly Scott (PhD Ohio State)

*Assistant Professor; Director, MSLOC Program*

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*

Bruce D. Spencer (PhD Yale)

*Professor; also Statistics, Institute for Policy Research*

James P. Spillane (PhD Michigan State)

*Spencer T. and Ann W. Olin Professor in Learning and Organizational Change; also Institute for Policy Research*

Martin A. Tanner (PhD Chicago)

*Professor; also Statistics*

Edd Taylor (PhD UC Berkeley)

*Assistant Professor*

Linda A. Teplin (PhD Northwestern)

*Professor; Owen L. Coon Professor (Psychiatry)*



Lois Trautvetter (PhD Michigan)

*Assistant Professor*

David H. Uttal (PhD Michigan)

*Associate Professor; also Psychology*

Sandra R. Waxman (PhD Pennsylvania)

*Professor; also Psychology*

Uriel J. Wilensky (PhD MIT)

*Associate Professor; also Electrical Engineering and Computer Science*

Whitney Witt (PhD Johns Hopkins)

*Assistant Professor; also Medicine*

## **Robert R. McCormick School of Engineering and Applied Science**

### **Administration**

Julio M. Ottino, PhD

*Dean of the McCormick School, Distinguished Robert R. McCormick Institute Professor, and Walter P. Murphy Professor of Chemical and Biological Engineering*

Joseph T. Walsh, PhD

*Senior Associate Dean for Graduate Studies and Research and Professor of Biomedical Engineering*

Michael D. Besançon, MBA

*Associate Dean of Administration, Finance, and Planning*

Stephen H. Carr, PhD

*Associate Dean for Undergraduate Engineering and Professor of Biomedical Engineering, Chemical and Biological Engineering, and Materials Science and Engineering*

Joseph L. Schofer, PhD

*Associate Dean for Faculty Affairs and Professor of Civil and Environmental Engineering; also Transportation Center*

Joseph J. Holtgreive, EdM

*Assistant Dean for Undergraduate Engineering*

Joann G. Mete

*Assistant Dean for Administration*

Ellen A. Worsdall, MS

*Assistant Dean for Undergraduate Engineering*

Gina Myerson, MA, MBA

*Assistant Dean and Director of Marketing and External Communications*

Helen C. Oloroso, MA

*Assistant Dean and Director of Walter P. Murphy Cooperative Engineering Education Program*

Alice Kelley

*Director of Administration and Planning*

Ira J. Uslander, PhD

*Director of Corporate Relations*

Roger J. Williams

*Director of McCormick Development*

Alan R. Wolff

*Director of McCormick Information Technology*

### **Biomedical Engineering**

Matthew R. Glucksberg (PhD Columbia)

*Professor and Chair*

Guillermo Ameer (PhD MIT)

*Associate 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, McCormick School*

Timothy J. Carroll (PhD Illinois)

*Assistant 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 UCLA)

*Assistant Professor; also Physical Medicine and Rehabilitation*

Jerome M. Garden (MD Northwestern)

*Associate Professor; also Clinical Medicine*

Mitra J. Hartmann (PhD Caltech)

*Assistant Professor; also Mechanical Engineering*

Dean Ho (PhD UCLA)

*Assistant Professor; also Mechanical Engineering*

James C. Houk (PhD Harvard)

*Professor; also Physiology*

Mark A. Johnson (PhD MIT)

*Associate Professor*

David M. Kelso (PhD Northwestern)

*Associate Professor*

Francis J. Klocke (MD SUNY Buffalo)

*Professor; Director, Feinberg Cardiovascular Research Institute*

Debiao Li (PhD Virginia)

*Associate 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*

Shu Q. Liu (PhD UC San Diego)

*Associate Professor*

Malcolm A. MacIver (PhD Caltech)

*Assistant Professor; also Mechanical Engineering*

Phillip B. Messersmith (PhD Illinois)

*Professor; also Materials Science and Engineering, Physical Medicine and Rehabilitation*

Ferdinando Mussa-Ivaldi (PhD Genoa)

*Associate 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)

*Assistant Professor; also Physical Medicine*

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)

*Associate Professor; also Chemical and Biological Engineering*

Kenneth G. Spears (PhD Chicago)

*Professor; also Chemistry*

Samuel I. Stupp (PhD Northwestern)

*Professor; Board of Trustees Professor of Materials Science and Engineering, Chemistry, and Medicine*

John B. Troy (DPhil Sussex)

*Professor*

Igal Szleifer (PhD Hebrew)

*Professor*

Jeffrey Vender (MD Northwestern)

*Professor; also Anesthesiology*

Joseph T. Walsh (PhD MIT)

*Professor; Senior Associate Dean for Graduate Studies and Research, McCormick School*

Tai Te Wu (PhD Harvard)

*Professor; also Biochemistry, Molecular Biology, and Cell Biology*

Li-Qun Zhang (PhD Vanderbilt)

*Assistant Professor; also Orthopaedic Surgery, Physical Medicine, and Rehabilitation*

### **Chemical and Biological Engineering**

Wesley R. Burghardt (PhD Stanford)

*Professor and Chair*

Luis A. N. Amaral (PhD Boston and Harvard Medical)

*Associate Professor*

Linda J. Broadbelt (PhD Delaware)

*Professor*

Stephen H. Carr (PhD Case Western Reserve)

*Professor; also Biomedical Engineering, Materials Science, and Engineering; Associate Dean for Undergraduate Engineering, McCormick School*

Kimberly A. Gray (PhD Johns Hopkins)

*Professor; also Civil and Environmental Engineering*

Bartosz A. Grzybowski (PhD Harvard)

*Associate Professor*

Michael Jewett (PhD Stanford)

*Assistant Professor*

Harold H. Kung (PhD Northwestern)

*Professor*

William M. Miller (PhD UC Berkeley)

*Professor*

Justin Notestein (PhD UC Berkeley)

*Assistant Professor*

Monica Olvera de la Cruz (PhD Cambridge)

*Professor; also Materials Science and Engineering*

Julio M. Ottino (PhD Minnesota)

*Distinguished Robert R. McCormick Institute Professor and Walter P. Murphy Professor of Chemical and Biological Engineering; Dean, McCormick School*

Gregory Ryskin (PhD Caltech)

*Associate Professor*

Lonnie D. Shea (PhD Michigan)

*Associate Professor; also Biomedical Engineering*

Randall Q. Snurr (PhD UC Berkeley)

*Professor*

John M. Torkelson (PhD Minnesota)

*Walter P. Murphy Professor of Chemical and Biological Engineering and Materials Science and Engineering; Director, Materials Research Center and Materials Research Institute*

### **Civil and Environmental Engineering**

Brian Moran (PhD Brown)

*Professor and Chair; also Mechanical Engineering*

Jan D. Achenbach (PhD Stanford)

*Walter P. Murphy Professor of Civil and Environmental Engineering and McCormick School Professor; also Engineering Sciences and Applied Mathematics, Mechanical Engineering; Director, Center for Quality Engineering and Failure Prevention*

Jose E. Andrade (PhD Stanford)

*Assistant Professor*

Zdeněk P. Bažant (PhD Czech Academy of Sciences)

*Walter P. Murphy Professor of Civil and Environmental Engineering; also Materials Science and Engineering*

Ted B. Belytschko (PhD IIT)

*Walter P. Murphy Professor of Civil and Environmental Engineering and Mechanical Engineering*

Neal Blair (PhD Stanford)

*Professor; also Earth and Planetary Sciences*

Isaac M. Daniel (PhD IIT)

*Walter P. Murphy Professor of Civil and Environmental Engineering and Mechanical Engineering; Director, Center for Intelligent Processing of Composites*

Charles H. Dowding (PhD Illinois)

*Professor*

Pablo L. Durango-Cohen (PhD UC Berkeley)

*Assistant Professor*

Richard J. Finno (PhD Stanford)

*Professor*

Joseph A. Fitzpatrick (PhD Harvard)

*Associate Professor*

Jean-François Gaillard (DSc Paris)  
*Associate Professor; also Earth and Planetary Sciences*

Kimberly A. Gray (PhD Johns Hopkins)  
*Professor; also Chemical and Biological Engineering*

Yonggang Huang (PhD Harvard)  
*Professor; also Mechanical Engineering*

Hamlin M. Jennings (PhD Brown)  
*Professor; also Materials Science and Engineering*

Leon M. Keer (PhD Minnesota)  
*Walter P. Murphy 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)  
*Professor*

Yu (Marco) Nie (PhD UC Davis)  
*Assistant Professor; Louis Berger Junior Professor; also Transportation Center*

Aaron I. Packman (PhD Caltech)  
*Associate Professor; also Mechanical Engineering*

John W. Rudnicki (PhD Brown)  
*Professor; also Mechanical Engineering*

Joseph L. Schofer (PhD Northwestern)  
*Professor; also Transportation Center; Associate Dean for Faculty Affairs, McCormick School*

Surendra P. Shah (PhD Cornell)  
*Walter P. Murphy Professor of Civil and Environmental Engineering; Director, Center for Advanced Cement-Based Materials*

### ***Electrical Engineering and Computer Science***

Bruce W. Wessels (PhD MIT)  
*Professor and Chair; Walter P. Murphy Professor of Materials Science and Engineering (Materials Science and Engineering)*

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*

Fabian E. Bustamante (PhD Georgia Tech)  
*Assistant Professor*

Arthur R. Butz (PhD Minnesota)  
*Associate Professor*

Justine Cassell (PhD Chicago)  
*Professor; also AT&T Research Professor (Communication Studies); also Education and Social Policy*

Robert P. H. Chang (PhD Princeton)  
*Professor; also Materials Science and Engineering*

Yan Chen (PhD UC Berkeley)  
*Assistant Professor*

Alok N. Choudhary (PhD Illinois)  
*Professor; Director, Center for Ultrascale Computing and Information Security; also Computational Biology and Bioinformatics*

Robert P. Dick (PhD Princeton)  
*Assistant Professor*

Peter A. Dinda (PhD Carnegie Mellon)  
*Associate Professor*

Daniel C. Edelson (PhD Northwestern)  
*Associate Professor; also Education and Social Policy*

Kenneth D. Forbus (PhD MIT)  
*Walter P. Murphy Professor of Electrical Engineering and Computer Science; also Education and Social Policy*

Randy A. Freeman (PhD UC Santa Barbara)  
*Associate Professor*

Lance Fortnow (PhD MIT)  
*Professor*

Louis M. Gomez (PhD UC Berkeley)  
*Professor; also Education and Social Policy*

Matthew A. Grayson (PhD Princeton)  
*Assistant Professor*

Dongning Guo (PhD Princeton)  
*Assistant Professor*

Abraham H. Haddad (PhD Princeton)  
*Henry and Isabelle Dever Professor; Director, Master of Information Technology Program; Director, Council on Dynamic Systems and Control*

Kristian J. Hammond (PhD Yale)  
*Professor; also Education and Social Policy*

Jason Hartline (PhD Washington)  
*Assistant Professor*

Lawrence J. Henschen (PhD Illinois)  
*Professor; Charles Deering McCormick Professor of Teaching Excellence; Associate Dean of Student Services, Graduate School*

Nicole Immerlica (PhD MIT)  
*Assistant Professor*

Seng-Tiong Ho (PhD MIT)  
*Professor*

Michael L. Honig (PhD UC Berkeley)  
*Professor*

Ian D. Horswill (PhD MIT)  
*Associate Professor*

Yehea Ismail (PhD Rochester)  
*Associate Professor*

Russell E. Joseph (PhD Princeton)  
*Assistant Professor*

Ming-Yang Kao (PhD Yale)  
*Professor; also Computational Biology and Bioinformatics*

Aggelos K. Katsaggelos (PhD Georgia Tech)  
*Ameritech Professor of Information Technology; Director, Motorola Center for Seamless Communications; Director, Image and Video Processing Laboratory*

John B. Ketterson (PhD Chicago)  
*Professor; Fayerweather Professor in Physics (Physics and Astronomy)*

Prem Kumar (PhD SUNY Buffalo)  
*AT&T Professor of Information Technology; also Physics and Astronomy; Director, Center for Photonic Communication and Computing*

Aleksandar Kuzmanovic (PhD Rice)  
*Assistant Professor*

Chung-Chieh Lee (PhD Princeton)  
*Professor*

Xu Li (PhD Wisconsin)  
*Assistant Professor; also Biomedical Engineering*

Wei-Chung Lin (PhD Purdue)  
*Associate Professor*

Gokhan Memik (PhD UCLA)  
*Assistant Professor; Lisa Wissner-Slivka and Benjamin Slivka Professor; also Computational Biology and Bioinformatics*

Seda Ogrenci Memik (PhD UCLA)  
*Assistant Professor*

Hooman Mohseni (PhD Northwestern)  
*Assistant Professor*

Jorge Nocedal (PhD Rice)  
*Professor; Director, Optimization Technology Center; Director, Computational Science Institute; also Industrial Engineering and Management Sciences*

Donald A. Norman (PhD Pennsylvania)  
*Professor; also Psychology*

Thrasyvoulos Pappas (PhD MIT)  
*Associate Professor*

Bryan Pardo (PhD Michigan)  
*Assistant Professor*

Martin A. Plonus (PhD Michigan)  
*Professor*

Manijeh Razeghi (PhD Paris)  
*Walter P. Murphy Professor of Electrical Engineering and Computer Science; Director, Center for Quantum Devices*

Christopher Riesbeck (PhD Stanford)  
*Associate Professor*

Alan V. Sahakian (PhD Wisconsin)  
*Professor; also Biomedical Engineering*

Peter I. Scheuermann (PhD SUNY Stony Brook)  
*Professor*

Selim Shahriar (PhD MIT)  
*Associate Professor*

Allen Taflove (PhD Northwestern)  
*Professor*

John E. (Jack) Tumblin (PhD Georgia Tech)  
*Associate Professor*

Uriel J. Wilensky (PhD MIT)  
*Associate Professor; also Education and Social Policy*

Chi-Haur Wu (PhD Purdue)  
*Associate Professor*

Ying Wu (PhD Illinois)  
*Associate Professor*

Horace P. Yuen (PhD MIT)  
*Professor; also Physics and Astronomy*

Hai Zhou (PhD Texas)  
*Associate Professor; also Computational Biology and Bioinformatics*

### ***Engineering Sciences and Applied Mathematics***

Michael J. Miksis (PhD NYU)  
*Professor and Chair; also Mechanical Engineering*

Jan D. Achenbach (PhD Stanford)  
*McCormick School Professor; Walter P. Murphy Professor of Civil and Environmental Engineering; also Mechanical Engineering; Director, Center for Quality Engineering and Failure Prevention*

Alvin Bayliss (PhD NYU)  
*Professor; also Electrical Engineering and Computer Science*

Dirk Brockmann (PhD Georg August)  
*Associate Professor*

David L. Chopp (PhD UC Berkeley)  
*Associate Professor*

Stephen H. Davis (PhD Rensselaer Polytechnic)  
*Walter P. Murphy Professor of Engineering Sciences and Applied Mathematics and McCormick School Professor; also Mechanical Engineering*

Alexander A. Golovin (PhD Karpov Institute of Physical Chemistry, Moscow)  
*Associate Professor*

William L. Kath (PhD Caltech)  
*Professor; also Neurobiology and Physiology*

Konrad Kording (PhD ETH)  
*Assistant Professor; also Physical Medicine and Rehabilitation*

Bernard J. Matkowsky (PhD NYU)  
*John Evans Professor in Applied Mathematics; also Mechanical Engineering*

W. Edward Olmstead (PhD Northwestern)  
*Professor; also Mathematics*

Hermann E. Riecke (PhD Bayreuth)  
*Professor*

Mary C. Silber (PhD UC Berkeley)  
*Professor*

Vladimir A. Volpert (PhD Institute of Chemical Physics, USSR Academy of Sciences)  
*Professor*

**Industrial Engineering and Management Sciences**

Ajit C. Tamhane (PhD Cornell)

*Professor and Chair; also Statistics*

Bruce E. Ankenman (PhD Wisconsin)

*Associate Professor; Director, MEM Program; Director, Institute for Design Engineering and Applications (IDEA)*

Daniel Apley (PhD Michigan)

*Associate Professor; Director, Manufacturing and Design Engineering Program*

Wei Chen (PhD Georgia Tech)

*Associate Professor; also Mechanical Engineering*

Noshir Contractor (PhD USC)

*Professor; also Communication Studies*

Sunil Chopra (PhD SUNY Stony Brook)

*Professor; IBM Professor in Management Information Systems (Managerial Economics and Decision Sciences)*

Mark S. Daskin (PhD MIT)

*Professor; Bette and Neison Harris Professor of Teaching Excellence; also Transportation Center*

Robert H. Fourer (PhD Stanford)

*Professor*

Donald N. Frey (PhD Michigan)

*Professor*

Gordon B. Hazen (PhD Purdue)

*Professor*

Tito Homem-de-Mello (PhD Georgia Tech)

*Associate Professor*

Seyed M. R. Iravani (PhD Toronto)

*Associate Professor*

Diego Klabian (PhD Georgia Tech)

*Associate Professor*

Paul Leonardi (PhD Stanford)

*Assistant Professor; also Communication Studies*

Vadim Linetsky (PhD Russian Academy of Sciences)

*Professor*

Michael A. Marasco (MBA Harvard)

*Clinical Associate Professor; Director, Center for Entrepreneurship and Innovation*

Sanjay Mehrotra (PhD Columbia)

*Professor; Deputy Director, Optimization Technology Center*

Barry L. Nelson (PhD Purdue)

*Professor; Charles Deering McCormick Professor of Teaching Excellence*

Jorge Nocedal (PhD Rice)

*Professor; also Electrical Engineering and Computer Science; Director, Computational Science Institute*

Karen R. Smilowitz (PhD UC Berkeley)

*Associate Professor; William A. Patterson Junior Chair in Transportation*

Jeremy C. Staum (PhD Columbia)

*Associate Professor*

Charles W. N. Thompson (PhD Northwestern)

*Professor*

William J. White (MBA Harvard)

*Professor*

**Materials Science and Engineering**

Peter W. Voorhees (PhD Rensselaer Polytechnic)

*Frank C. Engelbart Professor in Materials Science and Engineering and Chair*

Scott A. Barnett (PhD Illinois)

*Professor and Associate Chair*

Zdeněk P. Bažant (PhD Czech Academy of Science)

*Professor; Walter P. Murphy Professor of Civil and Environmental Engineering*

Michael J. Bedzyk (PhD SUNY Albany)

*Professor; also Physics and Astronomy*

L. Catherine Brinson (PhD Caltech)

*Professor; Jerome B. Cohen Professor of Engineering (Mechanical Engineering)*

Stephen H. Carr (PhD Case Western Reserve)

*Professor; also Biomedical Engineering, Chemical and Biological Engineering; Associate Dean for Undergraduate Engineering, McCormick School*

Robert P. H. Chang (PhD Princeton)

*Professor; also Electrical Engineering and Computer Science*

Yip-Wah Chung (PhD UC Berkeley)

*Professor*

Vinayak P. Dravid (PhD Lehigh)

*Professor*

David C. Dunand (PhD MIT)

*James N. and Margie M. Krebs Professor*

Katherine T. Faber (PhD UC Berkeley)

*Walter P. Murphy Professor of Materials Science and Engineering*

Arthur J. Freeman (PhD MIT)

*Professor; Charles E. and Emma H. Morrison Professor in Physics (Physics and Astronomy)*

Mark C. Hersam (PhD Illinois)

*Professor*

Jiaxing Huang (PhD UCLA)

*Assistant Professor*

Hamlin M. Jennings (PhD Brown)

*Professor; also Civil and Environmental Engineering*

Lincoln J. Lauhon (PhD Cornell)

*Assistant Professor; Morris E. Fine Professor in Materials and Manufacturing*

Derk Joester (PhD ETH Zurich)

*Assistant Professor*

Laurence D. Marks (PhD Cambridge)

*Professor*

Tobin J. Marks (PhD MIT)

*Professor; also Vladimir Ipatieff Research Professor in Organic Chemistry (Chemistry)*

Thomas O. Mason (PhD MIT)

*Professor*

Phillip B. Messersmith (PhD Illinois)

*Professor; also Biomedical Engineering, Physical Medicine and Rehabilitation*

Chad A. Mirkin (PhD Penn State)

*Professor; also George B. Ratbmann Professor of Chemistry (Chemistry)*

Gregory B. Olson (ScD MIT)

*Wilson-Cook Professor of Engineering Design*

Monica Olvera de la Cruz (PhD Cambridge)

*Professor; also Chemical and Biological Engineering*

Mark A. Ratner (PhD Northwestern)

*Professor; also Morrison Professor of Chemistry*

David N. Seidman (PhD Illinois)

*Walter P. Murphy Professor of Materials Science and Engineering*

Kenneth R. Shull (PhD Cornell)

*Professor*

Kathleen A. Stair (PhD Northwestern)

*Senior Lecturer*

Samuel I. Stupp (PhD Northwestern)

*Board of Trustees Professor of Materials Science and Engineering, Chemistry, and Medicine; also Biomedical Engineering*

John M. Torkelson (PhD Minnesota)

*Walter P. Murphy Professor of Chemical and Biological Engineering and Materials Science and Engineering; Director, Materials Research Center and Materials Research Institute*

Bruce W. Wessels (PhD MIT)

*Walter P. Murphy Professor of Materials Science and Engineering; also Electrical and Computer Engineering*

Christopher M. Wolverton (PhD UC Berkeley)

*Professor*

### **Mechanical Engineering**

L. Catherine Brinson (PhD Caltech)

*Chair and Jerome B. Cohen Professor of Engineering; also Materials Science and Engineering*

Jan D. Achenbach (PhD Stanford)

*McCormick School Professor; Walter P. Murphy Professor; also Civil and Environmental Engineering*

Ted B. Belytschko (PhD IIT)

*McCormick School Professor; Walter P. Murphy Professor; also Civil and Environmental Engineering*

Jian Cao (PhD MIT)

*Associate Professor*

Wei Chen (PhD Georgia Tech)

*Associate Professor; also Industrial Engineering and Management Sciences*

J. Edward Colgate (PhD MIT)

*Pentair-Eugene and Bonnie L. Nugent Teaching Professor*

James G. Conley (PhD Northwestern)

*Clinical Professor of Technology Industry Management (Kellogg School of Management)*

Isaac M. Daniel (PhD IIT)

*Walter P. Murphy Professor; also Civil and Environmental Engineering; Director, Center for Intelligent Processing of Composites*

Stephen H. Davis (PhD Rensselaer Polytechnic)

*McCormick School Professor; Walter P. Murphy Professor; also Engineering Sciences and Applied Mathematics*

Kornel F. Ehmann (PhD Wisconsin)

*James N. and Nancy J. Farley Professor in Manufacturing and Entrepreneurship*

Horacio D. Espinosa (PhD Brown)

*Professor*

Sandip Ghosal (PhD Columbia)

*Associate Professor*

Mitra J. Hartmann (PhD Caltech)

*Assistant Professor; also Biomedical Engineering*

Walter B. Herbst (MBA Northwestern)

*Clinical Professor; also Kellogg School of Management; Director, Master of Product Development Program*

Dean Ho (PhD UCLA)

*Assistant Professor; also Biomedical Engineering*

Yonggang Huang (PhD Harvard)

*Professor; also Civil and Environmental Engineering*

Leon M. Keer (PhD Minnesota)

*Walter P. Murphy Professor; also Civil and Environmental Engineering; Codirector, Center for Surface Engineering and Tribology*

Sridhar Krishnaswamy (PhD Caltech)

*Professor; Director, Center for Quality Engineering and Failure Prevention*

Elmer E. Lewis (PhD Illinois)

*Professor*

Seth H. Lichter (PhD MIT)

*Professor*

Chang Liu (PhD Caltech)

*Professor*

Wing Kam Liu (PhD Caltech)

*Walter P. Murphy Professor; also Civil and Environmental Engineering*

Richard M. Lueptow (PhD MIT)

*Professor; Codirector, Master of Product Development Program*

Kevin M. Lynch (PhD Carnegie Mellon)

*Associate Chair and Associate Professor*

Malcolm A. MacIver (PhD Illinois)

*Assistant Professor; also Biomedical Engineering*

Bernard J. Matkowsky (PhD NYU)

*Professor; John Evans Professor in Applied Mathematics  
(Engineering Sciences and Applied Mathematics)*

Ann McKenna (PhD UC Berkeley)

*Research Assistant Professor; also Education and Social Policy*

Michael J. Miksis (PhD NYU)

*Professor; also Engineering Sciences and Applied Mathematics*

Brian Moran (PhD Brown)

*Professor; also Civil and Environmental Engineering*

Julio M. Ottino (PhD Minnesota)

*Distinguished Robert R. McCormick Institute Professor and  
Walter P. Murphy Professor of Chemical and Biological  
Engineering (Chemical and Biological Engineering); Dean,  
McCormick School*

Aaron I. Packman (PhD Caltech)

*Associate Professor; also Civil and Environmental Engineering*

Neelesh A. Patankar (PhD Pennsylvania)

*Associate Professor*

Michael A. Peshkin (PhD Carnegie Mellon)

*Professor*

John W. Rudnicki (PhD Brown)

*Professor; also Civil and Environmental Engineering*

Siavash H. Sohrab (PhD UC San Diego)

*Associate Professor*

Henry W. Stoll (PhD Illinois)

*Clinical Professor*

Cheng Sun (PhD Penn State)

*Assistant Professor*

John A. Walker (PhD Texas)

*Professor*

Qian Wang (PhD Northwestern)

*Professor*

## **Medill School of Journalism**

### ***Administration***

John Lavine, BA

*Dean of the Medill School and Professor*

Richard J. Roth, MA

*Senior Associate Dean and Associate Professor*

Mary Nesbitt, MA

*Associate Dean, Curriculum and Professional Excellence*

Tom Collinger, BS

*Associate Dean; Chair, Integrated Marketing Communications;  
Sector Head, Direct, E-Commerce, and Search Marketing;  
Associate Professor*

Francis J. Mulhern, PhD

*Associate Dean for Research and Associate Professor*

Michele Bitoun, BA

*Senior Director of Undergraduate Education and Teaching  
Excellence, Director of Journalism Residency, and Assistant  
Professor*

Janice E. Castro, BA

*Senior Director of Graduate Education and Teaching Excellence  
and Assistant Professor*

Jeff Prah

*Senior Director of Technical Instruction and Chief Engineer*

Douglas Troutman, MA

*Senior Director of Student Services and Technology*

Earl Barrieffe, MSA

*Director of Business and Finance*

Keri Disch, MA

*Director of Student Life*

Anne L. Penway, JD

*Director of Graduate Admissions and Financial Aid*

Greg Schrader, MFA

*Director of Information Technology*

Thomas Hayden, JD

*Chief Marketing Officer*

### ***Journalism***

David Abrahamson (PhD NYU)

*Professor; Charles Deering McCormick Professor of  
Teaching Excellence*

Richard Alvarez (BA DePaul)

*Lecturer*

Fred Barbash (BS Wisconsin)

*Lecturer*

Elizabeth Bennett (MSJ Northwestern)

*Lecturer*

Michele Bitoun (BA Illinois)

*Assistant Professor; Senior Director of Undergraduate Education  
and Teaching Excellence; Director of Teaching Media*

Janice E. Castro (BA National-Louis)

*Assistant Professor; Senior Director of Graduate Education and  
Teaching Excellence*

Mary B. Coffman (MA Bowling Green)

*Associate Professor*

Susan Mango Curtis (BFA Virginia Commonwealth)

*Assistant Professor*

Michael Deas (MA Governors State)

*Lecturer*

Thomas K. Diemer (BA Ohio State)

*Lecturer*

Jack C. Doppelt (JD Chicago)

*Professor*

Eric Ferkenhoff (BA Kansas)

*Lecturer*

Abigail M. Foerstner (MSJ Northwestern)

*Lecturer*

Douglas M. Foster (BA UC Santa Cruz)

*Associate Professor*

Stephan Garnett (BA Illinois Wesleyan)

*Lecturer*

Loren Ghiglione (PhD George Washington)

*Richard A. Schwarzlose Professor of Media Ethics*

Richard Gordon (BA Penn)

*Associate Professor; Director of Digital Technology in Education*

Ava Thompson Greenwell (MSJ Northwestern)

*Associate Professor*

Sharon Edwards Kornely (BA Cleveland State)

*Senior Lecturer*

Alex W. Kotlowitz (BA Wesleyan)

*Senior Lecturer*

Craig L. LaMay (MA North Carolina)

*Associate Professor*

John Lavine (BA Carleton)

*Professor; Dean of the Medill School*

Donna R. Leff (PhD UC Berkeley)

*Professor*

Jonathan Marshall (MSJ Northwestern)

*Lecturer*

Joseph D. Mathewson (JD Chicago)

*Lecturer*

David L. Nelson (MSJ Northwestern)

*Associate Professor*

Arsenio M. Oloroso Jr. (MSJ Northwestern)

*Lecturer*

Marcel Pacatte (BA Eastern Illinois)

*Lecturer*

Abe Peck (BA NYU)

*Helen Gurley Brown Professor; Chair of Journalism and Cross-Media Storytelling*

David Protesse (PhD Chicago)

*Professor; Founding Director, Medill Innocence Project*

Richard J. Roth (MA Indiana State)

*Associate Professor; Senior Associate Dean of the Medill School*

Ellen Shearer (BA Wisconsin)

*Professor; Director and Bureau Chief, Medill Washington*

David Standish (MA Miami of Ohio)

*Lecturer*

Lawrence L. Stuelpnagel (MA Cal State Chico)

*Assistant Professor; also Political Science*

Mindy S. Trossman (JD Loyola Chicago)

*Assistant Professor*

Michele Weldon (MSJ Northwestern)

*Assistant Professor*

Charles F. Whitaker (MSJ Northwestern)

*Assistant Professor; Director, Medill's Academy for Alternative Journalism*

Patti L. Wolter (MSJ Northwestern)

*Assistant Professor*

## ***Integrated Marketing Communications***

Tom Collinger (BS Colorado)

*Associate Professor and Chair; Associate Dean of the Medill School; Sector Head, Direct, E-Commerce, and Search Marketing*

Martin P. Block (PhD Michigan State)

*Professor; Sector Head, Entertainment and Gaming*

Karen W. Brown (MM Northwestern)

*Lecturer*

Clarke L. Caywood (PhD Wisconsin)

*Professor; Sector Head, PR and Corporate Communications*

John Greening (MA Michigan State)

*Associate Professor; Sector Head, Advertising*

Geraldine Henderson (PhD Northwestern)

*Associate Professor*

Edward Malthouse (PhD Northwestern)

*Associate Professor; Theodore R. and Annie Laurie Sills Professor; Sector Head, Database Marketing and Data Mining*

Francis J. Mulhern (PhD Texas)

*Professor; Associate Dean for Research*

Jacquelyn Thomas (PhD Northwestern)

*Associate Professor*

Paul Wang (PhD Northwestern)

*Associate Professor*

## **School of Music**

### ***Administration***

Toni-Marie Montgomery, DMA

*Dean of the School of Music and Professor of Music; also African American Studies*

Peter R. Webster, PhD

*Associate Dean for Faculty Affairs and John W. Beattie Professor of Music Education and Technology*

René E. Machado, MM

*Associate Dean for Administration and Finance*

Linda A. Garton, PhD

*Assistant Dean for Admission and Student Affairs*

Karen Brunssen, BM

*Cochair of Music Performance and Associate Professor of Voice*

Charles Geyer, MM

*Cochair of Music Performance and Professor of Trumpet*

### ***Music Studies***

#### **Music Composition**

Lee Hyla (MA SUNY Stony Brook)

*Henry N. and Ruth F. Wyatt Professor in Music Theory*

Hans Thomalla (DMA Stanford)

*Assistant Professor*

Jay Alan Yim (PhD Harvard)

*Associate Professor and Coordinator of Music Composition Program*



## Music Education

Carlos R. Abril (PhD Ohio State)

*Assistant Professor*

Janet R. Barrett (PhD Wisconsin)

*Associate Professor*

Bernard J. Dobroski (PhD Northwestern)

*John Evans Professor in Music Education*

Maud M. Hickey (PhD Northwestern)

*Associate Professor and Coordinator of Music Education Program*

James M. Kjelland (PhD Texas)

*Associate Professor; also String Instruments*

Peter R. Webster (PhD Eastman)

*John W. Beattie Professor of Music Education and Technology  
and Associate Dean for Faculty Affairs, School of Music*

## Musicology

Linda P. Austern (PhD Chicago)

*Associate Professor*

Thomas A. Bauman (PhD UC Berkeley)

*Professor*

Drew Edward Davies (PhD Chicago)

*Assistant Professor*

Andrew Eisenberg (MPhil Columbia)

*Lecturer in Ethnomusicology*

Inna Naroditskaya (PhD Michigan)

*Associate Professor*

Jesse Rosenberg (PhD NYU)

*Charles Deering McCormick University Distinguished Clinical  
Professor and Coordinator of Musicology Program*

## Music Technology

Gary S. Kendall (PhD Texas)

*Associate Professor and Coordinator of Music Technology  
Program*

Christopher Mercer (PhD UC San Diego)

*Lecturer*

## Music Theory and Cognition

Richard D. Ashley (DMA Illinois)

*Associate Professor*

Drew Baker (DM Northwestern)

*Lecturer*

Robert O. Gjerdingen (PhD Pennsylvania)

*Professor and Coordinator of Music Theory and  
Cognition Program*

Susan Piagentini (PhD Northwestern)

*Senior Lecturer*

## Music Performance

### Conducting and Ensembles

Stephen Alltop (DM Northwestern)

*Senior Lecturer; Director of Music, Alice Millar Chapel*

Daniel J. Farris (MMed Illinois)

*Senior Lecturer and Director of Athletic Bands; also Jazz Studies*

Robert A. Harris (PhD Michigan State)

*Professor and Director of Choral Organizations*

Robert Hasty (DM Northwestern)

*Senior Lecturer*

Ryan Nelson (DMA North Texas)

*Assistant Professor and Associate Director of Bands*

Frederick Ockwell (MA Washington)

*Associate Professor and Opera Conductor; also Voice and Opera*

Mallory Thompson (DMA Eastman)

*Professor; Director of Band Organizations, and Coordinator of  
Conducting and Ensembles Program*

Amy Goodman Weller (DM Stanford)

*Lecturer*

Victor Yampolsky (Dipl Moscow Conservatory)

*Carol F. and Arthur L. Rice University Professor in Music  
Performance and Director of Orchestras*

## Jazz Studies

Andy Baker (BM Guildhall)

*Lecturer*

Daniel J. Farris (MMed Illinois)

*Senior Lecturer and Director of Athletic Bands; also Conducting  
and Ensembles*

Thomas Garling (MM Miami)

*Lecturer*

Joan Hickey (BM Illinois)

*Lecturer*

John Moulder (MM Northwestern)

*Lecturer*

Joel Spencer (MM Illinois)

*Lecturer; Interim Coordinator of Jazz Studies; also Wind and  
Percussion Instruments*

John Wojciechowski (MM Wayne State)

*Lecturer*

## Piano

Marcia Bosits (DM Northwestern)

*Associate Professor and Coordinator of Piano Pedagogy*

Elizabeth Buccheri (DMA Eastman)

*Senior Lecturer*

Alan Chow (MM Juilliard)

*Associate Professor and Coordinator of Piano Program*

Julian Dawson (BM Trinity Dublin)

*Senior Lecturer*

James Giles (DMA Manhattan)

*Assistant Professor*

Karen Kan-Walsh (DM Northwestern)

*Lecturer*

Margaret Kemper (MM Northwestern)

*Adjunct Associate Professor of Organ*

Ursula Oppens (MM Juilliard)

*John Evans Professor of Piano*

Susan Osborn (DM Northwestern)

*Lecturer*

Sylvia Wang (DMA Eastman)

*Associate Professor*

### **String Instruments**

Elizabeth Cifani (MM Northwestern)

*Lecturer in Harp*

Robert Hanford

*Lecturer in Violin*

Hans Jørgen Jensen (Dipl Royal Academy of Music, Denmark)

*Professor of Cello*

James M. Kjelland (PhD Texas)

*Associate Professor and Coordinator of String Pedagogy; also Music Education*

Paula Kosower (DM Northwestern)

*Lecturer in Cello Pedagogy*

Peter Lloyd (BM Curtis)

*Lecturer in Double Bass*

Blair Milton (MM Indiana)

*Assistant Professor of Violin*

Jonathan Pegis (MM Eastman)

*Lecturer in Cello Orchestral Studies*

Charles Pickler

*Lecturer in Viola Orchestral Studies*

Max Raimi

*Lecturer in String Chamber Music*

Gerardo Ribeiro (Dipl Lucerne Music Conservatory)

*Professor of Violin and Coordinator of String Instruments Program*

Stacia C. Spencer (MM Indiana)

*Senior Lecturer in String Pedagogy*

Mathias Tacke (MM Musikhochschule, Germany)

*Lecturer in String Chamber Music*

Almita Vamos (MA Western Illinois)

*Professor of Violin*

Roland Vamos (DMA Juilliard)

*Professor of Viola*

Anne Waller (MM Southern Methodist)

*Lecturer in Guitar*

### **Voice and Opera**

Richard L. Boldrey (BM Chicago Musical College)

*Senior Lecturer*

Theresa A. Brancaccio (MM Northwestern)

*Lecturer*

Karen Brunssen (BM Luther)

*Associate Professor and Cochair of Music Performance*

Alan Darling (Cert Royal Academy of Music)

*Senior Lecturer*

Richard Drews (MM Nebraska)

*Assistant Professor; Clinical; Coordinator of Voice and Opera Program*

Elizabeth Fischer-Monastero (MM Dominican, Florence)

*Adjunct Professor*

Melissa Foster (MM Northwestern)

*Senior Lecturer*

Nancy Gustafson (MM Northwestern)

*Artist in Residence*

Bruce Hall (MM Michigan)

*Senior Lecturer*

Kurt R. Hansen (MM Northwestern)

*Senior Lecturer*

Robert Heitzinger (DM Northwestern)

*Lecturer*

Pamela Hinchman (MM Curtis)

*Associate Professor*

Noel Koran (DMA Texas)

*Associate Professor and Director of Opera*

Philip Kraus (DM Northwestern)

*Lecturer*

Sunny Joy Langton (BM Indiana)

*Adjunct Assistant Professor*

Marie Michuda (MM DePaul)

*Lecturer (Music Theatre Program)*

Dominic E. Missimi (MA Wayne State)

*Professor and Donald G. Robertson Director in Music Theatre; also Theatre*

Frederick Ockwell (MA Washington)

*Associate Professor; also Conducting and Ensembles*

Jeffrey Peterson (DM Illinois)

*Lecturer*

Kenneth Smith (MM Indiana)

*Lecturer*

### **Wind and Percussion Instruments**

Ruben Alvarez

*Lecturer in Percussion*

William Barnewitz

*Lecturer in Horn*

J. Lawrie Bloom (MM Arizona State)

*Senior Lecturer in Clarinet*

Michael Burritt (MM Eastman)

*Professor of Percussion and Cooordinator of Wind and Percussion Instruments Program*

Barbara Butler (BM Northwestern)

*Professor of Trumpet*

Steven H. Cohen (BM Oberlin)

*Associate Professor of Clarinet and Coordinator of Wind and Percussion Instruments Program*

Peter Ellefson (DM Indiana)

*Lecturer in Trombone*

Charles Geyer (MM Northwestern)

*Professor of Trumpet and Cochair of Music Performance*

Richard Graef (MM Indiana)

*Adjunct Associate Professor of Flute*

Leslie A. Grimm (MM Northwestern)

*Senior Lecturer in Clarinet and Chamber Music*

Frederick L. Hemke (AMusD Wisconsin)

*Louis and Elsie Snyder Eckstein Professor of Music and Saxophone*

John Henes (Cert Society of Teachers of Alexander Technique)

*Lecturer in Alexander Technique*

Michael Henoch (MM Northwestern)

*Lecturer in Oboe*

Scott Hostetler (BM Cleveland Institute)

*Lecturer in Oboe*

Lewis Kirk (BM Manhattan)

*Lecturer in Bassoon*

Walfrid Kujala (MM Eastman)

*Adjunct Professor of Flute*

Christopher Martin (BM Eastman)

*Lecturer in Trumpet and Chamber Music*

Rex Martin (MM Northwestern)

*Professor of Tuba and Euphonium*

Christopher Millard

*Lecturer in Bassoon*

Robert Morgan (Cert Indiana)

*Lecturer in Wind Chamber Music*

Michael J. Mulcahy (ASCM New South Wales)

*Senior Lecturer in Trombone*

James Ross (MM Northern Illinois)

*Lecturer in Percussion*

Grover Schiltz (BM Michigan)

*Lecturer in English Horn and Oboe*

Joel Spencer (MM Illinois)

*Lecturer in Percussion; also Jazz Studies*

Charles Vernon

*Lecturer in Bass Trombone*

Paul Vertico

*Lecturer in Percussion*

Gail Williams (MM Northwestern)

*Professor of Horn and Charles Deering McCormick Professor of Teaching Excellence*

## Naval Science

James Otis, Captain USN (MS George Washington, MS Naval War College)

*Professor and Chair*

Graham M. Baldwin, Lieutenant USNR (BA USNA)

*Assistant Professor*

Michael G. Charnota, Lieutenant USNR (BA

Northwestern)

*Assistant Professor*

Gregory T. Cissell, Lieutenant USNR (BS Marquette)

*Assistant Professor*

Norah J. Kommnick, Captain USMC (BS IIT)

*Assistant Professor*

Ted S Kopinski, Lieutenant USNR (BA USMMA)

*Assistant Professor*

W. Michael Tooker, Commander USN (MS Naval Postgraduate School)

*Associate Professor*

# Index

- Academic advising, 30
  - Arts and Sciences, Weinberg College of, 44, 45, 48
  - Communication, School of, 154
  - Education and Social Policy, School of, 176
  - Engineering and Applied Science, McCormick School of, 191
  - Journalism, Medill School of, 228
  - Music, School of, 233, 234
- Academic integrity, 28
  - Communication, School of, student conduct in courses, 154
  - Medill Integrity Code, 227
- Academic options (general), 30
  - see also* individual schools
- Academic policies
  - Arts and Sciences, Weinberg College of, 44
  - Communication, School of, 153
  - Education and Social Policy, School of, 175
  - Engineering and Applied Science, McCormick School of, 187
  - Journalism, Medill School of, 226
  - Music, School of, 232
  - see also* individual departments and programs
- Academic regulations (general), 24
  - see also* individual schools, Academic policies
- Academic standing, 29
- Accelerated master's programs, 31
  - chemistry, 71
  - economics, 85
  - earth and planetary sciences, 82
  - French, 94
  - journalism, 32, 227
  - linguistics, 115
  - sociology, 144
  - statistics, 151
- Accreditation, 7, 8, 187
- ACT: *see* American College Test
- Adding courses, 25
- Addresses, inside back cover
- Adjunct majors, 36, 44, 46, 155, 227, 228
  - Animate arts, 36, 55, 155
  - Asian and Middle East studies, 65
  - Gender studies, 46, 98
  - Geography, 46
  - International studies, 46, 111, 177
  - Legal studies, 46, 114
  - Mathematical Methods in the Social Sciences Program (MMSS), 32, 46
  - Science in human culture, 46, 140
- Administration
  - Northwestern University, *list*, 249
  - see also* individual schools
- Admission procedure, 18
  - adult students, 20
  - advanced placement, 18
  - application: *see* Application for admission
  - auditors, 20
  - evening students, 20
  - foreign students, 20
  - for more information, inside back cover
  - general requirements, 18
  - notification, 18
  - number of units required, 17
  - readmission, 26
  - special students, 20
  - subject requirements, 17
  - tests, 17, 18, 20
  - transfer candidates, 18
- Adult students, 8, 20
  - see also* Returning adult students
- Advanced placement (AP), 18, 24
  - Arts and Sciences, Weinberg College of, 45, 46, 71, 106, 120, 128
  - Engineering and Applied Science, McCormick School of, 188, 191
  - honors programs, 30, 31, 32
  - Undergraduate Residence Requirement, 24
  - see also* individual departments and programs
- Aerospace studies, 42
- African American Student Affairs, 12
- African American studies, 49
  - faculty, *list*, 251
- African and Asian Languages, Program of (PAAL), 52
  - faculty, *list*, 252
- African Studies, Program of (PAS), 9, 52, 54, 130
- Air Force Reserve Officers Training Corps (AFROTC), 42
- Alice S. Millar Chapel and Religious Center, 14
- American College Test (ACT)
  - admission procedure, 18
  - admission requirements, 17
  - testing deadlines, 19
  - transfer candidates, 20
- American literature: *see* English
- American studies, 54

- Animate arts, 36, 55, 155
- Anthropology, 55  
     faculty, *list*, 252  
     field study, 59
- AP: *see* Advanced placement
- Application for admission  
     deadlines, 19  
     downloading from web, 18  
     fee, 22  
     submitting, 18
- Application for degree  
     deadlines, 4
- Application for financial aid: *see* Financial aid
- Applied mathematics, 194  
     *see also* Engineering Sciences and Applied Mathematics
- Arabic, 52, 53, 65
- Argumentation and advocacy concentration, 161
- Army Reserve Officers Training Corps (AROTC), 42
- Art history, 60  
     faculty, *list*, 252
- Arts administration minor (Music, School of), 235
- Arts and Sciences, Weinberg College of, 7, 44  
     academic options, 48  
     academic policies, 44  
     administration, *list*, 250  
     admission requirements, 17  
     combined bachelor's programs, 48  
     degree application, 4, 26  
     degree requirements, 44  
     faculty, *list*, 250  
     honors programs, 33, 47  
         *see also* individual departments and programs  
     master's degrees: *see* Accelerated master's programs  
     music studies concentration, 48  
     teaching certification, 33, 48  
         *see also* individual departments and programs  
     tuition and fees, 22  
     *see also* individual departments and programs
- Art theory and practice, 63  
     faculty, *list*, 253
- Asian American studies, 64
- Asian and Middle East studies, 65
- Asian/Asian American Student Affairs, 12
- Astronomy: *see* Physics and astronomy
- Audiology and hearing sciences concentration, 153, 156, 157
- Audition (Music, School of), 39  
     admission requirements, 17, 234, 235, 237, 244  
     music organizations, 235, 236, 237, 244  
     second undergraduate degree candidates, 234  
     transfer candidates, 20
- Auditors, 20  
     admission, 20  
     classification of students, 26  
     fee, 22
- BA: *see* Bachelor of arts
- BA/BMus degree, 22, 45, 233
- BA/BS degree, 32, 190
- Bachelor of arts (BA) degree, 44  
     *see also* individual Weinberg College departments and programs
- Bachelor of arts in communication (BACmn) degree, 153  
     curriculum requirements, 154
- Bachelor of arts in music (BAMus) degree, 190, 232
- Bachelor of music (BMus) degree, 32, 45, 48, 190, 232, 233  
     *see also* individual School of Music departments and programs
- Bachelor of philosophy (BPh) degree, 7
- Bachelor of philosophy in communication (BPhC) degree, 7
- Bachelor of science in communication (BSCmn) degree, 153  
     curriculum requirements, 153
- Bachelor of science (BS) degree (in engineering and applied science), 187, 189, 190, 191, 192, 200  
     curriculum requirements, 192
- Bachelor of science in education and social policy (BSESP) degree, 177  
     curriculum requirements, 178
- Bachelor of science in journalism (BSJ) degree, 226  
     curriculum requirements, 228
- BA/MA degree, 31, 48  
     economics, 85  
     French, 94  
     linguistics, 115  
     sociology, 144
- BA/MS degree, 31, 48  
     chemistry, 71  
     earth and planetary sciences, 82  
     statistics, 151
- BAMus: *see* Bachelor of arts in music
- BAMus/MSJ and BMus/MSJ degrees, 32, 233
- Bills and payments, 22
- Biochemistry, molecular biology, and cell biology, 66  
     faculty, *list*, 253
- Biological sciences, 66  
     faculty, *list*, 254
- Biomedical engineering, 201  
     curriculum, 194  
     faculty, *list*, 273
- Biotechnology and biochemical engineering, 190
- BMus: *see* Bachelor of music
- BPh: *see* Bachelor of philosophy
- BPhC: *see* Bachelor of philosophy in communication
- British General Certificate of Education (A-Level) Examinations, 18
- BS: *see* Bachelor of science
- BS/BAMus degree, 190, 233
- BS/BMus degree, 190, 233
- BSESP: *see* Bachelor of science in education and social policy

- BSJ: *see* Bachelor of science in journalism
- BS/MD degree: *see* Honors Program in Medical Education (HPME)
- BS/MS degree, 31, 190
- BS/MSJ degree: *see* Honors Program in Engineering and Journalism
- Business administration: *see* Management, Kellogg Graduate School of
- Business enterprise certificate (Engineering and Applied Science, McCormick School of), 190, 217
- Business German
- examinations, 102
  - minor, 102
- Business institutions, 69, 177
- CAESAR (students' academic portal), inside front cover, 11, 21, 25, 27, 35
- Calendar, academic (2007–08), 4
- Cancellation of registration, 25
- CAPS: *see* Counseling and Psychological Services Center
- Career counseling: *see* University Career Services
- CEEB: *see* Advanced placement
- Centers, University research, 9, 189
- Center for Student Involvement, 13
- Central and Southeast European studies, 141
- Certificate programs
- biotechnology and biochemical engineering, 190
  - business enterprise (for engineers), 190
  - engineering design, 190
  - financial economics, 37, 38
  - managerial analytics, 37, 38
  - music theatre, 38, 155
  - performance (graduate), 235
  - School of Continuing Studies, 8, 20
  - service learning, 38, 177
  - sound design, 39, 155
  - undergraduate leadership, 40, 152, 155, 177
- Chapel: *see* Alice S. Millar Chapel and Religious Center
- Chaplains (University), 14
- Cheating: *see* Academic integrity, Medill Honor Pledge
- Chemical and biological engineering, 203
- curriculum, 195
  - faculty, *list*, 274
- Chemistry, 70
- faculty, *list*, 254
- Chicago campus, 8
- libraries, 9
- Chicago Field Studies, 42, 73
- Chinese, 52
- Civil and environmental engineering, 206
- civil engineering curriculum, 195
  - environmental engineering curriculum, 198
  - faculty, *list*, 274
- Class attendance, absence, 27
- Communication, School of, 154
  - Music, School of, 234
- Classics, 73
- faculty, *list*, 255
- Classification of students, 26
- Class schedule, online, 11, 24, 27, 29, 35
- Clinical experiences (teaching requirements), 182
- Cognitive science, 76
- College Entrance Examination Board (CEEB): *see* Advanced placement
- College-industry schedule (engineering), 188
- College Preparation Program
- for more information, inside back cover
- College Scholarship Service
- Financial Aid Profile, 19, 21
- Combined degree programs, 32
- see also* BA/BMus degree, BA/BS degree, BA/MA degree, BA/MS degree, BS/BAMus degree, BS/BMus degree, BS/MS degree, Honors programs in McCormick School of Engineering and Applied Science
- Combined studies program (Engineering and Applied Science, McCormick School of), 200
- Commercial music minor, 235
- Communication industries and technologies concentration, 160
- Communication, School of, 7, 153
- academic options, 154
  - academic policies, 153
  - administration, *list*, 268
  - admission requirements, 17
  - degree application, 4, 26
  - degree requirements, 153
  - faculty, *list*, 268
  - student conduct in courses, 154
  - tuition and fees, 22
  - see also* individual departments
- Communication sciences and disorders, 156
- faculty, *list*, 268
- Communication studies, 160
- faculty, *list*, 269
- Comparative literary studies, 77
- Computer engineering, 211
- curriculum, 196
  - see also* Electrical engineering and computer science
- Computer science, 211
- curriculum, 196
  - see also* Electrical engineering and computer science
- Computing
- information technology services, 10
  - personal computers, 188
- Computing and information systems, 79
- Conducting and ensembles, 244
- faculty, *list*, 281

- Continuing education: *see* Continuing Studies, School of
- Continuing Studies, School of, 7, 8, 10, 20, 25, 47
- credit requirements (Arts and Sciences, Weinberg College of), 47
  - for more information, inside back cover
  - registration, 25
- Cooperative Engineering Education Program, Walter P. Murphy, 188
- Counseling
- see* Counseling and Psychological Services, University
  - Career Services, Women's Center, individual schools
- Counseling and Psychological Services (CAPS), 11
- Course listings
- see* individual departments and programs
- Course numbers, key to, 35
- Credits, academic
- military studies, 41
  - quarter system, 6, 32, 35
  - regulations, 24, 25
  - returning adult students, 20
  - School of Continuing Studies courses, 47
  - special students, 20
  - transfer students, 18, 20, 21, 24
  - Undergraduate Residence Requirement, 23
  - work at other institutions, 24
  - see also* Advanced placement
- Critical theory, 81
- Cross-school programs, 33, 36
- see also* Combined degree programs, Interdisciplinary certificate programs, Interdisciplinary degree programs, Interschool programs
- Dance
- major, 169, 172
  - minor, 155
- Degree application
- academic regulations, 24
  - filing dates, 4
- Degree requirements: *see* Undergraduate Residence Requirement, individual schools and programs
- Demographics, student, 6
- Departmental honors programs: *see* individual departments and programs
- Disabilities, services for students with, 14
- Dishonesty (academic): *see* Academic integrity, Medill Honor Pledge
- Dismissal (academic), 29
- financial aid, 22
- Dismissal (disciplinary), 30
- Distribution requirements
- Arts and Sciences, Weinberg College of, 45
  - Communication, School of, 154
  - Education and Social Policy, School of, 178, 180
  - Engineering and Applied Science, McCormick School of, 192
  - Journalism, Medill School of, 228
  - Music, School of, 233
- Dormitories: *see* Residence halls
- Double major, 34
- see also* individual schools
- Drama, 81
- Dropping courses, 25
- Duplication of courses, 25
- Earth and planetary sciences, 81
- faculty, *list*, 255
- Economics, 84
- faculty, *list*, 256
- Education and Social Policy, School of, 8, 175
- academic options, 177
  - academic policies, 175
  - academic programs, 177
  - administration, *list*, 271
  - admission requirements, 17
  - course descriptions, 183
  - degree application, 4, 26
  - degree requirements, 177
  - faculty, *list*, 271
  - tuition and fees, 22
  - see also* individual programs
- Electrical engineering and computer science, 210
- computer engineering curriculum, 196
  - computer science curriculum, 196
  - electrical engineering curriculum, 197
  - faculty, *list*, 275
- Electrical engineering
- curriculum, 197
  - see also* Electrical engineering and computer science
- Electronic billing and payment, 22
- E-mail, 27
- Engineering and Applied Science, McCormick School of, 8, 187
- academic options, 188
  - academic policies, 187
  - administration, *list*, 273
  - admission requirements, 17
  - combined degree programs, 32, 190
  - combined studies program, 200
  - degree application, 4, 26
  - degree requirements, 187
  - faculty, *list*, 273
  - laboratories, 189, 204, 206, 212, 217, 220, 223
  - multiple degrees, 189
  - student resources, 191
  - tuition and fees, 22
  - see also* individual departments and programs
- Engineering sciences and applied mathematics, 216
- applied mathematics curriculum, 194
  - faculty, *list*, 276

- Engineering design, certificate in, 190, 209
  - see also* Institute for Design Engineering and Applications (IDEA)
- English, 87
  - faculty, *list*, 257
- Enrollment requirement: *see* Undergraduate Residence Requirement
- Environmental engineering, 217
  - curriculum, 198
  - see also* Civil and environmental engineering
- Environmental policy and culture, 91
- Environmental science, engineering, and policy, 36
- Environmental sciences, 92
- European studies, 93
- Evanston campus, 7
- Evening programs
  - Managers' Program (Management, Kellogg Graduate School of), 10, inside back cover
  - School of Continuing Studies, 8, 20, inside back cover
- Evolutionary processes minor, 57
- Examinations
  - dates, 4
  - makeup, 29
  - regular, 29
- Excess courses
  - tuition, 25
  - Undergraduate Residence Requirement, 24
- Exchange programs: *see* Study abroad
- Fabrication: *see* Academic integrity, Medill Integrity Code
- Faculty
  - lists*, 250
- FAFSA: *see* Free Application for Federal Student Aid
- Fees, 22
- Feinberg School of Medicine, 8
- Field study, 42, 177
  - see also* Chicago Field Studies, individual programs
- Film: *see* Radio/television/film
- Film and media studies (Weinberg), 93
- Financial aid, 21
  - application filing dates, 4, 15, 19
  - application procedure, 21
  - quarters of eligibility, 21
  - satisfactory academic progress, 21
  - staff, *list*, 249
  - study abroad, 34
- Financial economics, 37
- Financial Aid Profile: *see* College Scholarship Service
- Financial regulations, 22
  - bills and payments, 22
  - change of registration, 23
  - electronic billing and payment, 22
  - installment payment plan, 23
  - late payment fees, 22
  - overdue bills, 22
  - service and other fees, 22
- Undergraduate Residence Requirement, 23
- undergraduate tuition, 22
- undergraduate tuition: exceptions, 22
- withdrawal from University, 23
- Fitness and recreation, 15
- Food service, 13
- Foreign language
  - proficiency requirement (Weinberg), 45
  - Global and diverse cultures requirement (Medill), 229
  - see also* individual languages
- Foreign students
  - admission requirements, 20
- Foreign study: *see* Study abroad
- Free Application for Federal Student Aid (FAFSA), 21
- French: *see* French and Italian
- French and Italian, 94
  - faculty, *list*, 258
- Freshman
  - advanced placement, 18, 24
  - classification of, 26
- Freshman seminars, 45
  - see also* individual programs
- Full-time student
  - classification of, 26
  - medical requirements, 12
- Gender studies, 98
  - faculty, *list*, 258
- General studies
  - Arts and Sciences, Weinberg College of: General studies courses, 49
  - Communication, School of: Introductory and related courses, 156
  - Education and Social Policy, School of: Core courses, 178, 180
  - Engineering and Applied Science, McCormick School of: General engineering courses, 200
  - Journalism, Medill School of: Arts and sciences, 228
  - Music, School of: Interdepartmental courses, 238
- Geography, 100
- German, 101
  - faculty, *list*, 259
- Global and diverse cultures requirement (Medill), 229
- Global health studies, 105, 177
- Grade point average, 26
- Grade reports, 27
- Grade requirements
  - academic probation, 29
  - academic standing, 29
  - Arts and Sciences, Weinberg College of, 46
  - Communication, School of, 154
  - Education and Social Policy, School of, 175
  - Engineering and Applied Science, McCormick School of, 187
  - Journalism, Medill School of, 227
  - Music, School of, 232



- Grading policies, 26  
and makeup examinations, 29
- Graduate School, 8  
accelerated master's programs, 31  
for more information, inside back cover
- Graduate student  
classification of, 26
- Graduation rates, 7
- Grant assistance, 21
- Greek: *see* Classics
- Half-time student  
classification of, 26
- Health insurance, 12
- Health Service, 12
- Hearing sciences: *see* Audiology and hearing sciences
- Hebrew, 52, 53, 65
- Hindi, 52, 53, 65
- Hispanic/Latino Student Affairs, 12
- Hispanic studies: *see* Spanish and Portuguese
- History, 106  
faculty, *list*, 259
- History of Northwestern, 7
- Honorary organizations, 30
- Honors, academic, 30  
*see also* individual schools, departments, and programs
- Honors Program in Medical Education (HPME), 8, 17, 19, 30, 33  
and Arts and Sciences, Weinberg College of, 48, 67, 71  
and Communication Sciences and Disorders (Communication, School of), 157  
and Engineering and Applied Science, McCormick School of, 191  
required tests for admission, 17
- Honors programs  
in Arts and Sciences, Weinberg College of, 47  
in Education and Social Policy, School of, 176  
in Engineering and Applied Science, McCormick School of, 32  
Engineering and Journalism, 33, 191  
Engineering and Law, 33, 191  
Undergraduate Research, 33, 191
- Honors programs, departmental: *see* individual departments and programs
- Housing contracts, 23  
deposit fee, 22  
refund policy, 23
- HPME: *see* Honors Program in Medical Education
- Human communication science minor, 154
- Human development and psychological services, 178, 179  
courses, 184
- Humanities, 109  
Kaplan Institute for the, 109
- IDEA: *see* Institute for Design Engineering and Applications
- Identification card (WildCARD), 16  
replacement fee, 22
- Independent study, 34  
Arts and Sciences, Weinberg College of, 47  
*see also* individual departments and programs
- Industrial engineering  
curriculum, 198  
*see also* Industrial engineering and management sciences
- Industrial engineering and management sciences, 217  
faculty, *list*, 277
- Information technology: *see* Northwestern University  
Information Technology division
- Institute for Design Engineering and Applications (IDEA), 190, 209
- Institutional divisions (Northwestern University), 7
- Integrated Marketing Communications Program (IMC)  
graduate program, 8, 226  
faculty, *list*, 280
- Integrated Science Program (ISP), 31, 33, 110  
and biological sciences, 67  
and chemistry, 71  
and computing and information systems, 80  
and earth and planetary sciences, 83  
and environmental sciences, 92  
and materials science, 118  
and mathematics, 120  
and physics, 128  
and psychology, 135  
required tests for admission, 17
- Interdepartmental studies (Communication, School of), 165
- Interdisciplinary certificate programs: *see* Certificate programs
- Interdisciplinary degree programs: *see* Combined degree programs, Cross-school programs
- International Baccalaureate examinations, 18, 46  
and Undergraduate Residence Requirement, 24
- International Office, 14
- International studies, 46, 52, 105, 111, 115, 177, 180, 228, 229
- Internships (field study), 42  
Education and Social Policy (practicums), 176, 177, 178, 179, 181, 182, 184, 185  
Journalism, Medill School of, 226, 227, 229, 231  
*see also* Field Study, Chicago Field Studies, individual departments
- Interschool programs, 36  
*see also* Animate arts; Environmental science, engineering, and policy; Film and media studies; Financial economics; International studies; Legal studies; Managerial analytics; Materials science; Military programs; Music theatre; Service learning certificate; Sound design; Transportation and logistics; Undergraduate Leadership Program; Center for the Writing Arts

- Interschool transfer, 25  
 Intramural sports, 15  
 ISP: *see* Integrated Science Program  
 Italian: *see* French and Italian
- Japanese, 52, 53, 65  
 Jazz studies, 244  
   faculty, *list*, 281  
   minor, 235  
 Jewish studies, 112  
 Journalism, Medill School of, 8, 226  
   academic options, 227  
   academic policies, 226  
   accelerated master's program, 32, 227  
   administration, *list*, 279  
   admission requirements, 17  
   combined degree programs, 32, 191, 233  
   courses, 230  
   degree application, 4, 26  
   degree requirements, 226  
   faculty, *list*, 279  
   Journalism Residency, 43, 226, 227, 229, 231  
   Medill Integrity Code, 227  
   student resources, 228  
   tuition and fees, 22  
 Junior  
   classification of, 26  
 Junior research seminars, 47
- Kaplan Humanities Scholars Program, 110  
 Kaplan Institute for the Humanities: *see* Humanities,  
   Kaplan Institute for the  
 Kellogg School of Management: *see* Management,  
   J. L. Kellogg School of  
 Korean, 52, 53, 65
- Language pathology: *see* Speech and language pathology  
 Languages: *see* individual languages  
 Late registration, 24  
   dates, 4, 5  
   fee, 22  
 Latin: *see* Classics  
 Latin American and Caribbean studies, 113  
 Law, School of, 8  
   for more information, inside back cover  
   Honors Program in Engineering and Law, 33, 191  
   JD/PhD degree, 8  
 Learning disabilities concentration, 157, 159  
 Learning and organizational change, 178, 179  
   courses, 184  
 Legal studies, 46, 114, 177, 227, 229  
 Libraries, 9  
 Linguistics, 115  
   faculty, *list*, 260
- Majors  
   double, 33  
   self-designed, 33  
   *see also* academic options in individual schools;  
     individual departments and programs  
 Makeup examinations, 29  
 Management, J. L. Kellogg School of, 7  
   for more information, inside back cover  
   Interschool undergraduate certificates, 37  
 Management sciences: *see* Industrial engineering and  
   management sciences  
 Managerial analytics, 37, 38  
 Manufacturing and design engineering, 209  
   curriculum, 199  
   *see also* Institute for Design Engineering and  
     Applications (IDEA)  
 Marine Corps: *see* Military studies  
 Master's degrees  
   accelerated master's degree programs, 31  
   Graduate School, 8  
   for more information, inside back cover  
   *see also* BA/MA degree, BA/MS degree, BS/MS degree,  
     BAMus/MSJ, BMus/MSJ, Honors Program  
     in Engineering and Journalism  
 Materials science and engineering, 219  
   curriculum, 199  
   faculty, *list*, 277  
 Materials science (Weinberg), 117  
 Mathematical Experience for Northwestern  
   Undergraduates Program (MENU), 119  
 Mathematical Methods in the Social Sciences Program  
   (MMSS), 32, 118  
 Mathematics, 119  
   faculty, *list*, 260  
 McCormick School of Engineering and Applied Science:  
   *see* Engineering and Applied Science, McCormick  
   School of  
 Meal contracts, 13, 23  
 Mechanical engineering, 222  
   curriculum, 200  
   faculty, *list*, 278  
 Media and politics concentration, 161  
 Medical education: *see* Honors Program in Medical  
   Education (HPME)  
 Medical school: *see* Feinberg School of Medicine  
   for more information, inside back cover  
 Medill School of Journalism: *see* Journalism, Medill  
   School of  
 MENU: *see* Mathematical Experience for Northwestern  
   Undergraduates  
 Middle East studies: *see* Asian and Middle East studies  
 Military programs, 41  
   *see also* Aerospace studies, Military science, Naval  
   science  
 Military science, 42

- Millar Chapel: *see* Alice S. Millar Chapel and Religious Center
- Minors
- arts administration, 235
  - Arts and Sciences, Weinberg College of, 48
  - commercial music, 235
  - dance, 155
  - evolutionary processes, 57
  - human communication science, 154
  - jazz studies, 235
  - music cognition, 235
  - music composition, 235
  - music criticism, 235
  - musicology, 235
  - music technology, 235
  - music theory, 235
  - theatre, 155
  - transportation and logistics, 37
  - see also* individual departments and programs
- Motor vehicles, 15
- Music, School of, 7, 232
- academic options, 234
  - academic policies, 232
  - administration, *list*, 280
  - admission requirements, 17
  - audition, 17, 18
  - combined degrees, 32, 48, 190, 233
  - degree application, 4, 26
  - degree requirements, 233
  - faculty, *list*, 280
  - music for nonmajors, 237
  - organizations, 236
  - resources, 236
  - transfer students, 20
  - tuition and fees, 22
  - see also* individual departments and programs
- Musical organizations, 236
- Music cognition, 243
- major, 243
  - minor, 235
  - see also* Music theory and cognition
- Music composition, 239
- faculty, *list*, 280
  - major, 239
  - minor, 235
- Music criticism minor, 235
- Music education, 240
- faculty, *list*, 281
- Music instruction: *see* Performance instruction
- Musicology, 241
- faculty, *list*, 281
  - minor, 235
- Music performance, 234
- faculty, *list*, 281
- Music studies, 239
- faculty, *list*, 280
- Music technology, 235
- faculty, *list*, 281
  - minor, 235
- Music theatre, 38
- School of Communication, 155
  - School of Music, 235
- Music theory, 243
- major, 243
  - minor, 235
  - see also* Music theory and cognition
- Music theory and cognition, 243
- faculty, *list*, 281
- National High School Institute
- for more information, inside back cover
  - School of Communication, 153
- Naval Reserve Officers Training Corps (NROTC)
- see* Naval Science
- Naval science, 41
- faculty, *list*, 283
- Neurobiology and physiology, 124
- faculty, *list*, 261
- Norris University Center, 12
- Norris Information Desk, 13
  - organizations and activities, 13
- Northwestern University
- administration, *list*, 249
  - graduation rates, 7
  - history, 7
  - student demographics, 6
  - undergraduate mission, 6
- Northwestern University Information Technology division (NUIT), 10
- Notification (admission), 18, 19
- NROTC: *see* Naval Reserve Officers Training Corps
- Numbering system (courses), 35
- Off-campus programs, 42
- see also* Internships, Study abroad
- Opera: *see* Voice and opera
- Organizational communication concentration, 160
- Organizations and activities: *see* Norris University Center
- PAAL: *see* African and Asian Languages, Program of
- Part-time student
- classification of, 26
  - tuition, 22
- PAS: *see* African Studies, Program of
- Pass/no credit (P/N) option, 33
- Arts and Sciences, Weinberg College of, 46
  - Engineering and Applied Science, McCormick School of, 188
  - Journalism, Medill School of, 227
  - Music, School of, 234
  - registration change, 25
  - see also* individual departments and programs

- Payments: *see* Bills and payments  
 Percussion: *see* Wind and percussion instruments  
 Performance instruction (Music, School of), 234  
 Performance studies, 165  
     faculty, *list*, 270  
 Persian, 52, 53, 65  
 Personal property liability, 16  
 Philosophy, 124  
     faculty, *list*, 262  
 Physics and astronomy, 127  
     faculty, *list*, 262  
 Piano, 245  
     faculty, *list*, 281  
 Plagiarism: *see* Academic integrity, Medill Honor Pledge  
 P/N option: *see* Pass/no credit option  
 Police: *see* University Police Department  
 Political science, 130  
     faculty, *list*, 263  
 Portuguese: *see* Spanish and Portuguese  
 Premedical track  
     Communication sciences and disorders, 156  
     Engineering and Applied Science, School of, 210  
     Arts and Sciences, Weinberg College of, 67  
     *see also* Honors Program in Medical Education  
 Preprofessional study  
     Arts and Sciences, Weinberg College of, 48  
     Education and Social Policy, School of, 178  
 Probation (academic), 29  
     academic standing, 29  
     Education and Social Policy, School of, 176  
     Journalism, Medill School of, 227  
 Professional linkage seminars, 47  
 Psychological services: *see* Counseling and Psychological  
     Services Center; Human development and  
     psychological services concentration  
 Psychology, 135  
     faculty, *list*, 264  
  
 Quarter system  
     and course credits, 35  
 QuikPAY (electronic payment), 22  
  
 Radio: *see* Radio/television/film  
 Radio/television/film, 166  
     faculty, *list*, 270  
 Readmission application, 26  
 Recreational sports, 15  
 Refunds  
     withdrawal from University, 23  
 Registration  
     academic regulations, 24  
     cancellations of, 25  
     changes of, 25  
     dates, 4  
     *see also* individual schools  
 Relational communication concentration, 161  
  
 Religion, 137  
     faculty, *list*, 265  
 Religious Center: *see* Alice S. Millar Chapel and  
     Religious Center  
 Religious services, 14  
 Reserve Officers Training Corps (ROTC)  
     financial aid, 21  
     Journalism, Medill School of, 227  
     *see also* Military studies  
 Residence contracts, 23  
 Residence halls, 13  
 Residence requirement, 23  
     BA degree, 46  
     study abroad, 24  
 Residential College tutorials, 34  
 Returning adult students, 20  
     School of Continuing Studies, 8, 20  
 Returning students  
     financial aid, 21  
     Undergraduate Residence Requirement, 24  
 Rhetoric, media, and public culture concentration, 160  
 ROTC: *see* Reserve Officers Training Corps  
 Russian: *see* Slavic languages and literatures  
  
 SAT: *see* Scholastic Assessment Tests  
 Satisfactory academic progress, 21  
 Scholarship programs  
     naval science, 41  
     *see also* Financial aid  
 Scholastic Assessment Tests (SAT)  
     admission procedure, 18  
     admission requirements, 17  
     test deadlines, 19  
     transfer candidates, 20  
 Scholastic standing  
     grading policies, 26  
 School of Communication: *see* Communication, School of  
 School of Continuing Studies: *see* Continuing Studies,  
     School of  
 School of Education and Social Policy: *see* Education and  
     Social Policy, School of  
 School of Music: *see* Music, School of  
 Science in human culture, 140  
 Searle Hall: *see* Health Service  
 Secondary teaching, 180  
     courses, 185  
     *see also* Teaching certification  
 Self-designed major, 34  
 Senior  
     classification of, 26  
 Service fees, 22  
 Service learning certificate, 39, 177  
 Slavic languages and literatures, 140  
     faculty, *list*, 266  
 Social policy, 180  
     courses, 183

- Sociology, 144  
     faculty, *list*, 266
- Sophomore  
     classification of, 26
- SOS: *see* Student-organized seminars
- Sound design, 39, 155
- Spanish: *see* Spanish and Portuguese
- Spanish and Portuguese, 147  
     faculty, *list*, 266
- Special students  
     admission requirements, 17  
     classification of, 26  
     tuition, 22
- Speech and language pathology concentration, 157
- Sports  
     classes, 15  
     clubs, 15  
     intramural, 15  
     recreational, 15
- Statistics, 150  
     faculty, *list*, 267
- String instruments, 245  
     faculty, *list*, 282
- Student Accounts, Office of, 22, 23
- Student Affairs Office, 13
- Student Affairs, Office of Vice President for, 11  
     staff, *list*, 249
- Student center: *see* Norris University Center
- Student counseling: *see* Counseling and Psychological Services, University Career Services
- Student employment: *see* Northwestern University Student Employment Center, Placement Center
- Student health service: *see* Health Service
- Student Hospitalization Plan  
     fees, 22
- Student-organized seminars (SOS), 34, 49, 176, 184
- Student records, access to, 27
- Student services, 11  
     African American Student Affairs, 12  
     Asian/Asian American Student Affairs, 12  
     Counseling and Psychological Services Center, 11  
     disability services, 14  
     fitness and recreation, 15  
     Health Service, 12  
     Hispanic/Latino Student Affairs, 12  
     Multicultural Center, 12  
     Multicultural Student Affairs, 12  
     Norris University Center, 12  
     International Office, 14  
     organizations, 13  
     religious services, 14  
     residence halls and food services, 13  
     University Career Services, 14  
     University Police Department, 15  
     Women's Center, 15
- Student teaching  
     Education and Social Policy, School of, 182  
     Music education, 240
- Study abroad, 34  
     Arts and Sciences, Weinberg College of, 49  
     Education and Social Policy, School of, 177  
     fees, 22  
     residence requirement, 24  
     *see also* individual departments and programs
- Subject requirements  
     admission, 17
- Summer Session, 8  
     for more information, inside back cover
- Summer study  
     anthropology field study, 59  
     naval science, 41  
     study abroad, 34
- Suspension: *see* Dismissal
- Swahili, 52, 54
- Teacher education: *see* Secondary teaching concentration, Teacher preparation program
- Teacher preparation program, 182
- Teaching: *see* Secondary teaching concentration; Teaching certification
- Teaching certification  
     Arts and Sciences, Weinberg College of, 34, 48  
     Communication, School of, 154  
     Education and Social Policy, School of, 180  
     Music, School of, 240
- Television: *see* Radio/television/film
- Testing  
     admission, 17  
     application deadlines, 19  
     career, 14  
     graduate and professional schools, 14  
     *see also* Examinations
- Test of English as a Foreign Language (TOEFL), 20
- Theatre, 169  
     faculty, *list*, 270  
     minor, 155
- TOEFL: *see* Test of English as a Foreign Language
- Transcripts, 27  
     courses taken elsewhere, 26  
     fee, 22  
     financial obligations, 23  
     readmission requirements, 24, 26  
     requests, 27
- Transfer students  
     admission procedures, 18  
     application and testing deadlines, 19  
     audition (music), 20  
     financial assistance, 21  
     interschool requirements, 25  
     Undergraduate Residence Requirement, 24
- Transportation and logistics, 37

- Tuition
  - amounts, 22
  - dates due, 4
  - deposit fee, 22
  - installment payment plan, 25
  - QuikPAY, 22
  - refund policy, 23
- Turkish, 52
- Tutorial program (Engineering and Applied Science, McCormick School of), 191
- Undergraduate Admission, Office of
  - for more information, inside back cover
  - staff, *list*, 250
- Undergraduate Leadership Program, 40
  - Arts and Sciences, Weinberg College of, 48, 109, 152
  - Communication, School of, 155
  - Education and Social Policy, School of, 177
  - Engineering and Applied Science, McCormick School of, 217
  - Journalism, Medill School of, 227
- Undergraduate research
  - Education and Social Policy, School of, 176
  - Engineering and Applied Science, McCormick School of, 189, 191
  - see also* individual departments and programs
- Undergraduate Residence Requirement (URR), 23
  - returning students, 24
  - transfer students, 24
- Undergraduate seminar
  - Arts and Sciences, Weinberg College of, 47
- Undergraduate study
  - for more information, inside back cover
  - see also* individual departments and programs
- University Career Services, 14
- University Enrollment, Office of Associate Provost of
  - staff, *list*, 249
- University Library, 9
  - administration, *list*, 250
- University Police Department, 15
- URR: *see* Undergraduate Residence Requirement
- Voice and opera, 247
  - faculty, *list*, 282
- Weinberg College of Arts and Sciences: *see* Arts and Sciences, Weinberg College of
- WildCARD: *see* Identification cards
- Wind and percussion instruments, 247
  - faculty, *list*, 282
- Withdrawal
  - academic regulations, 25
  - refund policy, 23
- Women's Center, 15
- Women's studies: *see* Gender studies
- Writing, English major in, 88
  - Writing Arts, Center for the, 33, 40, 48
    - Arts and Sciences, Weinberg College of, 48
    - Journalism, Medill School of, 227
  - Writing proficiency requirement, 45
  - Writing Program, 152
    - faculty, *list*, 267

## For More Information

### **Undergraduate Study**

*Full-time, freshmen and transfers*

Office of Undergraduate Admission  
Northwestern University  
Evanston, Illinois 60208-1260  
847-491-7271  
[www.ugadm.northwestern.edu](http://www.ugadm.northwestern.edu)

### **Graduate Study**

Office of Admissions  
Graduate School  
Northwestern University  
Evanston, Illinois 60208-1113  
847-491-7271  
[www.tgs.northwestern.edu](http://www.tgs.northwestern.edu)

### **Graduate Management Study**

*Full-time, day*

Office of Admissions  
J. L. Kellogg School of Management  
Northwestern University  
Evanston, Illinois 60208-2003  
847-491-3308  
[www.kellogg.northwestern.edu/admissions](http://www.kellogg.northwestern.edu/admissions)

*Part-time, evening*

Office of Admissions  
Managers' Program  
J. L. Kellogg School of Management  
Northwestern University  
339 East Chicago Avenue  
Chicago, Illinois 60611-3008  
312-503-8385  
[www.kellogg.northwestern.edu/admissions](http://www.kellogg.northwestern.edu/admissions)

### **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](http://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.medschool.northwestern.edu](http://www.medschool.northwestern.edu)

### **Continuing Education**

*Part-time, evening and weekend*  
Office of the Dean  
School of Continuing Studies  
Northwestern University  
339 East Chicago Avenue  
Chicago, Illinois 60611-3008  
312-503-6950  
[www.scs.northwestern.edu](http://www.scs.northwestern.edu)

### **Summer Study**

Office of the Director  
Summer Session  
Northwestern University  
405 Church Street  
Evanston, Illinois 60208-4220  
847-491-5250  
[www.scs.northwestern.edu/summernu](http://www.scs.northwestern.edu/summernu)

### **Precollege Programs**

National High School Institute  
Northwestern University  
Evanston, Illinois 60208-4165  
847-491-3026  
[www.northwestern.edu/nhsi](http://www.northwestern.edu/nhsi)

College Preparation Program  
Northwestern University  
Evanston, Illinois 60208-2650  
847-491-5250  
[www.scs.northwestern.edu/collegeprep](http://www.scs.northwestern.edu/collegeprep)

## Northwestern on the Web

### **[www.northwestern.edu](http://www.northwestern.edu)**

The University's home page

### **[www.registrar.northwestern.edu/nucatalog](http://www.registrar.northwestern.edu/nucatalog)**

The latest version of the *Undergraduate Catalog*

### **[www.registrar.northwestern.edu](http://www.registrar.northwestern.edu)**

Information about services of the Office of the Registrar

### **[www.northwestern.edu/caesar](http://www.northwestern.edu/caesar)**

CAESAR, students' gateway to web-based registration and personal academic information

### **[www.northwestern.edu/studentaffairs](http://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](http://www.planitpurple.northwestern.edu)**

The University's online calendar of events

### **[www.ugadm.northwestern.edu](http://www.ugadm.northwestern.edu)**

The Office of Undergraduate Admission

### **[www.northwestern.edu/sfs](http://www.northwestern.edu/sfs)**

Student Financial Services, where students access their personal accounts along with general financial information

E-mail [webmaster@northwestern.edu](mailto: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, 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.

Harassment, whether verbal, physical, or visual, that is based on any of these characteristics is a form of discrimination. This includes harassing conduct affecting tangible job benefits, interfering unreasonably with an individual's academic or work performance, or creating what a reasonable person would sense is an intimidating, hostile, or offensive environment.

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.