

Northwestern

**Undergraduate Catalog
2018–19**

TABLE OF CONTENTS

Undergraduate	6	Bienen Minors	30
Privacy & Disclosures	9	Programs & Centers Minors	31
Admission	10	Transportation and Logistics Minor	31
Financial Aid	14	SoC Minors	32
Financial Aid Application	14	McCormick Minors	32
Financial Aid Eligibility	14	WCAS Minors	32
Tuition & Payment	16	Second Majors	33
Tuition Benefit	16	Bienen Second Majors	33
Withdrawal Refunds	16	WCAS Second Majors	33
Programs A-Z	18	Dual Graduate & Undergraduate Degrees	34
Requirements and Policies	21	Honors Program in Medical Education	34
Courses and Credit	21	Premedical Scholars Program	34
Enrollment	22	Dual Bachelor's Degrees	35
Exams and Attendance	22	Study Outside Northwestern	37
Withdrawal	22	Undergraduate Research	38
Grades	23	Special Programs & Courses	39
Graduation & Degrees	23	College Transition Programs	39
Graduation Honors	23	Innovation in News and Storytelling	39
Student Status	24	Military Programs	39
Academic Standing	24	Naval Science	39
Disciplinary Actions	25	Academic Calendar	41
Returning to the University	25	Academic Integrity	43
Transcripts	25	Academic Support	44
Transfer Credit	25	Henry and Leigh Bienen School of Music	45
Test Credit	25	Composition and Music Technology	47
Transfer Types	26	Composition Major	48
Undergraduate Registration Requirement	26	Composition Minor	49
Additional Baccalaureate Options	28	Music Technology Minor	49
Accelerated Bachelors	28	Conducting and Ensembles	49
Certificates	28	Jazz	49
Kellogg Certificates	28	Jazz Studies Major	50
Financial Economics Certificate	28	Music Cognition	50
Managerial Analytics Certificate	28	Music Core	51
McCormick Certificates	29	Music Education	52
Medill Certificates	29	Music Education Major	53
Programs & Centers Certificates	29	Music Education Minor	54
Leadership	29	Music Studies for Nonmajors	54
Sustainability and Energy	29	Music Technology	56
SESP Certificates	30	Music Theory and Cognition	56
Minors	30	Music Cognition Major	56
		Music Cognition Minor	57
		Music Theory Major	57

Music Theory Minor	57	Social Policy	112
Musicology	57	Social Policy Major	113
Musicology Major	59	Summer Field Studies Program	114
Musicology Minor	59	Civic Engagement Certificate	114
Piano	59	Robert R. McCormick School of Engineering and Applied Science	116
Piano Major	60	Applied Mathematics	120
String Instruments	61	Biomedical Engineering	121
String Instruments Major	62	Biomedical Engineering Degree	123
Voice and Opera	63	Chemical Engineering	124
Voice and Opera Major	64	Chemical Engineering Degree	126
Winds and Percussion Instruments	64	Biotechnology and Biochemical Engineering Minor	126
Winds and Percussion Instruments Major	65	Civil and Environmental Engineering	127
School of Communication	67	Civil Engineering Degree	134
Communication Sciences and Disorders	71	Environmental Engineering Degree	135
Human Communication Sciences Major	72	Environmental Engineering Minor	136
Human Communication Sciences Minor	73	Architectural Engineering and Design Certificate	136
Communication Studies	73	Computer Engineering	137
Communication Studies Major	77	Computer Science	137
Dance	78	Design Engineering	137
General Communication	78	Electrical Engineering and Computer Science	137
Human Communication Sciences	78	Computer Engineering Degree	144
Performance Studies	78	Computer Science Degree	145
Performance Studies Major	80	Electrical Engineering Degree	146
Performance Studies Minor	80	Computer Science Minor (McCormick School of Engineering)	148
Radio/Television/Film	81	Engineering Design	148
Film and Media Studies Minor	83	Engineering Sciences and Applied Mathematics	148
Radio/Television/Film Major	84	Applied Mathematics Degree	149
Sound Design Minor	84	Environmental Engineering	149
Theatre	85	Farley Center for Entrepreneurship	149
Dance Major	91	Entrepreneurship Minor	150
Dance Minor	92	General Engineering	150
Music Theatre Certificate	93	Industrial Engineering and Management Sciences	153
Theatre Major	94	Industrial Engineering Degree	155
Theatre Minor	95	Segal Design Institute	156
School of Education and Social Policy	97	Manufacturing and Design Engineering Degree	157
Human Development and Psychological Services	99	Segal Design Certificate	158
Human Development and Psychological Services Major	100	Materials Science and Engineering	158
Learning and Organizational Change	101	Materials Science and Engineering Degree	161
Learning and Organizational Change Major	102	Mechanical Engineering	162
Learning Sciences	103	Mechanical Engineering Degree	165
Learning Sciences Major	105		
Secondary Teaching	106		

Medill School of Journalism, Media, Integrated Marketing Communications	167	Chemistry Major	215
Integrated Marketing Communications	169	Chemistry Minor	217
Integrated Marketing Communications Certificate	170	Chemistry Second Major for ISP Students	217
Journalism	170	Chemistry BA/MS	218
Journalism Degree	173	Chicago Field Studies	218
Judd A. and Marjorie Weinberg College of Arts and Sciences	175	Chinese	219
African American Studies	180	Classics	219
African American Studies Major	182	Classics Major	221
African American Studies Minor	184	Classics Minor Concentrations	222
African Studies	185	Cognitive Science	222
African Studies Adjunct Major	186	Cognitive Science Major	223
African Studies Minor	186	Cognitive Science Minor	225
American Studies	186	Comparative Literary Studies	225
American Studies Major	187	Comparative Literary Studies Major	227
Anthropology	187	World Literature Minor	227
Anthropology Major	191	Comparative Literary Studies BA/MA	228
Anthropology Minor	193	Computer Science	228
Arabic	193	Computer Science Major	228
Art History	193	Computer Science Minor (Weinberg College)	230
Art History Major	196	Computer Science Second Major for ISP Students	230
Art History Minor	196	Critical Theory	231
Art Theory and Practice	196	Critical Theory Minor	231
Art Theory and Practice Major	197	Earth and Planetary Sciences	231
Asian American Studies	197	Earth and Planetary Sciences Major	233
Asian American Studies Major	199	Earth and Planetary Sciences Minor	235
Asian American Studies Minor	199	Earth and Planetary Sciences Second Major for ISP Students	235
Asian Languages and Cultures	199	Economics	235
Asian Languages and Cultures Major	204	Economics Major	238
Asian Humanities Minor	204	Economics Minor	239
Advanced Asian Languages Minor	205	Economics BA/MA	239
Asian Studies	205	English	239
Asian Studies Major	205	English and American Literature Major	243
Asian Studies Minor	206	Creative Writing Major	243
Astronomy	206	English and American Literature Minor	244
Biological Sciences	206	Creative Writing Sequence-Based Minor	244
Biological Sciences Major	209	Creative Writing Cross-Genre Minor	244
Biological Sciences Second Major for ISP Students	210	Environmental Policy and Culture	244
Business Institutions	210	Environmental Policy and Culture Minor	245
Business Institutions Minor	211	Environmental Sciences	245
Catholic Studies	212	Environmental Sciences Major	246
Chemistry	212	Environmental Sciences Second Major for ISP Students	248

Ethics and Civic Life	248	Hebrew Studies Minor	284
Brady Scholars Program	248	Jewish Studies Minor	284
First-Year Seminars	248	Korean	284
French and Italian	248	Latin	284
French Major	253	Latin American and Caribbean Studies	284
French Minor	255	Latin American and Caribbean Studies Minor	285
Italian Literature and Culture Major	255	Latina and Latino Studies	285
Italian Minor	256	Latina and Latino Studies Major	286
French BA/MA	256	Latina and Latino Studies Minor	287
Gender and Sexuality Studies	256	Legal Studies	287
Gender and Sexuality Studies Major	258	Legal Studies Major	288
Gender and Sexuality Studies Minor	258	Legal Studies Minor	289
General Liberal Arts	258	Linguistics	289
Geography	259	Linguistics Major	291
Geography Adjunct Major	260	Linguistics Minor	291
Geography Minor	260	Linguistics BA/MA	291
German	260	Materials Science	291
German Major	264	Materials Science Major	292
German Minor	265	Materials Science Minor	293
German Studies Minor	266	Materials Science Second Major for ISP Students	293
Business German Minor	266	Mathematical Methods in the Social Sciences	294
Global Health Studies	266	MMSS Adjunct Major	295
Global Health Studies Adjunct Major	268	Mathematics	295
Global Health Studies Minor	268	Mathematics Major	300
Greek	268	Mathematics Minor	302
Hebrew	268	Mathematics Second Major for ISP Students	302
Hindi	268	Mathematics Second Major or Minor for MMSS Students	303
History	268	Middle East and North African Studies	303
History Major	273	Middle East and North African Studies Major	306
History Minor	276	Middle East and North African Studies Minor	306
Humanities	276	Molecular Biosciences	307
Humanities Minor	278	Neurobiology	307
Kaplan Humanities Scholars Program	278	Neuroscience Major	308
Integrated Science	278	Neuroscience Second Major for ISP Students	311
Integrated Science Major	279	Neuroscience	312
International Studies	279	Persian	312
International Studies Adjunct Major	280	Philosophy	312
International Studies Minor	281	Philosophy Major	315
Italian	281	Philosophy Minor	315
Japanese	281	Physics and Astronomy	316
Jewish Studies	281	Physics Major	319
Jewish Studies Major	283	Physics Minor	321

Physics Second Major for ISP Students	321
Political Science	322
Political Science Major	326
Political Science Minor	328
Portuguese	329
Psychology	329
Psychology Major	332
Psychology Minor	334
Religious Studies	334
Religious Studies Major	337
Religious Studies Minor	337
Catholic Studies Minor	337
Russian	337
Science in Human Culture	337
Science in Human Culture Adjunct Major	339
Science in Human Culture Minor	339
Slavic Languages and Literatures	339
Slavic Languages and Literatures Major	342
Russian and East European Studies Minor	344
Sociology	344
Sociology Major	347
Sociological Research Minor	348
Sociological Studies Minor	348
Spanish & Portuguese	348
Spanish Major	354
Spanish Minor	354
Portuguese Language and Lusophone Cultures Minor	355
Statistics	355
Statistics Major	357
Statistics Minor	358
Swahili	358
Turkish	358
Urdu	358
Writing Program	358
Yiddish	359
Index	360

UNDERGRADUATE

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

Approximately 20,000 full- and part-time students are enrolled on Northwestern's lakefront campuses in Evanston and Chicago and branch campus in Qatar. More than 8,300 undergraduates study at the University's largest campus in Evanston.

The University's 3,300 full-time faculty members range from Nobel Prize laureates to Tony Award winners. In their ranks are members of the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Sciences, the American Council of Learned Societies, and numerous other honorary and professional societies.

The some quarter-million alumni include Pulitzer and Nobel Prize laureates, Academy Award winners, and leaders in education, government, science, law, technology, medicine, media, and other domains.

A Historical Overview

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

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

Today, with the academic divisions listed on pages 7 to 9, Northwestern enjoys a position as one of the country's leading private research universities.

The Undergraduate Experience

Academic Excellence

Despite their relatively small numbers, Northwestern undergraduates enjoy a great range of educational choices, including more than 200 formal academic concentrations as well as opportunities to do research and special projects, study abroad, and pursue internships. Students frequently complete two majors or two degrees, and some construct and receive approval for their own programs of study. About three-fourths of Northwestern's undergraduates engage in internships, practicums,

paid cooperative education programs, applied research, study abroad, and other off-campus experiences, often for academic credit. All benefit from a level of faculty involvement unusual for undergraduates at major universities, with faculty teaching a large proportion of classes as well as inviting students to participate in research.

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

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

Other academic resources available to Northwestern students include the 10th-largest library collection among US private universities (www.library.northwestern.edu). Northwestern University Information Technology supports students' academic needs with extensive online services, computer labs, and wired and wireless access from nearly anywhere on campus (it.northwestern.edu)

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

Outside the Classroom

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

Supported by the Center for Student Involvement, the more than 500 extracurricular groups include organizations devoted to service on campus and in the community, cultural awareness and support, musical and theatrical performance, entertainment programming, political activism, career preparation, and countless mutual interests. The full list is available at northwestern.campuslabs.com/engage.

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

About 4,000 undergraduates live in University-owned on-campus student residences that range widely in size, age, character, and suite arrangements; another 800 live in fraternity or sorority houses, and the remainder live off campus. Services available to undergraduates include counseling and psychological services, healthcare, career advising, and assistance in identifying employment, internship, and external-funding opportunities. Specialized offices and resource centers serve students

with disabilities, LGBTQA students, international students, members of various religious denominations, women, and African American, Asian/Asian American, and Hispanic/Latino students. For all programs offered by the Division of Student Affairs, see northwestern.edu/studentaffairs.

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

Student Demographics

Northwestern recruits students of demonstrated academic achievement from diverse social, ethnic, and economic backgrounds. More than 90 percent of applicants rank in the top 10 percent of their high school classes, and Northwestern's National Merit Scholar enrollment rate has recently ranked among the nation's highest. About one in ten applicants is accepted.

All 50 states and more than 70 countries are represented among the undergraduate student body. International students make up roughly 10 percent of the class of 2019. More than 43 percent of the first-year class come from underrepresented backgrounds. About 62 percent of students receive financial assistance.

Both the federal government and the National Collegiate Athletic Association use as a measurement for reporting purposes the graduation rates of entering classes over six continuous years. Such rates at Northwestern have remained above 90 percent since 1991–92. See www.registrar.northwestern.edu/academic_records/enrollment_and_graduation_statistics.html.

Campuses and Schools

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

Northwestern is accredited by the Higher Learning Commission (www.ncahlc.org). Some schools have additional accreditation, as noted in the following sections.

Evanston Campus

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

- The Judd A. and Marjorie Weinberg College of Arts and Sciences (1851) offers the degree of bachelor of arts. Majors and minors are available through departments and interdisciplinary programs spanning the arts and humanities, foreign languages, mathematics and statistics, the natural sciences, and the social sciences. Through Northwestern University School of Professional Studies, Weinberg College also offers the degrees of bachelor of philosophy and bachelor of science in general studies.
- 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 Northwestern University School of Professional Studies, the School of Communication offers the bachelor of philosophy in communication. The school also offers the degrees of master of science in communication, health communication, leadership for creative enterprises, nonclinical audiology, and speech, language, and learning as well as the doctor of audiology degree. Its programs are accredited by the American Speech-Language-Hearing Association and the National Association of Schools of Theatre.
- The Henry and Leigh Bienen School of Music (1895) offers the degrees of bachelor of music, bachelor of arts in music, and bachelor of science in music. In its graduate division the school offers the master of music and doctor of musical arts degrees. 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 choose from many majors, which are listed at kellogg.northwestern.edu/faculty/academics/majors. In addition to the full-time MBA program, Kellogg offers a part-time evening or weekend MBA program on Northwestern's Chicago campus, an executive MBA in Evanston and Miami, and international executive MBA programs in Canada, Europe, the Middle East, and Asia. There is also a PhD program; see kellogg.northwestern.edu/programs/doctoralprogram. In addition, a wide range of nondegree executive education courses are offered at the school's James L. Allen Center on the Evanston campus as well as in Miami. Kellogg is accredited by the American Assembly of Collegiate Schools of Business.
- The Robert R. McCormick School of Engineering and Applied Science (1909) offers the bachelor of science degree in applied mathematics, biomedical engineering, chemical engineering, civil engineering, computer engineering, computer science, electrical engineering, environmental engineering, industrial engineering, manufacturing and design engineering, materials science and engineering, mechanical engineering, and medical engineering (only for students enrolled in the Honors Program in Medical Education). All departments offer advanced study for graduate students. The McCormick School also offers master's degrees in analytics, biotechnology, engineering management, information technology, product design and development management, and project management. Select McCormick programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.
- The Graduate School (1910) administers all advanced programs leading to the degrees of doctor of philosophy, master of arts, master of fine arts, master of public health, and master of science. Degree requirements and descriptions of individual graduate degree programs and curricula can be found through the school's website, tgs.northwestern.edu.
- Summer Session (1920) provides summer programs for undergraduate, graduate, and visiting students.
- The Medill School of Journalism, Media, Integrated Marketing Communications (1921) offers the bachelor of science degree in journalism, master of science degrees in journalism and integrated marketing communications, and an undergraduate certificate in integrated marketing communications.
- The School of Education and Social Policy (1926) offers the bachelor of science degree in education and social policy with concentrations in human development and psychological services, learning and organizational change, secondary teaching, learning sciences, and social policy. It offers master of science degree programs in education (MSEd) with concentrations in elementary, secondary, and advanced teaching; in higher education administration and policy (MSHE); and in learning and organizational change (MSLOC). School programs administered by the Graduate School offer MA and PhD

degrees in human development and social policy and in learning sciences. Its teacher education programs are accredited by the Illinois State 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, doctor of physical therapy, master of medical science, master in prosthetics-orthotics, and bachelor of science in medicine. High school graduates accepted for the Honors Program in Medical Education can receive a Feinberg MD degree seven or eight years after they enter Weinberg College, the McCormick School, or the School of Communication. The Feinberg and McCormick Schools cooperate in biomedical engineering programs; joint degree programs with the Graduate School and the Kellogg School offer an MD degree as well as MA, MS, MPH, MBA, and PhD degrees. The Feinberg School has accreditation from the Liaison Committee on Medical Education, Accreditation Council for Continuing Medical Education, American Psychological Association, American Board for Certification in Prosthetics and Orthotics, American Physical Therapy Association, and Accreditation Council for Graduate Medical Education.
- The Northwestern Pritzker School of Law (1859) offers the degrees of juris doctor (JD), master of laws (LLM), master of studies and LLM in international human rights, LLM in taxation, master of science in law, and doctor of juridical science. An accelerated JD program allows select motivated students to complete the JD in two calendar years. The Pritzker School and the Kellogg School offer a joint degree program allowing students to earn both JD and MBA degrees in three years. Another joint program with Kellogg permits international and foreign-trained students to earn an LLM degree and a certificate in business administration in one year. Students also may participate in a five-year program to earn a JD and a PhD in one of the social sciences. In addition, the Pritzker School offers an LLM degree to executive students in Seoul, South Korea; Madrid, Spain; and Tel Aviv, Israel. The school is accredited by the American Bar Association and the Association for American Law Schools.
- Northwestern University School of Professional Studies (1933) is the continuing education division of the University, providing adults an opportunity to return to school part-time or full-time on evenings and weekends. Classes are offered on the Chicago and Evanston campuses, in the Chicago Loop, and online. In addition to postbaccalaureate and professional development certificates and master's degrees, the school offers courses leading to the degrees of bachelor of philosophy and bachelor of science in general studies, conferred by Weinberg College; and the degree of bachelor of philosophy in communication, conferred by the School of Communication. For a complete list of degrees awarded, please visit www.registrar.northwestern.edu/academic_records/nu_degrees_awarded.html. SPS administers Summer Session programs for the University and is the home of the Center for Public Safety and the Osher Lifelong Learning Institute.

Northwestern University in Qatar

Northwestern's 12th school and only overseas campus is based in Education City, Doha, Qatar. In addition to liberal arts instruction, the school offers bachelor of science degrees conferred by the Medill School of Journalism, Media, Integrated Marketing Communications and the School of Communication. For more information about Northwestern University in Qatar, please visit www.qatar.northwestern.edu.

PRIVACY & DISCLOSURES

This catalog for the academic year beginning in Fall 2018 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, Media, Integrated Marketing Communications; and Henry and Leigh Bienen School of Music and about cross-school undergraduate programs. Failure to read this catalog does not excuse a student from knowing and complying with its content.

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

Access to Student Records

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

Students' rights under FERPA include

- 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 US Department of Education concerning alleged failures by Northwestern University to comply with FERPA requirements

The University's Use of Email

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

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

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

Title IX Compliance

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, pregnancy, sexual orientation, gender identity, gender expression, parental status, marital status, age, disability, citizenship status, veteran status, genetic information, or any other classification protected by law in matters of admissions, employment, housing, or services or in the educational programs or activities it operates. Further prohibited by law is discrimination against any employee and/or job applicant who chooses to inquire about, discuss, or disclose their own compensation or the compensation of another employee or applicant. Harassment, whether verbal, physical, or visual, that is based on any of these characteristics is a form of discrimination.

Northwestern University complies with federal and state laws that prohibit discrimination based on the protected categories listed above, including Title IX of the Education Amendments of 1972, which prohibits discrimination based on sex (including sexual misconduct) in the University's educational programs and activities. In addition, Northwestern provides reasonable accommodations to qualified applicants, students, and employees with disabilities and to individuals who are pregnant.

Any alleged violations of this policy or questions with respect to nondiscrimination or reasonable accommodations should be directed to:

Northwestern's Director of Equal Opportunity and Access and Section 504 Coordinator
1800 Sherman Avenue, Suite 4500
Evanston, Illinois 60208
847-491-7458
eeo@northwestern.edu

Any alleged violations of this policy or questions with respect to sexual misconduct or sexual harassment should be directed to:

Northwestern's Title IX Coordinator
1800 Sherman Avenue, Suite 4500
Evanston, Illinois 60208
847-467-6871
TitleIXCoordinator@northwestern.edu

A person may also file a complaint with the Department of Education's Office for Civil Rights regarding an alleged violation of Title IX by visiting www2.ed.gov/about/offices/list/ocr/complaintintro.html or calling 800-421-3481.

ADMISSION

Admission

General Requirements for Admission

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

Candidates for admission should demonstrate a level of performance in curricular and extracurricular areas that indicates they will be able to succeed in a competitive academic environment. In the selection of students, careful attention is given to the ability of each candidate as evidenced by academic records and the results of entrance tests as well as by character and personal qualities. 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 tests (All candidates must submit either SAT or ACT scores. The writing sections for these tests are optional. Candidates for certain special admission programs and all home-schooled applicants must submit the SAT Subject Tests specified below. SAT Subject Tests are optional for other candidates.)
- Music audition (required of Bienen School of Music candidates)
- Candidate's written statements
- Any other information received by the University that bears on the candidate's readiness for study at Northwestern

English Proficiency for International Applicants

In addition to meeting all regular admission requirements, international students are required to present evidence of their ability to speak, read, and write the English language. International applicants whose first language is not English or whose schooling has not been in English are required to submit the results of either the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS).

SAT Subject Tests

Required for Special Admission Programs and Home-Schooled Applicants

- Honors Program in Medical Education: Mathematics Level 2 and Chemistry
- Integrated Science Program: Mathematics Level 2, Chemistry or Physics, and an additional science
- Home-schooled applicants: Mathematics Level 1 or 2 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.)
- All other applicants: SAT Subject Tests are optional.

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, the Office of Undergraduate Admission notes the subjects studied, the rigor of coursework taken, 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.

Recommended Units

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

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

Students preparing for college are strongly advised to take four years of work in English with as much emphasis on composition as the curriculum allows. Two units of the same foreign language should be taken; three or four years are strongly recommended.

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

- Mathematics: 3½ to 4 units (the minimum requirements for mathematics include algebra [2 units], plane geometry [1 unit], and trigonometry [½ unit]; many entering McCormick first-year students 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 incoming first-year candidates a choice of two notification plans, Early Decision and Regular Decision. Early Decision is a binding admission commitment. Candidates accepted to Northwestern under Early Decision must withdraw all other university applications.

The table below 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 steps:

- Complete the Common Application or the Coalition Application. You may apply online at commonapp.org or mycoalition.org.

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.
- Submit standardized tests as outlined in the General Requirements for Admission (p. 10) section and, if applicable, the English Proficiency for International Applicants (p. 10) and/or SAT Subject Tests (p. 10) sections in this chapter. Testing deadlines can be found in the Application and Testing Deadlines (p. 11) table. Applicants may self-report SAT and ACT scores, taking care to report their highest individual sections of the SAT and/or highest ACT composite score. Applicants are not obligated to report scores from all test dates, though are welcome to do so. Admitted students who choose to enroll will be required to submit official SAT or ACT test scores prior to matriculation. English proficiency scores may not be self-reported; these should be submitted officially via the testing company at the applicant stage.
- Present a music audition if applying for admission to the Bienen School of Music; follow the audition guidelines specified at <https://music.northwestern.edu/admission/undergraduate/auditions>.

Application to Dual Bachelor's Degree Programs

A student interested in taking advantage of the opportunity to receive bachelor's degrees from two different Northwestern undergraduate schools in five years must apply to both schools. It is possible to be admitted to only one or both schools since applicants are considered for each school separately.

Dual degree programs available include the following:

- BA/BMus in liberal arts and music
- BA/BS or BS/BS in communication and engineering
- BA/BMus, BS/BMus, BA/BAMus, or BS/BAMus in communication and music
- BSED/BMus or BSED/BAMus in education and music
- BS/BMus or BS/BAMus in engineering and music
- BSJ/BMus or BSJ/BAMus in journalism and music

For descriptions of these and other dual bachelor's degree programs, see the Dual Bachelor's Degree Programs (p. 35) chapter of this catalog.

Special Admission Programs

The following undergraduate programs at Northwestern have special application requirements.

Honors Program in Medical Education

The Honors Program in Medical Education (HPME) provides simultaneous admission to undergraduate study and the Feinberg School of Medicine at Northwestern. Interested students must preapply by the due date. Those whose preapplications qualify receive the special HPME application to submit in addition to their regular Application for Admission to Weinberg College, the School of Communication (human communication sciences major only), or the McCormick School. For application deadlines, see the Application and Testing Deadlines (p. 11) table.

For information about HPME, see the Honors Program in Medical Education (p. 34) section in the Dual Graduate & Undergraduate Degrees (p. 34) chapter of this catalog.

Integrated Science Program

A student wishing to be considered for Weinberg College's Integrated Science Program, which provides a rigorous background in the major scientific disciplines and mathematics and can lead to a bachelor of arts degree in three years, must complete the special ISP application (available at isp.northwestern.edu/admissions/applying/). Applicants to the McCormick School of Engineering and Applied Sciences may also submit an ISP application, but doing the additional major in ISP along with engineering does not accelerate completion of the bachelor of science degree. Either the Common Application or the Coalition Application is also required of applicants.

For more information on ISP, see the Integrated Science Program (p. 278) section in the Weinberg College (p. 175) chapter of this catalog.

Mathematical Methods in the Social Sciences

A student interested in Weinberg College's program in Mathematical Methods in the Social Sciences (MMSS), which is designed for students with high mathematical aptitude and strong interest in social problems and issues, must complete the special MMSS application (<https://www.mmss.northwestern.edu/admission/first-year-application.html>). Either the Common Application or the Coalition Application is also required. For more information on MMSS, visit this website (<https://www.mmss.northwestern.edu>).

Application and Testing Deadlines: Notification Plans

Regular Programs for Fall Quarter Matriculation

Event	Early Decision	Regular Decision
First-year students seeking to enter in other quarters should request information from the Office of Undergraduate Admission.		
Apply by	November 1	January 1
Take SAT or ACT 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 15
and file FAFSA by	December 1	February 15 ¹
Northwestern releases its decision by	December 15	March 31
Applicant's reply and nonrefundable tuition and housing deposits due by	February 1	May 1

¹ Illinois residents should file the FAFSA as close to October 1 as possible to be considered for eligibility for an Illinois Monetary Award Program (MAP) grant.

Honors Program in Medical Education

Event	Regular Decision
HPME preapplication deadline	December 1
HPME application deadline	January 1
Submit first-year student application to Northwestern by	January 1
Take SAT (or ACT) by	November test
Take two SAT Subject Tests by	December test
To apply for financial aid, file FAFSA and CSS PROFILE by	February 15 ¹
Northwestern releases its decision by	March 31
Applicant's reply and nonrefundable tuition and housing deposits due by	May 1

¹ Illinois residents should file the FAFSA as close to October 1 as possible to be considered for eligibility for an Illinois Monetary Award Program (MAP) grant.

Transfer Students for Fall Quarter Matriculation

Event	Regular Decision
Apply by	March 15
(Space is limited in some programs; apply well before the deadline.)	
Take SAT or ACT by	March 15
(Scores from previous academic years are acceptable.)	
Apply for financial aid by	March 15
(Aid availability is limited; consult the Office of Undergraduate Admission.)	
Northwestern releases its decision as soon as possible after the application deadline; applicant's reply is due within two weeks.	

Advanced Placement

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

Northwestern may award credit for distinguished performance on certain foreign national examinations, and the higher-level examinations of the International Baccalaureate. Students will receive credit only once for the same course of study even if mastery is demonstrated on multiple exams (e.g., mathematics AP and IB exams). Also, credit is awarded only for exams taken prior to matriculation at Northwestern.

Northwestern also may award credit for college courses taken by incoming first-year students before they enter the University. To qualify for such recognition, the courses must be similar to courses offered at Northwestern, must have been completed 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 taken primarily by bona fide college students (i.e., high school graduates pursuing a college degree).

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 admission as first-year candidates and must meet the criteria to apply as transfer candidates. Undergraduate schools at Northwestern enroll transfer students in the fall quarter only, and admitted transfer students may not defer their enrollment to any subsequent fall. Transfer students must meet the relevant provisions of the Undergraduate Registration Requirement (p. 26).

Transfer Admission Procedure

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

- Complete the Common Application or the Coalition Application. Submit online at commonapp.org or mycoalition.org.
- 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 or the ACT. Writing sections are optional. Applicants may self-report SAT and ACT scores, taking care to report their highest individual sections of the SAT and/or highest ACT composite score. Applicants are not obligated to report scores from all test dates, though are welcome to do so. Admitted students who choose to enroll will be required to submit official SAT or ACT test scores prior to matriculation. English proficiency scores may not be self-reported; these should be submitted officially via the testing company at the applicant stage.
- 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 if applying for admission to the Bienen School of Music (for audition guidelines, see <https://music.northwestern.edu/admission/undergraduate/auditions/programs>).
- Submit application for admission before the March 15 deadline.

Evaluation of Credits

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

Professional Education Students

The Northwestern University School of Professional Studies, the University's continuing education division, offers an extensive range of programs and courses in Chicago, Evanston, and online for adult students seeking personal enrichment or professional mobility, preparation for graduate study, or pursuit of a degree or a certificate.

The school 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 the school is available on its website, sps.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 Professional Studies may apply these credits toward a degree.) Special students are granted academic credit for coursework 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
Northwestern University
405 Church Street
Evanston, Illinois 60208

For more information see sps.northwestern.edu/main/nondegree-special-students.

Admission Withdrawal

In cases where an admitted student's academic performance falters seriously, as indicated by a final transcript, an offer of admission may be withdrawn. Northwestern also reserves the right to rescind an admission offer if we receive information that, in our judgment, reflects negatively on a student's character or fitness for study and/or participation in the Northwestern community.

FINANCIAL AID

The University awards financial aid on the basis of need as determined by the financial circumstances of the family. Federal loans or private scholarships are provided according to their own criteria and sometimes regardless of financial need. Financial aid consists of scholarships, part-time employment, and loan funding. These funds come from state, federal, institutional, and private sources. Students must apply for financial aid each year and might qualify for a combination of funds. Aid awards will be relatively consistent assuming the family financial circumstance is also relatively consistent.

For new first-year students, financial aid is renewable for a maximum of 12 quarters of full-time enrollment or its equivalent. Students admitted to a five-year dual degree program approved for aid are eligible for a maximum of 15 quarters of full-time enrollment or its equivalent. The five-year dual degree programs approved for aid include liberal arts and music, communication and engineering, communication and music, education and music, engineering and music, or journalism and music.

Students must be enrolled in the dual degree program by the end of their sophomore year. A student who later decides to pursue only one degree reverts to a maximum eligibility of 12 quarters. Students pursuing other dual degree opportunities that are not approved for aid would be eligible for federal and state funding only after utilizing 12 quarters of institutional aid. Transfer students are eligible for up to 9 quarters of institutional financial aid.

Regardless of whether a student receives financial aid in a given quarter or year, all quarters of enrollment count toward the maximum eligibility. Those needing additional quarters of aid must submit an appeal to the Office of Undergraduate Financial Aid. Those appeals should be submitted at the time that the additional quarter is needed.

For information consult undergradaid.northwestern.edu/information-for-prospective-students.html.

Financial Aid Application

Who Should Apply

Students who believe they cannot afford the full cost of a Northwestern education should apply for financial aid. International students might wish to apply for need-based financial aid, although financial need may factor into a final admission decision (whereas the review process is need-blind for US citizens and permanent residents). For more information see admissions.northwestern.edu/tuition-aid/international-student-aid.

Application Procedure

Applicants apply for financial aid at the same time as they are submitting the application for admission. Eligibility for aid cannot be determined until the University has admitted an applicant. Candidates should do the following:

- File the Free Application for Federal Student Aid (FAFSA) and the College Scholarship Service/Financial Aid PROFILE (CSS PROFILE) and request that the information is sent to Northwestern.
- Submit parent and student federal tax returns to the College Board's Institutional Documentation Service.

- File the applications as soon possible but not later than the dates indicated in the table titled Application and Testing Deadlines: Notification Plans (p. 11).

Returning students should consult the website undergradaid.northwestern.edu for reapplication instructions, deadlines, and updated policies.

Students are expected to consult their CAESAR account to verify that all required applications and additional information have been received by the Office of Undergraduate Financial Aid.

Financial Aid Eligibility

For financial aid purposes:

Financial Aid Status	Units
Full-Time	3 to 5.5 units
Half-time	2 to 2.99 units
Less than half-time	fewer than 2 units

(Note: students who register for more than 5.5 units may be subject to overload tuition charges, and some schools require these students to obtain the approval of the dean before registering.) All quarters of full-time registration are counted toward the maximum number of quarters of financial aid eligibility (12 quarters in most cases). Each quarter of half-time status counts as .5 quarter. Any quarter of less than half-time status is not counted toward the maximum eligibility.

Students enrolled less than half-time are not eligible for financial aid from Northwestern but may have limited eligibility for federal aid. Students awarded aid at full-time status who enroll at a lower level will have their aid reduced accordingly. Students will not receive additional university aid to pay any overload tuition charges they incur.

Students considering a change of registration status should contact the Office of Financial Aid to determine how the change might affect their aid awards or quarters of eligibility. A detailed explanation of aid eligibility and policies is provided on the Office of Undergraduate Financial Aid's website, undergradaid.northwestern.edu.

Students must maintain satisfactory academic (SAP) progress to remain eligible for financial aid. For Northwestern students, SAP means the successful completion of at least 67 percent of the course units attempted in an academic year (e.g., a student who registers for a total of 12 quarter-courses a year must complete at least 8). Withdrawn, incomplete, and repeated courses are counted as attempted course units.

In addition, students must attain a cumulative GPA of 2.0 or better by the end of their second academic year and every year thereafter in order to meet SAP requirements. This GPA minimum may differ from a school's academic requirements, which are outlined in those chapters in this catalog.

Students can receive financial aid only for a maximum time frame, which is 150 percent of the program's published length as measured in academic units. All transfer credits are counted toward the maximum time frame. The total number of units required for a bachelor's degree is specified in each school's chapter in this catalog; the website of the Office of Undergraduate Financial Aid notes the maximum time frames calculated in terms of credits required for degree completion.

Students who fail to maintain SAP as described above will lose eligibility for financial aid. He or she will receive email notification from the

Office of Undergraduate Financial Aid and will have the opportunity to appeal the cancellation. The appeal must be submitted to the Office of Undergraduate Financial Aid within two weeks of the notification from the office. In some cases, an appeal will not be considered until the student has met with his or her academic adviser to determine an academic plan for completing the degree.

Those students whose appeals are approved will be placed in a probationary status. While on probation, students are eligible for one quarter of aid. At the end of the probationary period, students must then be meeting the cumulative standards of SAP. Students who are required to submit an academic plan must meet the conditions of the plan to remain eligible. Students who fail to meet these requirements as of the end of the probationary quarter will be ineligible for financial aid from that point forward.

Those students denied an appeal or who do not appeal can reestablish eligibility by successfully meeting SAP requirements without the use of financial aid.

Students returning to the University after academic dismissal must submit an appeal before they will be considered for financial aid.

More detailed information regarding satisfactory academic progress is available on the Office of Undergraduate Financial Aid's website.

TUITION & PAYMENT

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 are listed on the Undergraduate Tuition (<https://www.northwestern.edu/sfs/tuition/undergraduate>) section of the Student Financial Services website. Rates are subject to change without notice, and increases should be expected in subsequent years.

Changes of Registration & Bills

No refund or bill reduction is made for dropped or swapped classes after the fifth day of the quarter. Bills will be adjusted for classes added after that date. The University's policies regarding enrollment changes and billing are listed on the Enrollment Changes & Billing (<https://www.northwestern.edu/sfs/payments/enrollment-changes.html>) section of the Student Financial Services website.

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 (<https://www.northwestern.edu/sfs/payments/methods>). Free to students and authorized payers such as their parents, it provides email notification of new bills, allows online payments, and offers the option of receiving paper bills.

Prepayment Plan

The University provides a tuition and fee installment prepayment plan, 9PAY (<https://www.northwestern.edu/sfs/payments/methods/9PAY>), which offers the benefit of prepaying the educational costs for the academic year in nine monthly payments without incurring finance or interest charges.

Additional Information

For more information about bills and payments or 9PAY, visit northwestern.edu/sfs or contact the:

Office of Student Accounts
555 Clark Street
Evanston, Illinois 60208-1221
studentaccounts-ev@northwestern.edu
847-491-5224

Financial Obligations

Students whose University bills are overdue may not be given an academic transcript and/or a diploma until all financial obligations are paid in full. Students whose accounts are overdue must pay a \$200 late payment penalty fee. The director of student accounts may cancel or prevent the registration of a student whose bills are past due. A 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.

Tuition Benefit

Supplemental Enrollment Benefit

Students who are unable to complete bachelor's degree requirements in 12 quarters of enrollment due to circumstances beyond their control, and who have paid full-time tuition to Northwestern for 12 quarters, may petition the Registration 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.

The Supplemental Enrollment Benefit is not available for students who choose a program that may take more than 12 quarters to complete, such as a dual degree program, or for students who have graduated. A final quarter at no charge is also not available for students whose pursuit of an optional program, such as study abroad, a double major, a minor, or extra coursework beyond that normally required for the degree, is the cause of the additional term(s) of enrollment. The benefit is intended to help students meet degree requirements only.

Appeals are considered by the Undergraduate Enrollment Committee, which consists of the associate provost for University enrollment, the associate provost for undergraduate education, the University registrar, and two associate or assistant deans from different undergraduate schools. The deans serve three-year terms on a rotating basis. The Committee convenes on a regular basis to review appeals.

Students should consult their academic adviser(s) to discuss whether their situation is appropriate for this benefit or an appeal to Undergraduate Financial Aid. For instructions on preparing an appeal for the benefit, see the Office of the Registrar's website at <https://www.registrar.northwestern.edu/registration-graduation/graduation-preparation/index.html>.

Withdrawal Refunds

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

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:

Percent of Term	Tuition Refunded
0-9.99	100%
10-24.99	75%
25-49.99	50%
50+	No Tuition Refunded

Residence and meal contracts are signed for the full school year. Students who leave a residence before the end of the year are liable for the entire year's rent or for charges up to the date another student takes the vacated space. Meal charges are assessed until the end of the week in which withdrawal is in effect. Adjustments may be made at the discretion of Residential Services 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 Undergraduate Financial Aid.

PROGRAMS A-Z

A

- Advanced Asian Languages Minor (p. 205)
- African American Studies Major (p. 182)
- African American Studies Minor (p. 184)
- African Studies Adjunct Major (p. 186)
- African Studies Minor (p. 186)
- American Studies Major (p. 187)
- Anthropology Major (p. 191)
- Anthropology Minor (p. 193)
- Applied Mathematics Degree (p. 149)
- Architectural Engineering and Design Certificate (p. 136)
- Art History Major (p. 196)
- Art History Minor (p. 196)
- Art Theory and Practice Major (p. 197)
- Asian American Studies Major (p. 199)
- Asian American Studies Minor (p. 199)
- Asian Humanities Minor (p. 204)
- Asian Languages and Cultures Major (p. 204)
- Asian Studies Major (p. 205)
- Asian Studies Minor (p. 206)

B

- Biological Sciences Major (p. 209)
- Biological Sciences Second Major for ISP Students (p. 210)
- Biomedical Engineering Degree (p. 123)
- Biotechnology and Biochemical Engineering Minor (p. 126)
- Brady Scholars Program (p. 248)
- Business German Minor (p. 266)
- Business Institutions Minor (p. 211)

C

- Catholic Studies Minor (p. 337)
- Chemical Engineering Degree (p. 126)
- Chemistry BA/MS (p. 218)
- Chemistry Major (p. 215)
- Chemistry Minor (p. 217)
- Chemistry Second Major for ISP Students (p. 217)
- Chicago Field Studies (p. 218)
- Civic Engagement Certificate (p. 114)
- Civil Engineering Degree (p. 134)
- Classics Major (p. 221)
- Classics Minor Concentrations (p. 222)
- Cognitive Science Major (p. 223)
- Cognitive Science Minor (p. 225)
- Communication Studies Major (p. 77)
- Comparative Literary Studies BA/MA (p. 228)
- Comparative Literary Studies Major (p. 227)
- Composition Major (p. 48)
- Composition Minor (p. 49)

- Computer Engineering Degree (p. 144)
- Computer Science Degree (p. 145)
- Computer Science Major (p. 228)
- Computer Science Minor (McCormick School of Engineering) (p. 148)
- Computer Science Minor (Weinberg College) (p. 230)
- Computer Science Second Major for ISP Students (p. 230)
- Conducting and Ensembles (p. 49)
- Creative Writing Cross-Genre Minor (p. 244)
- Creative Writing Major (p. 243)
- Creative Writing Sequence-Based Minor (p. 244)
- Critical Theory Minor (p. 231)

D

- Dance Major (p. 91)
- Dance Minor (p. 92)

E

- Earth and Planetary Sciences Major (p. 233)
- Earth and Planetary Sciences Minor (p. 235)
- Earth and Planetary Sciences Second Major for ISP Students (p. 235)
- Economics BA/MA (p. 239)
- Economics Major (p. 238)
- Economics Minor (p. 239)
- Electrical Engineering Degree (p. 146)
- English and American Literature Major (p. 243)
- English and American Literature Minor (p. 244)
- Entrepreneurship Minor (p. 150)
- Environmental Engineering Degree (p. 135)
- Environmental Engineering Minor (p. 136)
- Environmental Policy and Culture Minor (p. 245)
- Environmental Sciences Major (p. 246)
- Environmental Sciences Second Major for ISP Students (p. 248)
- Ethics and Civic Life (p. 248)

F

- Film and Media Studies Minor (p. 83)
- Financial Economics Certificate (p. 28)
- First-Year Seminars (p. 248)
- French BA/MA (p. 256)
- French Major (p. 253)
- French Minor (p. 255)

G

- Gender and Sexuality Studies Major (p. 258)
- Gender and Sexuality Studies Minor (p. 258)
- General Communication (p. 78)
- General Engineering (p. 150)
- Geography Adjunct Major (p. 260)
- Geography Minor (p. 260)
- German Major (p. 264)
- German Minor (p. 265)

- German Studies Minor (p. 266)
- Global Health Studies Adjunct Major (p. 268)
- Global Health Studies Minor (p. 268)

H

- Hebrew Studies Minor (p. 284)
- History Major (p. 273)
- History Minor (p. 276)
- Human Communication Sciences Major (p. 72)
- Human Communication Sciences Minor (p. 73)
- Human Development and Psychological Services Major (p. 100)
- Humanities Minor (p. 278)

I

- Industrial Engineering Degree (p. 155)
- Integrated Marketing Communications Certificate (p. 170)
- Integrated Science Major (p. 279)
- International Studies Adjunct Major (p. 280)
- International Studies Minor (p. 281)
- Italian (p. 281)
- Italian Literature and Culture Major (p. 255)
- Italian Minor (p. 256)

J

- Jazz Studies Major (p. 50)
- Jewish Studies Major (p. 283)
- Jewish Studies Minor (p. 284)
- Journalism Degree (p. 173)

L

- Latin American and Caribbean Studies Minor (p. 285)
- Latina and Latino Studies Major (p. 286)
- Latina and Latino Studies Minor (p. 287)
- Leadership (p. 29)
- Learning and Organizational Change Major (p. 102)
- Learning Sciences Major (p. 105)
- Legal Studies Major (p. 288)
- Legal Studies Minor (p. 289)
- Linguistics BA/MA (p. 291)
- Linguistics Major (p. 291)
- Linguistics Minor (p. 291)

M

- Managerial Analytics Certificate (p. 28)
- Manufacturing and Design Engineering Degree (p. 157)
- Materials Science and Engineering Degree (p. 161)
- Materials Science Major (p. 292)
- Materials Science Minor (p. 293)
- Materials Science Second Major for ISP Students (p. 293)
- Mathematics Major (p. 300)
- Mathematics Minor (p. 302)
- Mathematics Second Major for ISP Students (p. 302)

- Mathematics Second Major or Minor for MMSS Students (p. 303)
- Mechanical Engineering Degree (p. 165)
- Middle East and North African Studies Major (p. 306)
- Middle East and North African Studies Minor (p. 306)
- MMSS Adjunct Major (p. 295)
- Music Cognition (p. 50)
- Music Cognition Major (p. 56)
- Music Cognition Minor (p. 57)
- Music Education Major (p. 53)
- Music Education Minor (p. 54)
- Music Technology Minor (p. 49)
- Music Theatre Certificate (p. 93)
- Music Theory Major (p. 57)
- Music Theory Minor (p. 57)
- Musicology Major (p. 59)
- Musicology Minor (p. 59)

N

- Naval Science (p. 39)
- Neuroscience Major (p. 308)
- Neuroscience Second Major for ISP Students (p. 311)

P

- Performance Studies Major (p. 80)
- Performance Studies Minor (p. 80)
- Persian (p. 312)
- Philosophy Major (p. 315)
- Philosophy Minor (p. 315)
- Physics Major (p. 319)
- Physics Minor (p. 321)
- Physics Second Major for ISP Students (p. 321)
- Piano Major (p. 60)
- Political Science Major (p. 326)
- Political Science Minor (p. 328)
- Portuguese (p. 329)
- Portuguese Language and Lusophone Cultures Minor (p. 355)
- Premedical Scholars Program (p. 34)
- Psychology Major (p. 332)
- Psychology Minor (p. 334)

R

- Radio/Television/Film Major (p. 84)
- Religious Studies Major (p. 337)
- Religious Studies Minor (p. 337)
- Russian (p. 337)
- Russian and East European Studies Minor (p. 344)

S

- Science in Human Culture Adjunct Major (p. 339)
- Science in Human Culture Minor (p. 339)
- Secondary Teaching (p. 106)
- Segal Design Certificate (p. 158)

- Slavic Languages and Literatures Major (p. 342)
- Social Policy Major (p. 113)
- Sociological Research Minor (p. 348)
- Sociological Studies Minor (p. 348)
- Sociology Major (p. 347)
- Sound Design Minor (p. 84)
- Spanish Major (p. 354)
- Spanish Minor (p. 354)
- Statistics Major (p. 357)
- Statistics Minor (p. 358)
- String Instruments Major (p. 62)
- Summer Field Studies Program (p. 114)
- Sustainability and Energy (p. 29)

T

- Theatre Major (p. 94)
- Theatre Minor (p. 95)
- Transportation and Logistics Minor (p. 31)

V

- Voice and Opera Major (p. 64)

W

- Winds and Percussion Instruments Major (p. 65)
- World Literature Minor (p. 227)
- Writing Program (p. 358)

REQUIREMENTS AND POLICIES

Degrees, Academic Options, and Requirements

Undergraduate degree requirements are established by the faculties of each school and thus differ significantly by school. A student's degree requirements are determined by their school, and all must pursue at least one major (their degree major) in their home school to earn a Northwestern undergraduate degree.

Students often also elect to pursue additional majors (p. 33), minors (p. 30), certificates (p. 28), and other special programs in schools other than their own, in addition to those from their home school. A program like this results in a single undergraduate degree with multiple majors.

Students may also apply and be admitted to multiple schools that offer pre-approved dual degrees (p. 35). A program like this results in two different undergraduate degrees conferred by the two different schools and often requires an additional year of study.

All undergraduate students must also meet the Undergraduate Registration Requirement (p. 26).

Academic Advising

Academic advising is an essential component of an undergraduate education. All first-year students are assigned an academic adviser through their school. Returning students may obtain academic advice through their major department and from the dean's office of their school.

In addition to meeting with an academic adviser on a regular basis, students should routinely check their academic requirements—accessible via CAESAR and McCormick MAS—to ensure that they are meeting their degree requirements; any concerns about progress or discrepancies in the reports should be promptly discussed with an adviser.

Courses and Credit

Although the course listings in this catalog are as complete and exact as is possible at the time of publication, some changes may occur later, and courses may be dropped or added. The class schedule for each quarter is posted on CAESAR and contains a complete and updated listing of classes offered each quarter. The University reserves the right to cancel classes when necessary, including those for which registration is not sufficient.

Undergraduate Course Credits and Quarters

Traditional undergraduate work in all the schools on the Evanston campus is on the quarter system. In a quarter-long course, students and faculty meet at least three hours per week, and students are awarded 1.0 unit of credit. Exceptions are courses that meet less than three hours per week, which carry less than 1.0 unit, and 15-week courses, which carry 1.5 units.

For purposes of transfer to other institutions or for certification stated in credit or semester hours, a quarter-long course bearing 1.0 unit of credit

is generally the equivalent of $2^{2/3}$ (2.66) semester hours. In quarter hours, 1 quarter-long course is equal to 4 quarter hours of undergraduate credit.

Credit for Repeated Courses

When courses designed to be taken once are repeated, all attempts remain on the student's record and are used to compute the cumulative grade point average. However, credit is awarded only once, following the attempt that resulted in the highest grade. Similarly, when courses that allow more than one completion are repeated more than the maximum number of allowed times, all attempts remain on the record but credit is not awarded for units taken in excess of the maximum.

Numbering System

A three-part alphanumeric code denotes all courses. PHYSICS 211-1 Mathematical Tools for Physical Sciences, PHYSICS 211-2 Mathematical Tools for Physical Sciences may be used as an example:

- The first part is the subject code indicating the area of study (PHYSICS in the example).
- The subject code is followed by the three-digit course number indicating the level of study:
 - 100–199 denote courses primarily for first-year students and sophomores, usually without college prerequisite.
 - 200–299 (as in the example) denote courses primarily for first-year students, sophomores, and juniors, sometimes with the prerequisite of a 100-level course in the same or a related department.
 - 300–399 denote courses primarily for juniors and seniors, with the prerequisite of junior standing or a 100- or 200-level course in the same or a related department.
 - 400–499 denote courses or seminars, primarily for graduate students, in which the major part of the work is not research; they may be open to advanced undergraduate students with permission.
 - 500–599 denote graduate courses or seminars in which the work is primarily research.
- The third part usually indicates whether the course is part of a sequence.
 - -0 = one-quarter course
 - -1,2 = two-quarter sequence (as in the example)
 - -1,2,3 = three-quarter sequence

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

Graduate School Courses

Descriptions of Graduate School courses that are open to advanced undergraduate students are not included in this catalog. Please see the relevant department or program.

Enrollment

Registration for All Students

Students register for classes using the CAESAR (<https://caesar.northwestern.edu>) system, where the complete and updated class schedule can be found.

- The dates of registration for each quarter are announced in advance. Late registration is permitted only through the fifth full day of classes in any quarter.
- Students will not earn credit for courses in which they are not officially registered. Degree-seeking students may not audit (p. 24) courses.
- At the time of registration, students receive a warning message when enrolling in a class that they have already taken. Repeated courses all calculate in the GPA but credit is typically awarded only once.
- Waiver of prerequisites for admission to a course may be sought from the course instructor.

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.
- In courses designated with "Student Option" grading, undergraduate students may elect to change from quality 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 and how courses completed P/N may be applied to academic requirements.
- To add a class, students must log on to CAESAR and add the course to their record. Consent of the department or instructor may be required. See the class schedule for specific course information.
- To drop a course, students must log on to CAESAR and drop the course from the record. In most cases no special consent is required.
- A course dropped by the sixth Friday of a quarter does not appear on the permanent academic record, and no grade is recorded.
- Failure to drop a course within the time allowed may result in a failure and may be recorded with a grade of F.

See also Withdrawal Refunds (p. 16) and Change of Registration and Bills (p. 16).

Registration in the School of Professional Studies

Northwestern University School of Professional Studies, with locations in Evanston, Chicago, and the Chicago Loop, offers courses designed primarily for working adults. Students enrolled in an undergraduate school at Northwestern may take SPS courses for credit only with the approval of their school's dean or their faculty adviser. SPS students have priority, so enrollment of non-SPS undergraduate students in SPS courses is capped. Registrations are processed on the first day of the quarter, and priority is given to students who need a course to complete a major.

To register for SPS courses, students must

- Pick up a Dual Registration Form from the Office of the Registrar in Evanston.

- Secure the required approvals.
- Turn in the form at the Office of the Registrar in Evanston as soon as possible before classes start.

Exams and Attendance

Regular Examinations

Regular course examinations are held during the last week of each quarter at the times indicated in the quarterly class schedule, accessible via CAESAR and at www.registrar.northwestern.edu/registration. Summer Session examinations are usually held at the last class meeting. Students are responsible for knowing the time and location of each examination. Early examinations are not permitted. Both the instructor and the dean may permit a student to be absent from the final examination for cause beyond the student's control; normally such permission must be secured in advance of the date of the examination. For credit to be awarded, the student must complete the course and the grade must be changed no later than the end of the following like term, or the incomplete will be changed to a final grade of F (failure). Students planning to graduate within that time frame must complete courses and receive grades before graduating. Incomplete grades remaining at the time of degree conferral will be changed to final grades of F (failure).

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. Such courses are designated in CAESAR as "First Class Mandatory."

Withdrawal

Withdrawal from the University

Students who wish to withdraw from the University, either temporarily or permanently, after registering for classes must file a withdrawal form (available at the Office of the Registrar) and have it approved by appropriate school and/or Student Affairs officials, and then submitted to the Office of the Registrar.

If the request is submitted before the term begins (i.e. the first day of classes), registration is cancelled and removed from the student's record.

Cancellation of registration also cancels all applicable tuition and fees for that quarter.

If the request is submitted after the term begins but before the deadline to drop classes, that quarter's registered courses are removed from the transcript and a withdrawal notation added.

After the drop deadline has passed, a withdrawal petition period begins during which students may request complete withdrawal from the term or from individual courses. Approved petitions will result in W grades.

Withdrawals may no longer be requested after the final exam or the final assessment due date, or after 5 p.m. two Fridays before exams begin, whichever is sooner. Detailed procedures can be found at www.registrar.northwestern.edu.

See also Withdrawal Refunds (p. 16).

Grades

Grading Policies

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

Grade	Grade Points
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:

Grade	Notation
P	Pass with credit
N	No grade, no credit
K	In progress
S	Satisfactory: noncredit course
U	Unsatisfactory: noncredit course
W	Withdrawn by permission
NR	No grade reported by instructor

Pass/No Credit (P/N)

Many undergraduate courses are open to the P (pass) or N (no credit) option, which allows students to explore fields beyond their areas of specialization without concern about grade point average. Students may exercise the P/N option in classes designated with “Student Option” grading in CAESAR. For information about a particular school’s P/N policy, see that school’s chapter in this catalog.

Incomplete Coursework

At the end of a quarter a grade of X (missed final exam) or Y (work incomplete) 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.

For credit to be awarded, the student must complete the course and the grade must be changed no later than the end of the following like term, or the incomplete will be changed to a final grade of F (failure). Students planning to graduate within that time frame must complete courses and receive grades before graduating. Incomplete grades remaining at the time of degree conferral will be changed to final grades of F (failure). No

academic record changes, including grade changes, are allowed after a degree has been conferred.

Grade Reports

Quarterly grades are not mailed but are delivered online through CAESAR. Students may print a copy of their grades from CAESAR for verification purposes.

Graduation & Degrees

Petition to Graduate

Undergraduate students must submit a graduation petition, approved by appropriate advisers in their programs, in order to graduate. Students should submit the petition one calendar year before they expect to graduate, but at the latest must submit by the deadlines published on the Office of the Registrar’s website. The Office of the Registrar processes petitions for students with programs in Weinberg College, the School of Communication, the School of Education and Social Policy, the Medill School of Journalism, Media, Integrated Marketing Communications and the Bienen School of Music. McCormick School students submit petitions to the Undergraduate Engineering Office. Failure to petition in a timely fashion may delay graduation or result in omission of the student’s name from the printed Commencement program.

For additional information, see <https://www.registrar.northwestern.edu/registration-graduation/graduation-preparation/index.html>.

Degree Conferral

Undergraduate degrees are conferred at the end of each quarter, including summer. The official conferral date for each term is the Friday after exams end and grades are due. All programs for which a student has completed requirements are conferred simultaneously at the end of the student’s career. Once the degree(s) are posted to the student’s record, it is closed and no changes or further enrollment as an undergraduate are permitted.

The appropriate credential documenting degree completion and majors, minors and certificates completed is an official transcript with notation of an awarded degree. Diplomas are considered by Northwestern University to be ceremonial documents only.

Graduation Honors

Honors and Prizes

Graduation with School Honors

Degrees with honors are determined by grades in all work at Northwestern University and are awarded to the top 25 percent of the students in each school who complete graduation requirements. Spring quarter graduates in the highest 5 percent of the school’s class are awarded degrees summa cum laude; those in the next 8 percent, magna cum laude; and those in the next 12 percent, cum laude. Graduation honors are not announced before Spring Commencement, and the GPA cutoffs for each level of honors based on the stated percentages are not made public. Students who complete degrees in the summer, fall, or winter quarter are awarded school honors based on the GPA cutoffs established by the prior spring quarter’s graduating class.

Graduation with Departmental Honors

Departmental honors may be granted to graduating seniors who have done outstanding work in a department in connection with a research

project or work of an integrative nature. Students are nominated for these honors by their departments. The faculty of the school concerned makes the final awards. See the school sections of this catalog for more information on departmental honors.

Honorary Organizations and Prizes

Students who qualify by reason of superior scholarship or other outstanding achievement are eligible for membership in certain honorary societies. Some of these recognize outstanding performance within one of the undergraduate schools, while others recognize distinction in a specific field of study, certain extracurricular options, or other endeavors.

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

Student Status

Classification of Students

Class	Units Completed
Senior	33+ units complete
Junior	22 - 33 units complete (Engineering Co-Op students are considered preseniors when they have completed 32 units and seniors when they have completed 40 units)
Sophomore	11 - 22 units complete
First-year student	less than 11 units complete

- 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

Student Status for Financial Aid & Enrollment Verification

Financial Aid Status	Units
Full Time	3.00+
Half-time	2.00-2.99
Less than Half Time or Part Time	Less than 2.00

Class Rank

Northwestern University does not rank its students.

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 and application deadlines can be found at www.registrar.northwestern.edu/forms/interschool_transfer.html.

Auditors

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. Degree-seeking students may not audit classes.

Academic Standing

The faculty of the school in which a student is enrolled determines the academic standing of that student.

Continuing enrollment should be interpreted as good academic standing.

Academic Probation

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.

The following are ordinarily placed on academic probation:

- Students who have received final grades below C in 2 or more courses in any term
- 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 3 quarter-courses or the equivalent in each of 2 consecutive quarters
- Students who, on account of dropped courses, failure, or uncompleted courses, have failed to earn credit for an average of 3 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 4 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 2 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 first-year student 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 first-year student whose record clearly discloses lack of aptitude or flagrant neglect of work.

Academic dismissal from the University is noted on official transcripts at the end of the relevant term.

Disciplinary Actions

Disciplinary Suspension/Expulsion

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

Student Conduct findings that result in dismissal from the University are noted on official transcripts at the end of the relevant term. Expulsion and exclusion are recorded on the transcript; suspension is not. Details about disciplinary policies and records can be found at <http://www.northwestern.edu/student-conduct/>.

Returning to the University

Readmission to the University

Undergraduate students who have not registered for one or more quarters of an academic year must file an application to reenter with their school dean's office no later than six weeks before the first day of registration of the quarter in which they plan to return. Students who seek credit for course work taken at another institution must submit an official transcript to the Office of the Registrar, as well as have the transfer credit approved by relevant Northwestern departments and officials in their home schools.

Application to reenter is not required if students have registered during the spring quarter and intend to return in the fall.

If a student interrupts a program of study for an extended period of time and 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.

Transcripts

Northwestern University Transcripts

Students who have satisfied all financial obligations to the University may request an official transcript of their academic record from the Office of the Registrar in person, by fax, or through CAESAR. Northwestern provides transcripts either on paper or in the form of a certified PDF that may be distributed securely. A fee is charged for all official transcripts

(see Fees under Tuition and Fees). Current students may print unofficial copies for their personal use from CAESAR.

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

Former students may order an official transcript by following the instructions at www.registrar.northwestern.edu/academic_records/obtaining_a_transcript.html. The site provides full information on the University's policies and procedures governing academic records.

Transcripts from Other Institutions

Northwestern neither releases nor certifies copies of transcripts or other academic documents received from other schools or institutions. This includes test score reports and transcripts submitted to Northwestern for admission or evaluation of transfer or study abroad credits. Students who study abroad and subsequently need a transcript of their coursework must request it from the institutions they attended or through their study abroad programs.

Transfer Credit

Per the Undergraduate Registration Requirement (<https://www.registrar.northwestern.edu/registration-graduation/graduation-preparation/undergraduate-registration-requirements.html>), there are required minimum numbers of Northwestern credits and quarters students must earn in order to complete a Northwestern degree. These minimums also affect the numbers of Advanced Placement (AP), transfer credit, and/or other external credit (such as International Baccalaureate) that may be applied toward the undergraduate degree. The requirement varies depending upon whether a student enters as a freshman or transfer student, and whether the degree program is a four-year program or a dual bachelor's degree program. Students should review the requirement (<https://www.registrar.northwestern.edu/registration-graduation/graduation-preparation/undergraduate-registration-requirements.html>) when attempting to transfer credit.

Test Credit

Eligible Advanced Placement (AP) and higher-level International Baccalaureate (IB) scores may be used toward a bachelor's degree. Northwestern may award credit for distinguished performance on certain foreign national examinations, which may also be used toward a bachelor's degree. The type and level of test credit awarded is standardized across the undergraduate schools, though each school has separate rules regarding the use of test credit to fulfill degree requirements. For details refer to the schools' websites.

Students may not receive duplicate credit in one area of study. For example, a student who takes the AP and IB exams in calculus and receives eligible scores on both will be granted credit for only one set of results. Students may only earn credit for exams taken prior to matriculation at Northwestern University, or matriculation at another post-secondary institution before transferring to Northwestern.

An updated test credit policy is published annually for the incoming class. For further details see the Office of the Registrar's website: <https://www.registrar.northwestern.edu/registration-graduation/transfer-and-test-credit/advanced-placement-and-international-baccalaureate-credits.html>.

Transfer Types

Work at Other Institutions

Students who wish to transfer credit for work taken elsewhere during an absence from Northwestern must obtain advance approval of their proposed course of study. Procedures vary depending upon whether the study is part of a study abroad program or simply enrollment at another institution. Students should consult <https://www.registrar.northwestern.edu/registration-graduation/transfer-and-test-credit/transfer-credit-after-enrolling-at-nu.html> for policies and procedures, including the appropriate petition for credit for non-Northwestern courses. An official signed and sealed transcript documenting that work must be submitted to the Office of the Registrar in order for credit to be applied to the student's record.

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 schools. This applies to traditional and online or blended-format courses.

Transfer Students

Transfer students are defined as students who have completed at least one full academic year at a postsecondary institution prior to entering Northwestern. Once admitted, the Office of the Registrar conducts an evaluation of credit earned at the student's previous institution and makes an initial determination of appropriate Northwestern credit to award. Transfer students are held to a different Undergraduate Registration Requirement (<https://www.registrar.northwestern.edu/registration-graduation/graduation-preparation/undergraduate-registration-requirements.html>) than students who enter Northwestern as first-year students; otherwise, all academic policies apply equally.

Undergraduate Registration Requirement

The Undergraduate Registration Requirement applies to undergraduate students seeking a bachelor's degree and must be completed in addition to the degree requirements established by the various school faculties. Each school specifies a minimum number of units of credit needed for a bachelor's degree (42 or more, depending on the degree and school). The URR specifies the number of quarters a student must be registered at Northwestern and how much credit must be earned at Northwestern. It is predicated on the principle that when a student receives a bachelor's degree from Northwestern University, the majority of the student's academic work is completed at the University.

For the purposes of the URR, the following definitions apply:

- Being "registered at Northwestern" for a quarter means that during that quarter the student is registered for and completes Northwestern coursework worth at least 2 full units of credit under the supervision of Northwestern faculty members. Eligible coursework includes, for instance, the practicum in the School of Education and Social Policy and the Journalism Residency in the Medill School of Journalism,

Media, Integrated Marketing Communications. It does not include the Walter P. Murphy Cooperative Engineering Education Program or most study abroad credits (see exception below).

- For counting number of quarters, a credit-bearing course is considered completed if a student receives any of the following grades: A, B, C (including pluses and minuses), D, F, P, N, X, Y, K, or W. Courses in which the student receives an NR are not included. The NR is an administrative notation rather than a grade.
- Only credits earned (not just attempted) count toward the minimum units of credit needed. Thus, only courses in which the student receives an A, B, C (including pluses and minuses), D, or P are included.

The provisions of the URR are as follows:

- A student entering as a first-year student in a four-year degree program must be registered at Northwestern for at least 9 quarters and earn credit for courses worth at least 32 units at the University.
- A student entering as a first-year student and completing a dual bachelor's degree program involving two schools must be registered at Northwestern for at least 12 quarters and earn credit for courses worth at least 42 units at the University. See pages 29–30 for information on approved dual bachelor's degree programs. This provision does not apply to students completing two BS degrees within McCormick; see page 212 for the specific requirements covering this situation.
- A student entering as a transfer student in a four-year degree program must be registered at the University for at least 6 quarters and earn credit for courses worth at least 23 units at the University.
- A student entering as a transfer student and completing a dual bachelor's degree program involving two schools must be registered at Northwestern for at least 9 quarters and earn credit for courses worth at least 32 units at the University. See pages 29–30 for information on approved dual bachelor's degree programs. This provision does not apply to students completing two BS degrees within McCormick; see page 212 for the specific requirements covering this situation.
- Variances of the above provisions apply to students taking study abroad courses with Northwestern course numbers and the SA course designation, students in the Honors Program in Medical Education (details below), and students in the Integrated Science Program (see below for details). Students who complete at least 2 full units of credit in SA-designated courses in a quarter are considered to be registered at Northwestern for that quarter, and this credit will count toward the minimum needed to satisfy the URR. Transfer credit for study abroad courses that do not carry Northwestern course numbers and the SA designation will not be counted toward the URR.
- All HPME students are subject to the following special URR provisions:
 - Students must be enrolled as undergraduates for at least 9 full-time quarters. A full time quarter for HPME refers to one in which the student completes coursework worth at least 3 units of credit. With permission from the HPME director, students may count 1 quarter of Northwestern-approved study abroad toward the 9 quarters. Weinberg HPME students may receive permission to complete a full year of foreign study rather than 1 quarter and will receive a bachelor of science in medicine from the Feinberg School at the end of the first year of medical school.
 - Students must earn at least 36 units of credit as undergraduates, plus credit earned in required labs. Only credit earned at

Northwestern or through Northwestern-approved study abroad (with permission) may be counted toward this requirement.

- The P/N option is not permitted for any courses taken to satisfy the URR; a student may apply 1 unit from the approved P/N course listing (BIOL_SCI 398-0 Tutorial in Biology, BMD_ENG 399-0 Projects) toward the 36-unit requirement. A student who applies BIOL_SCI 398-0 Tutorial in Biology to the 36-unit requirement will be required to complete BIOL_SCI 399-0 Independent Research in a subsequent quarter. If a student takes BIOL_SCI 398-0 Tutorial in Biology but decides later to not enroll in BIOL_SCI 399-0 Independent Research, he or she must speak with the HPME director. Approval for this request is handled on a case-by-case basis at the director's discretion.
- ISP students in Weinberg College are subject to the following special URR provisions:
 - Students must register for at least 6 quarters and complete at least 23 units of credit at Northwestern.
 - The remainder of the 38.7 minimum units required of ISP students may be a combination of test and approved transfer (including study abroad) credit.

A student may appeal for a URR variance to the Registration Requirement Appeals Committee, which consists of the associate provost for University enrollment, the associate provost for undergraduate education, the University registrar, and two associate or assistant deans from different undergraduate schools. The deans serve three-year terms on a rotating basis. The student should submit a written petition to an adviser familiar with his or her situation. The adviser writes a letter of support and submits both documents to the Office of the Registrar for the committee's consideration. The appeal must be specific and document any unusual or mitigating circumstances, such as illness, family hardship, or a death in the family. The Registration Requirement Appeals Committee convenes on a regular basis to review petitions.

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
or nu-registrar@northwestern.edu

ADDITIONAL BACCALAUREATE OPTIONS

Undergraduate degree requirements are established by the faculties of each school and thus differ significantly by school. A student's degree requirements are determined by their school, and all must pursue at least one major (their degree major) in their home school to earn a Northwestern undergraduate degree.

Students often also elect to pursue additional majors (p. 33), minors (p. 30), certificates (p. 28), and other special programs in schools other than their own, in addition to those from their home school. A program like this results in a single undergraduate degree with multiple majors.

Students may also apply and be admitted to multiple schools that offer pre-approved dual degrees (p. 35). A program like this results in two different undergraduate degrees conferred by the two different schools and often requires an additional year of study.

Accelerated Bachelors Integrated Science Program

The Integrated Science Program (ISP) (p. 278) is a highly selective undergraduate program of integrated science studies within Weinberg College. The curriculum provides a thorough and rigorous background in the major scientific disciplines and mathematics and offers special research opportunities. ISP can lead to a bachelor of arts degree from Weinberg College in three years or, after a fourth year at Northwestern, to a double major or an advanced degree. Students from the McCormick School of Engineering and Applied Sciences who have been admitted to ISP may complete Integrated Science as an additional major, but it does not accelerate completion of the bachelor of science degree. For information on applying to ISP, see Special Admission Programs (p. 11). For a description of the program, see the Integrated Science (p. 278) section of this catalog and isp.northwestern.edu.

Certificates

Smaller in scope than majors or minors, certificates usually are offered in areas of concentration for which no major or minor exists and are comprised of at least 4 units of coursework that are not also applied to a major or a minor. Certificates are conferred concurrent with the student's undergraduate degree. They do not appear on the diploma, but are noted on the transcript.

Most undergraduate schools and the Kellogg School of Management offer certificates for undergraduate students. See the list of offerings on the left in the web navigation and in subsequent pages in the PDF.

Kellogg Certificates

kellogg.northwestern.edu/certificate

The Kellogg School of Management administers a program leading to an undergraduate certificate in either financial economics or managerial analytics. Each certificate requires completion of four courses taught at an advanced level by Kellogg faculty members. Building on students' existing analytical skills, the certificate curriculum serves as excellent

preparation for careers in consulting, financial services, and other data-driven professions and/or for doctoral or professional school programs.

About 100 students each year are accepted into the certificate program through a competitive application process. Any Northwestern undergraduate who meets the program's rigorous selection criteria may apply. Course prerequisites include advanced calculus and linear algebra, intermediate probability and statistics, advanced econometrics and statistics, microeconomics, and optimization; see kellogg.northwestern.edu/certificate for a complete list.

Certificate students also benefit from one-on-one counseling from a dedicated career development specialist to help them secure summer internships and full-time employment.

Financial Economics Certificate

The 2018–19 financial economics curriculum comprises the following four courses:

Course	Title
KELLG_FE 310-0	Principles of Finance
KELLG_FE 312-0	Investments
KELLG_FE 314-0	Derivatives
KELLG_FE 316-0	Topics in Financial Economics

KELLG_FE 310-0 Principles of Finance (1 Unit) Foundation course for the certificate; taken in the fall. Basic principles of finance, focusing on the effects of time and uncertainty on value. First half emphasizes valuation, including discounted cash flows, equity and debt valuation, the term structure of interest rates, portfolio theory, asset pricing, and efficient market theory. Second half examines firms' financing decisions, including capital budgeting, capital structure, and payout policy.

KELLG_FE 312-0 Investments (1 Unit) 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. Performance evaluation, trading costs, and other special topics.

KELLG_FE 314-0 Derivatives (1 Unit) Use and pricing of forwards and futures, swaps, and options. Strategies for speculation and risk management, no-arbitrage pricing for forward contracts, binomial and Black-Scholes option pricing models, applications of pricing models in other contexts.

KELLG_FE 316-0 Topics in Financial Economics (1 Unit) In-depth examination of selected issues in finance.

Managerial Analytics Certificate

The 2018–19 managerial analytics curriculum comprises the following four courses:

Course	Title
KELLG_FE 310-0	Principles of Finance
KELLG_MA 324-0	Operations and Supply Chain Management
KELLG_MA 326-0	Topics in Managerial Analytics
KELLG_MA 322-0	Pricing

KELLG_MA 320-0 Analytical Decision Modeling (1 Unit)

KELLG_MA 322-0 Pricing (1 Unit) Comparison of the three main ways to set prices—haggling/negotiation, posted price, and auctions. 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, pricing multiple products. Introduction to techniques for gathering information about buyer valuations and demands, including regression, conjoint analysis, and enterprise value creation.

KELLG_MA 324-0 Operations and Supply Chain Management (1 Unit)

Management of business processes-i.e., a firm's recurring activities. Challenges facing operations managers; the language, concepts, insights, and tools needed to gain competitive advantage through operations and supply chains; different strategies for different processes and supply chain structures, and the operational capabilities allowing and supporting them.

KELLG_MA 326-0 Topics in Managerial Analytics (1 Unit) In-depth examination of selected issues in managerial analytics; topic varies each year.

KELLG_MA 328-0 Competitive Strategy and Industrial Structure (1 Unit)

The course studies the determinants nature of competitive strategy in a variety of industry structures.

McCormick Certificates

In the McCormick School of Engineering and Applied Science

All certificates in the McCormick School of Engineering are open to students from other Schools. These include the following:

- Architectural Engineering and Design (p. 136)
- Segal Design (p. 158)
- Business Enterprise (<https://www.mccormick.northwestern.edu/academics/undergraduate/programs/certificates-and-minors/business-enterprise-certificate.html>)

Information on these options, including course requirements and application instructions, can be found in Academic Options (p. 118) of the McCormick school section.

Medill Certificates

In the Medill School of Journalism, Media, Integrated Marketing Communications

Medill offers a Certificate in Integrated Marketing Communications Program (p. 170) open to undergraduates throughout Northwestern and includes prerequisite courses from the other undergraduate schools. Details on prerequisites and requirements can be found in the Medill School (p. 167) section of this catalog. Medill also offers a range of courses for non-majors.

Programs & Centers Certificates

- Leadership (p. 29)
- Sustainability and Energy (p. 29)

Leadership

lead.northwestern.edu

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

Certificate Requirements (4 units)

Course	Title
1 introductory course:	
LDRSHP 204-0	Paradigms and Strategies of Leadership
Field study component:	
LDRSHP 396-0	Field Studies in Leadership (2 units)
1 elective course ¹	

- ¹ 1 elective course complementing LDRSHP 204-0 Paradigms and Strategies of Leadership
- May be taken at any time but ideally after LDRSHP 204-0 Paradigms and Strategies of Leadership.
 - Chosen from a preapproved list (found on the ULP website) to provide a macro-level exploration of leadership; students may petition to substitute an appropriate course not on the list.

LDRSHP 204-0 Paradigms and Strategies of Leadership (1 Unit) ULP students' introduction to six foundational leadership assets: asking powerful questions, navigating and leading amid change, inspiring others through narrative, mobilizing difference to maximize team performance, thriving in collaborative and hierarchical settings, and responding to setbacks and failure with resilience. Components include weekly lectures, guest speakers, and discussion groups.

LDRSHP 396-0 Field Studies in Leadership (2 Units) Students have the opportunity to leave a positive "leadership footprint" by fostering the success of a group, organization, or community. Spending at least 160 hours outside the classroom, they undertake a leadership role, an internship or externship, or a community engagement experience, exploring leadership models and concepts through application. Consent of instructor required.

Sustainability and Energy

isen.northwestern.edu

The Institute for Sustainability and Energy at Northwestern (ISEN) advances global energy and sustainability solutions through transformational research, interdisciplinary education, and public engagement. ISEN supports on-campus research at the undergraduate, graduate, and faculty levels spanning multiple fields, including physical and social sciences, engineering, law, policy, ethics, business, economics, and journalism. It also sponsors a variety of outreach programs, both on and off campus, in collaboration with student groups, academic and governmental partners, and private industry.

ISEN also offers curriculum at the undergraduate and graduate levels, including an undergraduate certificate in sustainability and energy. It provides a means for Northwestern students to pursue interdisciplinary instruction in the increasingly important areas of sustainability and energy during their undergraduate coursework, while signaling broad topic proficiency to potential future employers. See more at isen.northwestern.edu/isen-certificate.

In partnership with Northwestern's Study Abroad Office, Office of International Program Development, and Northwestern Engineering Office for Global Initiatives, ISEN offers for-credit and non-credit summer programs in China, Germany, and Israel, with a focus on renewable energy policy, green technology development, sustainable manufacturing, and water resource management. See more at isen.northwestern.edu/study-abroad.

Certificate Requirements (7 units)

Course	Title
ISEN 210-0	Introduction to Sustainability: Challenges and Solutions
ISEN 220-0	Introduction to Energy Systems for the 21st Century
ISEN 230-0	Climate Change and Sustainability: Ethical Dimensions

- 4 electives
 - Chosen from pre-approved curricula—including study abroad options—in the natural and social sciences, engineering, and other disciplines. An eligible electives list (along with registration forms and FAQs) is at isen.northwestern.edu/isen-certificate.
 - Can draw no more than 2 elective courses from a single department/program.
 - At least 3 must be 300 level or higher.
 - 3.0 GPA requirement.
- Up to 3 of the 7 total courses may be double-counted toward all other academic plans (major, minor, other certificates; including distribution requirements, unrestricted electives, etc).

ISEN 210-0 Introduction to Sustainability: Challenges and Solutions (1 Unit) Introduction to using lifecycle systems perspectives in forming evaluations and basic quantitative understandings of the challenges and potential solutions that exist for sustainable societies; framing these in the context of resource use, energy consumption and development, and environmental constraints. *Social Behavioral Sciences Distro Area*

ISEN 220-0 Introduction to Energy Systems for the 21st Century (1 Unit) Overview of energy issues in the context of global sustainability: energy demands for industrial, transportation, housing, and commercial uses, strategies for demand reduction, traditional versus renewable energy systems. *Natural Sciences Distro Area*

ISEN 230-0 Climate Change and Sustainability: Ethical Dimensions (1 Unit) Interdisciplinary analysis of economic and ethical issues concerning climate change; scientific evidence for anthropogenic global warming; economics and ethics of resource use, conservation practices, and sustainability. ISEN 230-0 taught with PHIL 270-0; students may not earn credit for both courses. *Ethics Values Distro Area*

ISEN 350-SA Energy Technology & Policy in China (1 Unit) Examines the energy landscape in China, including an overview of various energy technologies, national policies, practical applications, and future innovations, through lectures and field trips in the US and China. Restricted to students in Northwestern's China program.

ISEN 390-0 Special Topics in Energy & Sustainability (1 Unit) Focused exploration of specific topical themes, trends, and challenges in applied energy and sustainability. Content varies each year; previously offered topics include geographic information systems and the impact of energy systems on the geographic distribution, wellbeing, and social organization of societies. May be repeated for credit with change in topic.

ISEN 390-SA Special Topics in Energy & Sustainability (1 Unit) Focused exploration of specific topical themes, trends, and challenges in applied energy and sustainability. Content varies each year; previously offered topics include geographic information systems and the impact of energy systems on the geographic distribution, wellbeing, and social organization of societies. May be repeated for credit with change in topic.

SESP Certificates

In the School of Education and Social Policy

Northwestern undergraduates regardless of school may participate in the School of Education and Social Policy's Certificate in Civic Engagement Program (p. 114) and Summer Field Studies Programs (p. 114) in Chicago, Washington, DC, and San Francisco. For more information on these programs, see the School of Education and Social Policy (p. 97) chapter of this catalog.

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

Teaching Certification

The School of Education and Social Policy offers its students and students in Weinberg College the option to complete the requirements of the Teacher Preparation and Certification program (p. 106) to qualify for Illinois state certification.

Minors

Minors are smaller in scope than majors and offer an opportunity to become familiar with other areas of study outside one's degree major. They do not appear on the diploma, but are noted on the transcript.

Most undergraduate schools offer minors for undergraduate students outside their own school. See the list of offerings on the left in the web navigation and in subsequent pages in the PDF.

Bienen Minors

In the Bienen School of Music

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

- Commercial music (p. 46)
- General music (p. 55)
- Music cognition (p. 57)
- Music composition (p. 49)
- Music technology (p. 49)
- Musicology (p. 59)

Information on these options, including course requirements and application instructions, can be found at the Bienen School (p. 45) section of this catalog.

Programs & Centers Minors

Transportation and Logistics

transportation.northwestern.edu

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

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

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

Transportation and Logistics Minor

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

Students in the McCormick School may double-count a maximum of 2 courses from their major program toward the minor. Students from other schools are not allowed to double-count courses that are part of their major but may count courses that fulfill related course, distribution, or social science and humanities requirements.

Prerequisites

In preparation for pursuing the minor, students should take courses in calculus and in probability and statistics.

Minor Requirements (7 units)

- TRANS 310-0 Seminar in Transportation and Logistics
- 3 or more core courses
 - Chosen from the following:

Course	Title
ECON 310-1	Microeconomics
ECON 355-0	Transportation Economics and Public Policy
CIV_ENV 371-0	Introduction to Transportation Planning and Analysis
CIV_ENV 376-0	Transportation System Operations
IEMS 310-0	Operations Research
or IEMS 313-0	Foundations of Optimization
IEMS 381-0	Supply Chain Modeling and Analysis
IEMS 383-0	Service Operations Management

- 2 must be outside the student's major program.
- No substitutions are allowed.
- 3 additional courses selected from core courses or approved electives:
 - Approved electives include the following:

Course	Title
ECON 309-0	Public Finance
ECON 337-0	Economics of State and Local Governments
ECON 349-0	Industrial Economics
ECON 350-0	Monopoly Competition & Public Policy
ECON 354-0	Issues in Urban and Regional Economics
ECON 361-0	International Trade
ECON 371-0	Economics of Energy
ECON 372-0	Environmental Economics
or ECON 370-0	Environmental & Natural Resource Economics
ECON 373-0	Natural Resource Economics
or ECON 370-0	Environmental & Natural Resource Economics
ECON 381-1	Econometrics
ECON 381-2	Econometrics
GEOG 312-0	Geography of Chicago & Its Region
GEOG 341-0	Principles of Cartography
GEOG 343-0	Geographic Information Systems
HISTORY 322-2	Development of the Modern American City: 1880-Present
POLI_SCI 321-0	Urban Politics
POLI_SCI 322-0	Ideas and Institutions in Urban Politics
POLI_SCI 329-0	U.S. Environmental Politics
SOCIOL 301-0	The City: Urbanization and Urbanism
SOCIOL 312-0	Social Change and the Environment
CIV_ENV 205-0	Economics and Finance for Engineers
or BUS_INST 304-0	Corporate Finance
or ECON 360-1	Foundations of Corporate Finance Theory
or KELLG_FE 310-0	Principles of Finance
CIV_ENV 304-0	Civil and Environmental Engineering Systems Analysis
CIV_ENV 330-0	Engineering Project Management
CIV_ENV 368-0	Sustainability: The City
IEMS 315-0	Stochastic Models
IEMS 317-0	Discrete Event Systems Simulation
IEMS 365-0	Analytics for Social Good
IEMS 382-0	Production Planning and Scheduling
1 unit of approved independent study	
Graduate Level Courses	
CIV_ENV 471-1	Transportation Systems Analysis 1
CIV_ENV 471-2	Transportation Systems Analysis 2
CIV_ENV 472-1	Transportation System Operations and Control 1: Urban Networks
CIV_ENV 472-2	Transportation System Operations and Control 2: Scheduled Modes and Real-Time
CIV_ENV 473-0	Survey methods, data and analysis
CIV_ENV 480-1	Travel Demand Analysis & Forecasting 1
CIV_ENV 480-2	Advances in Travel Demand Analysis and Forecasting
CIV_ENV 482-0	Evaluation and Decision Making for Infrastructure Systems
CIV_ENV 483-0	Infrastructure Systems Analysis

CIV_ENV 484-0	Advanced Theories of Traffic Flow
IEMS 481-0	Logistics

- At least 2 of the core or elective courses must be outside the school in which the student is registered.
- Students in the McCormick School may double-count a maximum of 2 courses from their major program toward the minor.
- Students from other schools are not allowed to double-count courses that are part of their major but may count courses that fulfill related course, distribution, or social science and humanities requirements.
- 4XX level courses require consent of the instructor and the Director of the Transportation and Logistics Program.

TRANS 310-0 Seminar in Transportation and Logistics (1 Unit) Yearlong senior seminar on the structure of the transportation and supply-chain industries and evaluation of relevant public policy. Students receive 1 credit in the spring quarter of their senior year.

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

SoC Minors

In the School of Communication

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

- Dance minor (p. 92)
- Film and media studies minor (p. 83)
- Human communication sciences minor (p. 73)
- Performance studies minor (p. 80)
- Sound design minor (p. 84)
- Theatre minor (p. 95)
- Modules in comedy arts; digital media; health communication; media arts and game design; performance, activism, and human rights; performance studies, analyses and applications; playwriting; theatre management; and theatrical design.

See the School of Communication (p. 67) section of this catalog for more information.

McCormick Minors

In the McCormick School of Engineering and Applied Science

All minors in the McCormick School of Engineering are open to students from Northwestern's other undergraduate schools. These include the following:

- Biotechnology and Biochemical Engineering (p. 126)
- Computer Science (p. 148)
- Entrepreneurship (p. 150)
- Environmental Engineering (p. 136)

Information on these options, including course requirements and application instructions, can be found in Academic Options (p. 118) of the McCormick school section.

WCAS Minors

In Weinberg College of Arts and Sciences

All majors and minors in Weinberg College are open to students from Northwestern's other undergraduate schools. These include traditional fields of study in the social sciences, the humanities, mathematics, and the natural sciences, as well as many interdisciplinary majors and minors. Undergraduate students from throughout Northwestern may also participate in the Chicago Field Studies programs (p. 218) housed within Weinberg College.

For more information on all these options, see the Judd A. and Marjorie Weinberg College of Arts and Sciences (p. 175) chapter of this catalog.

The following academic units offer Weinberg College minors:

- African American Studies (p. 180)
- African Studies (p. 185)
- Anthropology (p. 187)
- Art History (p. 193)
- Asian American Studies (p. 197)
- Asian Languages and Cultures (p. 199) (minors in Asian Humanities or Advanced Asian Languages)
- Asian Studies (p. 205)
- Business Institutions (p. 210)
- Chemistry (p. 212)
- Classics (p. 219) (minors in Latin, Greek, or Classical Studies)
- Cognitive Science (p. 222)
- Comparative Literary Studies (p. 225) (minor in World Literature)
- Computer Science (p. 228)
- Critical Theory (p. 231)
- Earth and Planetary Sciences (p. 231)
- Economics (p. 235)
- English (p. 239) (minors in English and American Literature or Creative Writing)
- Environmental Policy and Culture (p. 244)
- French and Italian (p. 248) (minors in French or Italian)
- Gender and Sexuality Studies (p. 256)
- Geography (p. 259)
- German (p. 260) (minors in German, German Studies, or Business German)
- Global Health Studies (p. 266)
- History (p. 268)
- Humanities (p. 276)
- International Studies (p. 279)
- Jewish Studies (p. 281) (minors in Jewish Studies or Hebrew Studies)
- Latina and Latino Studies (p. 285)
- Latin American and Caribbean Studies (p. 284)
- Legal Studies (p. 287)
- Linguistics (p. 289)
- Materials Science (p. 291)
- Mathematics (p. 295)
- Middle East and North African Studies (p. 303)

- Philosophy (p. 312)
- Physics and Astronomy (p. 316) (minor in Physics)
- Political Science (p. 322)
- Psychology (p. 329)
- Religious Studies (p. 334) (minors in Religious Studies or Catholic Studies)
- Science in Human Culture (p. 337)
- Slavic Languages and Literatures (p. 339) (minor in Russian and East European Studies)
- Sociology (p. 344)
- Spanish and Portuguese (p. 348) (minors in Spanish or Portuguese Language and Lusophone Cultures)
- Statistics (p. 355)

Second Majors

In addition to their primary (degree) majors, students may pursue a "second" major. The Weinberg College of Arts and Sciences and the Bienen School of Music offer their majors as primary or second majors; other schools' majors are only available as primary majors, meaning they can only be earned by students in the appropriate school and degree program. The completion of a second (or third) major, whether it is offered by a student's home school or another school, results in a single undergraduate degree conferred by the home school with additional majors noted on the transcript.

Dual undergraduate degree programs, which result in two different degrees conferred by different schools, can be found in the Dual Bachelor's Degrees (p. 35) section.

Bienen Second Majors

In the Bienen School of Music

Any undergraduate student may undertake a second major from the Bienen School with successful completion of the application and audition process.

Information on these options, including course requirements and application instructions, can be found at the Bienen School (p. 45) section of this catalog.

WCAS Second Majors

In the Weinberg College of Arts and Sciences

All majors and minors in Weinberg College are open to students from Northwestern's other undergraduate schools. These include traditional fields of study in the social sciences, the humanities, mathematics, and the natural sciences, as well as many interdisciplinary majors and minors. Adjunct majors must be completed with another major that is *not* an adjunct major; they are always a "second major" along with a primary major in the College or another of the undergraduate schools at Northwestern. Students from throughout Northwestern may also participate in the Chicago Field Studies programs (p. 218) housed within Weinberg College.

For more information on all these options, see the Judd A. and Marjorie Weinberg College of Arts and Sciences (p. 175) chapter of this catalog.

The following academic units offer majors in Weinberg College:

- African American Studies (p. 180)
- African Studies (p. 185) (adjunct major)
- American Studies (p. 186) (special admission requirements)
- Anthropology (p. 187)
- Art History (p. 193)
- Art Theory and Practice (p. 196)
- Asian American Studies (p. 197)
- Asian Languages and Cultures (p. 199)
- Asian Studies (p. 205)
- Biological Sciences (p. 206)
- Chemistry (p. 212)
- Classics (p. 219)
- Cognitive Science (p. 222)
- Comparative Literary Studies (p. 225)
- Computer Science (p. 228)
- Earth and Planetary Science (p. 231)
- Economics (p. 235)
- English (p. 239) (major in English and American Literature; special admission requirements for major in Creative Writing)
- Environmental Sciences (p. 245)
- French and Italian (p. 248) (majors in French or Italian Literature and Culture)
- Gender and Sexuality Studies (p. 256)
- Geography (p. 259) (adjunct major)
- German (p. 260)
- Global Health Studies (p. 266) (adjunct major)
- History (p. 268)
- Integrated Science (p. 278) (special admission requirements)
- International Studies (p. 279) (adjunct major)
- Jewish Studies (p. 281)
- Latina and Latino Studies (p. 285)
- Legal Studies (p. 287) (special admission requirements)
- Linguistics (p. 289)
- Materials Science (p. 291)
- Mathematical Methods in the Social Sciences (p. 294) (adjunct major; special admission requirements)
- Mathematics (p. 295)
- Middle East and North African Studies (p. 303)
- Neurobiology (p. 307) (major in Neuroscience)
- Philosophy (p. 312)
- Physics and Astronomy (p. 316)
- Political Science (p. 322)
- Psychology (p. 329)
- Religious Studies (p. 334)
- Science in Human Culture (p. 337) (adjunct major)
- Slavic Languages and Literatures (p. 339) (Russian Language, Literature, and Culture or Russian and East European Studies)
- Sociology (p. 344)
- Spanish and Portuguese (p. 348) (major in Spanish)
- Statistics (p. 355)

DUAL GRADUATE & UNDERGRADUATE DEGREES

Accelerated Master's Programs

Accelerated master's programs enable exceptional, advanced undergraduates to apply for admission early and meet requirements for the master's degree in an expedited manner. The programs are highly demanding intellectually, require early commitment to a discipline, and necessitate careful planning.

The Graduate School offers combined degree programs in the following disciplines: chemistry, comparative literary studies, economics, French, linguistics, plant biology and conservation, public health and all departments in the McCormick School except Industrial Engineering and Management Sciences. Interested students should consult The Graduate School's website for application and degree requirements.

The Northwestern Pritzker School of Law offers a coordinated bachelor's degree/master of science in law degree program for Weinberg College and McCormick School students in STEM fields. More information is available from the MSL program.

Students in Medill who exhibit exceptional ability in undergraduate work may apply to that school's graduate division for early admission to the graduate journalism program. This program allows students to qualify for BSJ and MSJ degrees in 12 to 15 quarters of full-time study. More information is available from the Medill Office of Graduate Admissions.

Honors Program in Medical Education

feinberg.northwestern.edu/sites/hpme

The Honors Program in Medical Education provides an opportunity for highly talented high school seniors to be admitted to an undergraduate program and to the Feinberg School of Medicine and to complete their formal premedical and medical studies in seven or eight years. Applicants should be able to qualify for advanced placement in chemistry and mathematics. Each year a small number of students are admitted to the program and to Weinberg College, the School of Communication, or the McCormick School. Only candidates applying directly from high school are considered. For information on applying, see Special Admission Programs (p. 10).

The first three or four years of the program are spent in undergraduate study, during which students must complete coursework that meets HPME requirements—including chemistry, physics, and biological sciences courses and labs—as well as courses that meet their school's HPME requirements. Special Undergraduate Registration Requirement (p. 26) provisions apply to HPME students. To remain in the program, students must maintain designated grade point averages both in required science courses and overall.

In addition to the required science courses, HPME students enrolled in Weinberg College fulfill the college's general education requirements by taking courses in four areas of inquiry: social and behavioral sciences, historical studies, ethics and values, and literature and fine arts. They complete at least one first-year seminar as well as other Weinberg College requirements. The third year is usually devoted to completing the requirements for a BA in Weinberg College by doing advanced coursework

in the major and/or to studying abroad in a Northwestern-affiliated program. Students may also take an additional undergraduate year at Northwestern.

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

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

After the first three or four years, HPME students who meet the program requirements matriculate to the Chicago campus as members of the first-year Feinberg School of Medicine class. After successfully completing their first year at Feinberg, 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. McCormick School students either fully complete BS requirements in biomedical engineering during the undergraduate phase of their studies or qualify for the BS in biomedical engineering after successfully completing the second year at Feinberg.

At the end of seven or eight years, HPME students qualify for the doctor of medicine degree from the Feinberg School of Medicine.

Premedical Scholars Program

feinberg.northwestern.edu/admissions/nupsp

The Northwestern Undergraduate Premedical Scholars Program (NUPSP) is an early MD acceptance program for high-achieving Northwestern undergraduate students who have completed two full years of undergraduate study with a demonstrated commitment to a career in medicine who aspire to admission into Northwestern University Feinberg School of Medicine.

NUPSP is for students who have committed to the Feinberg School of Medicine as their program of choice and requires a binding decision on the part of both the applicant and the medical school. Students are accepted during their third undergraduate year for matriculation into Feinberg after their fourth (and final) undergraduate year. The program is not designed to be a fast-track to medical school. Transfer students may apply if they meet the listed requirements and coursework was conducted at a similarly rigorous program.

Each year, approximately three to six students are offered early acceptance to Feinberg via this program. The accepted student agrees to enter FSM in August of the calendar year after acceptance and, assuming all program provisions are met, Feinberg agrees to commit a seat to the applicant.

NUPSP is committed to MD applicants only (NUPSP does not accommodate those interested in the MD/PhD program) and does not require program participants to take the MCAT Examination.

DUAL BACHELOR'S DEGREES

Qualified students may earn bachelor's degrees from two different undergraduate schools at Northwestern. Five years of full-time study are usually required.

For information on applying to the combined programs, see Application to Dual Bachelor's Degree Programs (p. 11).

Dual Bachelor's Degree Programs

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

- BA/BS in liberal arts and engineering
- BA/BMus in liberal arts and music
- BA/BS or BS/BS in communication and engineering
- BA/BMus, BS/BMus, BA/BAMus, or BS/BAMus in communication and music
- BS/BS or BS/BS in education and social policy and in music
- BS/BMus or BS/BAMus in engineering and music
- BSJ/BMus or BSJ/BAMus in journalism and music

Typically, five years of faculty-approved full-time study are required to complete any of these programs and meet the Undergraduate Registration Requirement (p. 26).

Students in dual degree programs must earn at least 42 credits in 12 quarters at Northwestern to fulfill the URR.

Students apply to the BA/BS program in liberal arts and engineering after matriculating. For information on applying to the other programs, see the section titled Application to Dual Bachelor's Degree Programs (p. 11) in Admissions. Students receiving financial aid should also note the restrictions under Financial Aid (p. 14).

Liberal Arts and Engineering Program

Qualified Northwestern undergraduates with strong interests in the liberal arts as well as engineering may elect to earn both a bachelor of arts degree in a liberal arts discipline from Weinberg College and a bachelor of science degree in an engineering field from the McCormick School (BA/BS). Students may pursue any combination of majors from the two schools. They must complete all requirements of both schools and both majors and are subject to all regulations of both schools and the URR. The one exception is that students may be exempted—by decision of the Weinberg College associate dean for undergraduate academic affairs—from the rule that a minimum of 34 Weinberg College courses must be completed toward requirements for a Weinberg BA degree.

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

Liberal Arts and Music Program

Some Northwestern undergraduates choose to combine intensive study in music with a broad exploration of the liberal arts and a major in a liberal arts discipline. Students accepted into the Weinberg College–Bienen School of Music dual bachelor's degree program may simultaneously earn a bachelor of arts degree from Weinberg College and a bachelor of music degree from the Bienen School (BA/BMus). In addition to the URR, they must complete all Weinberg College degree requirements, including at least 30 Weinberg courses (other students must complete 34; details about what constitutes a Weinberg course can be found in this Catalog under Weinberg College Requirements (p. 175)), as well as all Bienen School degree requirements, including at least 30 music courses.

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

Communication and Engineering Program

The dual degree program in communication and engineering offers students the opportunity to earn both a bachelor of science in engineering and either a bachelor of science or a bachelor of arts in communication in five years. Students may select any of the School of Communication's six majors and any of the available programs in engineering.

Dual degree students must complete all requirements for both degrees and are subject to all regulations of both schools and the URR. Each school enforces all of its policies regarding requirements.

Current students interested in pursuing the dual degree in communication and engineering should contact advisers in the Undergraduate Engineering Office and a School of Communication adviser in the desired major. Contact information for School of Communication advisers is available at communication.northwestern.edu/advising.

Communication and Music Program

The dual degree program in communication and music offers students the opportunity to earn both a bachelor of science or bachelor of arts in communication and either a bachelor of music or bachelor of arts in music. Students may select any of the School of Communication's six majors and any of the available programs in music.

Dual degree students must complete all requirements for both degrees and the URR. Each school enforces all of its policies regarding requirements.

Current students interested in pursuing the dual degree in communication and music should contact the assistant dean for student affairs in the Bienen School of Music and a School of Communication adviser in the desired major. Contact information for advisers is available at communication.northwestern.edu/advising.

Education and Social Policy and Music Program

The dual degree program in music and education and social policy offers students the opportunity to earn a bachelor of music/bachelor of arts in music and a bachelor of science in education and social policy in five years, developing their passion for music as a tool for creating change in learning environments, human relationships, organizations, and the field of social policy.

Students may select any of the Bienen School's undergraduate majors and any of SESP's undergraduate majors except secondary teaching. Students must complete all requirements for both degrees as well as the URR. Each school enforces all of its policies regarding requirements.

Engineering and Music Program

Highly capable students who have a strong interest in and commitment to both engineering and music may apply to the McCormick School–Bienen School dual bachelor's degree program. Students accepted into this program may simultaneously earn a bachelor of science degree from the McCormick School and a bachelor of music or bachelor of arts in music degree from the Bienen School (BS/BMus or BS/BAMus). Students must complete all requirements of both schools and both majors and are subject to all regulations of both schools and the URR.

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

Journalism and Music Program

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

The program requires completion of all Medill and Bienen School degree requirements as well as the URR. Students should work with advisers from both schools to develop a timeline for completing all requirements within five years of enrollment.

STUDY OUTSIDE NORTHWESTERN

Study Abroad

northwestern.edu/abroad

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

Undergraduate Learning Abroad (ULA) and the Global Engagement Studies Institute (GESI) provide information and advising to all students interested in study abroad. Students must submit a study abroad application, including signatures from school advisers and, in many cases, department advisers; approval is required before the study abroad experience. 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 150 programs administered by or affiliated with the University. Students participating in University exchange programs and some programs administered by the University continue to pay Northwestern tuition. For all other programs, students pay the program fee plus a Northwestern administrative fee. Students participating in Northwestern-sponsored and affiliated programs may apply for financial aid, including Northwestern grant assistance, to help offset the cost of their programs. Additional sources of funding include ULA and external scholarships (<https://www.northwestern.edu/studyabroad/guide/money-matters/scholarships-funding>).

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

Since study abroad often requires special language or other preparation, interested students consult with advisers in ULA, as well as in academic departments, Undergraduate Financial Aid (<https://undergradaid.northwestern.edu>), and the Office of Fellowships (<https://www.northwestern.edu/fellowships>). Other resources include information sessions, an annual study abroad fair, ULA Student Ambassadors, and detailed information on study abroad programs and policies on the ULA website (<https://www.northwestern.edu/abroad>).

Field Studies and Internships

Many off-campus field studies, internships, and research opportunities sponsored by schools and departments, including McCormick's co-op program, are available to Northwestern students. The programs vary greatly. Some carry academic credit and/or a stipend. Some are done in conjunction with coursework, while others require full-time commitment and may involve living away from campus. Field study (p. 218) and internship opportunities are available during both the regular academic year and Summer Session. See the individual schools and departments in this catalog for details. Additional information on internship opportunities is available from Northwestern Career Advancement.

UNDERGRADUATE RESEARCH

Fellowships

northwestern.edu/fellowships

Northwestern undergraduates win an array of national and international fellowships. Such awards fund study, research, and service opportunities in the United States and around the globe. The Office of Fellowships works with students in group and individual advising sessions to identify fellowships that fit their educational, professional, and personal goals. The office offers guidance on the preparation of written applications and conducts practice interviews.

Independent Study (399)

Many departments offer seminars and independent studies for qualified undergraduates. An independent study, typically numbered 399, 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 quarter is 2 units.

Support for Undergraduate Research Endeavors

undergradresearch.northwestern.edu

globalresearchopportunities.northwestern.edu

The Office of Undergraduate Research (OUR) awards more than \$1.3 million annually to students pursuing research and creative projects across all fields of study. OUR uses an advising-centric model that focuses on helping students learn how to get started and how to write successful grant proposals; OUR advisors meet one-on-one with more than 450 students a year, totaling over 1,200 advising appointments.

OUR has three core programs. The Undergraduate Research Assistant Program (URAP) allows faculty to apply for funding to hire students to help with their own projects in a formal mentoring environment designed to foster rapid development. The program focuses on assisting students just getting started in research and prefers disciplines where funding for undergraduates is hard to get, such as in the humanities or creative arts.

The Undergraduate Research Grant (URG) program funds independent research and creative projects across all disciplines. The 35+ member faculty review committee is currently charged with offering a strictly merit-based review of grant proposals. This process means that the committee can fund any and all projects that they feel are worthy. If a student has a solid idea, works with faculty mentors, and uses the Office's advising to learn how to write a successful grant proposal, then the competition is not between students, but rather challenges the individual student to discover what is needed in a field and create a project to potentially address this need to gain funding. These grants regularly transform a student's experience of college and beyond. Finally, OUR runs the Undergraduate Research and Arts Exposition, an annual showcase of student work through oral presentations, posters, and a Creative Arts Festival. For all participants, OUR runs workshops designed to help students develop strong and effective communication skills, specifically for an audience that isn't already familiar with their field of interest.

Other OUR grants provide support for intensive language study or for conference travel. An annual \$9,000 award—the Circumnavigators

Travel-Study Grant, jointly funded by Northwestern University and the Circumnavigators Club Foundation—enables one undergraduate researcher to undertake around-the-world travel during the summer before senior year. In addition, OUR manages the Global and Research Opportunities website, allowing students easy, searchable access to opportunities within and beyond Northwestern, and OUR collaborates to other schools, departments, and units who also provide funds to support undergraduate research experiences.

SPECIAL PROGRAMS & COURSES

Special Courses

Residence-Linked Seminars

Students in residential colleges or residential communities may take residence-linked seminars on a theme of common interest. Associated faculty members direct the seminars, which meet in the residence and are normally limited to 10 students. The course number and title indicate the Weinberg distribution area in which a seminar counts. Proposals for seminars must be approved by Weinberg College.

Student-Organized Seminars (SOS)

Students who wish to pursue studies not included in the catalog may 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, Media, Integrated Marketing Communications.

College Transition Programs

Numerous opportunities, both academic and nonacademic, exist for new undergraduates to transition to Northwestern before the start of the regular academic year. Academic opportunities include two Arch Scholars (<https://www.weinberg.northwestern.edu/undergraduate/first-year-transfer/first-year/arch-scholars>) programs—Bridge and Bio & Chem EXCEL—plus the Summer Academic Workshop in Weinberg College and the EXCEL (<https://www.mccormick.northwestern.edu/students/undergraduate/excel>) (Excellence in Engineering Leadership) program in the McCormick School. Beyond the first year, Weinberg College offers Bridge II summer preparatory courses for chemistry and economics courses typically taken in the sophomore year.

Innovation in News and Storytelling

knightlab.northwestern.edu

Knight Lab is a community of designers, developers, students, and educators working on experiments designed to push journalism into new spaces. The lab provides an open, collaborative environment for interdisciplinary exploration and conversation, where students and professionals learn together and from one another. The lab's primary aims are to experiment with new story forms in emergent platforms, to enable journalists to tell better stories with data, and to create open-source digital storytelling tools.

Military Programs

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

Naval Science

Naval Science (p. 39)

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). AFROTC consists of four

years of aerospace studies classes and a corresponding leadership laboratory where students apply leadership skills, demonstrate command and effective communication, develop physical fitness, and practice military customs and courtesies. Credits earned in approved aerospace studies courses at IIT may be counted toward degree requirements within the limits of the Northwestern school in which the student is registered. Students who participate in AFROTC may be eligible for federal AFROTC scholarships that may partially or fully pay tuition at Northwestern. Complete information may be obtained from:

Air Force ROTC
Detachment 195, Illinois Institute of Technology
10 West 35th Street
Chicago, Illinois 60616
phone 312-567-3525

For course descriptions, see afrotc.iit.edu.

Military Science

Northwestern students may participate in the programs of the Army Reserve Officers Training Corps through a cross-enrollment agreement with the ROTC battalion at Loyola University Chicago. Credits earned in approved military science courses may be counted toward degree requirements within the limits of the Northwestern school in which the student is registered. Complete information may be obtained from the:

LUC Department of Military Science
Campion Hall, Room 001
1144 West Loyola Avenue
Chicago, Illinois 60626
phone 773-508-8980
[web luc.edu/militaryscience](http://web.luc.edu/militaryscience)

Naval Science

northwestern.edu/nrotc

The Northwestern University Naval Reserve Officers Training Corps (NROTC) Unit was established in 1926 by congressional authorization when Northwestern became one of the original six universities to create a naval science department. The professor of naval science chairs Northwestern's Department of Naval Science. Department faculty members are commissioned officers serving on active duty in the US 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 847-491-5284

Naval ROTC Programs

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

At Northwestern, NROTC midshipmen lead essentially the same campus life as other students. They make their own arrangements for room and board and participate in campus activities of their choice, including the opportunity for University-sponsored overseas study. There are no

prescribed academic majors for NROTC students, though scientific and technical studies are encouraged. NROTC students are required to complete the naval science curriculum, attend a weekly two-hour laboratory, and participate in four to six weeks of active-duty summer training at sea or ashore. NROTC students are required to abide by the Midshipmen Regulations issued by the unit. Students may enroll in the NROTC program at any time from the beginning of their first year of enrollment until the end of their sophomore year.

Courses

In addition to the required courses listed here, 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 NAV_SCI 110-0 and NAV_SCI 355-0 Directed Study, 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.

NAV_SCI 110-0 Introduction to Naval Organization (0 Unit) This course is a general introduction to the USN and USMC that emphasizes organizational structure, warfare components and assigned roles/missions of USN/USMC. It covers all aspects of Naval Service from its relative position within the DoD to the specific warfare communities/career paths and includes basic elements of leadership and USN and USMC Core Values.

NAV_SCI 120-0 Sea Power and Maritime Affairs (1 Unit) This course is a study of the U.S. Navy and the influence of sea power on history that incorporates both a historical and political science process to explore the major events, attitudes, personalities, and circumstances that have imbued the U.S. Navy with its proud history and rich tradition.

NAV_SCI 210-0 Marine Navigation (1 Unit) This course is an in-depth study of the theory, principles, procedures, and application of plotting, piloting, and electronic navigation, as well as an introduction to maneuvering boards. Students learn piloting techniques, the use of charts, the use of visual and electronic aids, and the theory of operation of both magnetic and gyrocompasses. Students develop practical skills in plotting and electronic navigation.

NAV_SCI 220-0 Naval Ship Systems II--Naval Weapons (1 Unit) This course outlines the theory and employment of weapons systems. Students explore the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. Fire control systems and major weapons types are discussed, including capabilities and limitations. The physical aspects of radar and underwater sound are described. Facets of command, control, communications, computers, and intelligence are explored as a means of weapons system integration.

NAV_SCI 230-0 Leadership and Management Seminar for Naval Officers (1 Unit) The course introduces the student to many of the fundamental concepts of leading Sailors and Marines, which shall be expanded upon during the continuum of leadership development throughout NROTC. It develops the elements of leadership vital to the effectiveness of Navy/Marine Corps officers by reviewing the theories and parameters of leadership and management within and outside of the Naval Service.

NAV_SCI 331-0 Naval Operations (1 Unit) This course is a continued study of relative motion, formation tactics, and ship employment. It includes introductions to Naval operations and operations analysis, ship behavior and characteristics in maneuvering, applied aspects of ship handling, afloat communications, Naval command and control, Naval warfare areas, and joint warfare.

NAV_SCI 336-0 Evolution of Warfare (1 Unit) Students trace the development of warfare to the present day. It is designed to cover the causes of continuity and change in the means and methods of warfare. It addresses the influence of political, economic, and societal factors on the conduct of war, with significant attention focused on the role of technological innovation in changing the battlefield. Students will explore the contribution of preeminent military theorists and battlefield commanders to our modern understanding of the art and science of war.

NAV_SCI 338-0 Fundamentals of Maneuver Warfare (1 Unit) Students trace the development of warfare to the present day. It is designed to cover the causes of continuity and change in the means and methods of warfare. It addresses the influence of political, economic, and societal factors on the conduct of war, with significant attention focused on the role of technological innovation in changing the battlefield. Students will explore the contribution of preeminent military theorists and battlefield commanders to our modern understanding of the art and science of war.

NAV_SCI 341-0 Naval Leadership and Ethics (1 Unit) The course integrates an intellectual exploration of Western moral traditions and ethical philosophy with a variety of topics, such as military leadership, core values, professional ethics, the UCMJ and Navy regulations, and discussions relating to the roles of enlisted members, junior and senior officers, command relationships, and the conduct of warfare.

NAV_SCI 345-0 Naval Ship Systems I --Naval Engineering (1 Unit) Students learn detailed ship design, hydrodynamic forces, stability, propulsion, electrical theory and distribution, hydraulic theory and ship control, and damage control. The course includes basic concepts of theory/design of steam, gas turbine, diesel, and nuclear propulsion. Case studies on leadership/ethical issues in the engineering arena are also covered.

NAV_SCI 350-0 Naval Science Lab (0 Unit) Topics shall cover general Navy/Marine Corps mission and policies, force protection, operational security, watch standing, physical fitness, nutrition, stress management, and other professional development subjects not normally included in the curriculum of the Naval Science courses.

NAV_SCI 355-0 Directed Study (0 Unit)

ACADEMIC CALENDAR

Academic Calendar 2018–19

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

Fall Quarter 2018

Date	Event
September	
1	Fall tuition due
9	Returning student registration ends 11:59 p.m.
21	Wildcat Welcome (orientation) begins
25	New students register for fall
27	Fall classes begin 8 a.m.
27	Change of registration (drop/add)/Late registration begins
October	
3	Last day to add a class or change a section, change to or from part-time status with tuition adjustment, or receive a tuition refund for fall; no tuition reductions for dropped or swapped fall classes after this date
12	Last day for undergraduates to change to or from P/N grading option for fall
November	
2	Last day to drop a class for fall
5	Preregistration for winter quarter begins
12	Registration for winter begins
21	Thanksgiving break begins 6 p.m.
26	Fall classes resume 8 a.m.
December	
3	Weinberg College reading period begins
8	Last day of fall classes
10	Fall final exams begin
15	Fall final exams end
15	Winter break begins
17	Grades due 3 p.m.
21	Degrees conferred for fall-quarter graduates

Winter Quarter 2019

Date	Event
January	
1	Winter tuition due
7	Winter classes begin 8 a.m.
7	Change of registration (drop/add)/Late registration begins
11	Last day to add a class or change a section, change to or from part-time status with tuition adjustment, or receive a tuition refund for winter; no tuition reductions for dropped or swapped winter classes after this date
21	Martin Luther King Jr. Day (no classes)

25 Last day to change to or from P/N grading option for winter

February	
15	Last day to drop a class for winter
18	Preregistration for spring quarter begins
25	Registration for spring begins
March	
12	Weinberg College reading period begins
16	Last day of winter classes
18	Winter final exams begin
23	Winter final exams end
23	Spring break begins
25	Grades due 3 p.m.
29	Degrees conferred for winter-quarter graduates

Spring Quarter 2019

Date	Event
April	
1	Spring tuition due
1	Spring classes begin 8 a.m.
1	Change of registration (drop/add)/Late registration for spring begins
5	Last day to add a class or change a section, change to or from part-time status with tuition adjustment, or receive a tuition refund for spring; no tuition reductions for dropped or swapped spring classes after this date
15	Registration for Summer Session begins
19	Last day to change to or from P/N grading option for spring
May	
10	Last day to drop a class for spring
13	Preregistration for fall quarter 2018 begins
20	Registration for fall begins
27	Memorial Day (no classes)
June	
4	Weinberg College reading period begins
8	Last day of spring classes
10	Spring final exams begin
15	Spring final exams end
17	Grades due 3 p.m.
21	160th annual Commencement
21	Degrees conferred for spring-quarter graduates

Summer Session 2019

Date	Event
June	
1	Summer tuition due
24	Summer classes begin
24	Change of registration (drop/add)/Late registration begins
July	
4	Independence Day (no classes)

August

3	Six-week Summer Session ends
17	Eight-week Summer Session ends
31	Ten-week Summer Session ends

September

6	Degrees conferred for summer-quarter graduates
---	--

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 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; providing or selling class materials to websites that sell such materials to students, including notes, PowerPoint slides, outlines, and graded assignments.
- *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

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 violations of academic integrity may be obtained from the dean's office of each school. This will include information regarding how decisions may be appealed to the appropriate University officials, up to and including the University provost. A complete statement of the University's principles regarding academic integrity may be obtained from the Office of the Provost at northwestern.edu/provost/students/integrity.

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

ACADEMIC SUPPORT

School and Program Advisors and Support

Every undergraduate student is assigned at least one academic advisor within their school, often directly related to the major(s) they have chosen. Students can find a list of their advisor(s) and make an appointment with them in AdviseStream (<https://northwestern.advisestream.com/login>). Robust information about advising and academic support resources is available at the websites of the Weinberg College of Arts and Sciences (<https://www.weinberg.northwestern.edu/undergraduate/advising>), the McCormick School of Engineering (<https://www.mccormick.northwestern.edu/students/undergraduate/>), the School of Education and Social Policy (<http://www.sesp.northwestern.edu/ugrad/student-affairs-staff>), the Medill School of Journalism, Media, Integrated Marketing Communications (<http://www.medill.northwestern.edu/journalism/undergraduate-journalism/life-at-medill/student-life>), the Bienen School of Music (<https://music.northwestern.edu/resources/students/undergraduate/advising>), and the School of Communication (<https://communication.northwestern.edu/advising>).

Academic Support and Learning Advancement

If you're a Northwestern student, you're a skilled learner — but that doesn't mean you never need help. The best learners are the ones who seek, and give, support when it's needed. The Academic (<https://www.northwestern.edu/academic-support-learning>) Support and Learning Advancement (<https://www.northwestern.edu/academic-support-learning>) office provides peer tutoring, study groups, academic leadership development, and more.

Programs focus on overall academic strategies and course support, providing undergraduates with sustained small-group mentoring, individual coaching, interactive workshops, and course-specific sustained or drop-in tutoring. Advisors are also available to help students find the best resources for their needs and develop a plan to achieve their academic goals.

The office is located in the University Library, Level 2, near The Writing Place.

AccessibleNU

Northwestern University and AccessibleNU (<https://www.northwestern.edu/accessiblenu>) are committed to providing a supportive and challenging environment for all students with disabilities who attend the University. AccessibleNU works to provide students with disabilities a learning and community environment that affords them full participation, equal access, and reasonable accommodation. The majority of accommodations, services, and auxiliary aids provided to eligible students are coordinated by AccessibleNU.

The Evanston office is located at 2122 Sheridan Road, Suite 130. The building entrance is at 600 Haven Street.

Health Professions Advising

Health Professions Advising (<http://www.northwestern.edu/health-professions-advising>) assists students in developing meaningful educational plans that are compatible with their life goals. Using an

intentional approach to academic advising based on advising theories and knowledge of counseling, the Center staff will:

- Provide information about academic programs and resources
- Provide assistance to students in refining goals and objectives, understanding available choices, and assessing the consequences of alternative courses of action
- Reinforce the philosophy that the ultimate responsibility for making decisions about educational plans and life goals rests with the individual student

The office is located at 1940 Sheridan Road.

The Writing Place

The Writing Place (<http://www.writing.northwestern.edu>) is Northwestern's center for peer writing consultations. Whether you are writing a paper for a class, composing application letters and essays, or working on some other writing project, a Writing Place consultant can help you at any stage of the writing process, from talking about ideas to developing a plan to revising and editing a draft.

Writing Place consultants are not graders or ghostwriters, but attentive readers who are trained to engage you in a conversation about your writing and help you plan and revise it. Consultations are free and available to anyone in the Northwestern community.

The office is located in the University Library, Level 2, near Academic Support and Learning Advancement.

HENRY AND LEIGH BIENEN SCHOOL OF MUSIC

music.northwestern.edu

Overview

One of the oldest degree-granting music institutions in the United States, Northwestern University's Henry and Leigh Bienen School of Music combines a nationally ranked music program of conservatory-level intensity with the academic rigor and scholarly resources found only at a world-class private research university. Entering first-year undergraduates show the highest level of achievement in music as well as academics. The school believes that by carefully developing outstanding musicianship and keen intelligence, while nurturing a curiosity about the world, we can best encourage the emergence of each student's unique creative voice.

Key to all performance majors 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 artists 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 dual-degree curriculum—enabling students to earn a degree in music as well as one in communication, education and social policy, engineering, journalism, or arts and sciences—and the ad hoc (self-designed) major. Additionally, the world-class music making and other cultural resources of downtown Chicago provide exceptional opportunities for learning outside the classroom.

The Bienen School of Music is a founding member of the National Association of Schools of Music, which fully accredits all its degree programs.

Facilities

The Bienen School of Music occupies three lakefront buildings. The Patrick G. and Shirley W. Ryan Center for the Musical Arts houses the 400-seat Mary B. Galvin Recital Hall, the 150-seat David and Carol McClintock Choral and Recital Room, and the 150-seat Shirley Welsh Ryan Opera Theater as well as administrative and faculty offices, teaching studios, classrooms, and practice rooms. The building connects with Regenstein Hall, which houses the 200-seat Regenstein Masterclass Room, the Office of Bands, rehearsal facilities, faculty studios, and practice rooms. The 1,000-seat Pick-Staiger Concert Hall houses rehearsal facilities and the Concert Management Office.

Musical Organizations

As a part of their program of study, music majors are required to participate in music school ensembles. Students from all other schools of the University are also encouraged to participate in any organizations for which they qualify. Ensembles include Symphony Orchestra, Chamber Orchestra, and Philharmonia; Symphonic Wind Ensemble, Symphonic Band, Concert Band, and Wildcat Marching Band; Bienen Contemporary/Early Vocal Ensemble, University Chorale, University Singers, Alice Millar Chapel Choir, and Northwestern Camerata; Jazz Orchestra and jazz small ensembles; Baroque Music Ensemble and Contemporary Music Ensemble; Guitar Ensemble and Percussion Ensemble; and chamber music ensembles.

Music Library

Among the nation's largest music libraries, the Northwestern University Music Library supports all areas of musical study with a broad collection of books, scores, sound recordings, periodicals, and online resources. The facility, located in historic Deering Library, offers a reading room rich in reference materials, a music listening center, and a computer lab equipped with specialized music hardware and software. The Music Library is also distinguished internationally for its extensive collection of contemporary music, which includes one copy of nearly every score published since 1945 as well as many original manuscripts by prominent composers such as Pierre Boulez, John Cage, George Crumb, and Iannis Xenakis. The Music Library's collections and staff serve the Bienen School of Music, the entire Northwestern University community, and researchers from around the world. For more information see www.library.northwestern.edu/music.

Programs of Study

The Bienen School of Music offers programs leading to the professional degrees of bachelor of music, master of music, and doctor of musical arts. The school also offers two nonprofessional degrees, the bachelor of arts in music and bachelor of science in music.

The curriculum allows flexibility for students while providing an education that is basic for all musicians. Applicants in all areas who are accepted by the Bienen School enter directly into a program of specialization that begins in the first undergraduate year. The music core studies, taken by all students, require the acquisition of fundamental competencies and provide fundamental and essential experiences that complement the specialized studies in the declared major. Students are also required to complete studies in a number of allied subjects throughout the University.

Bachelor of Music (BMus)

Courses of study leading to the bachelor of music degree include majors in piano, strings, voice, winds and percussion, jazz, music cognition, music composition, music education, musicology, and music theory. Candidates for the degree of bachelor of music must complete 50–53.5 units, depending on the minimum number of courses required for their major. For bachelor of music degree requirements, see the program page specific to the area of study.

Bachelor of Arts in Music (BAMus) and Bachelor of Science in Music (BSMus)

The bachelor of arts in music and bachelor of science in music are nonperformance degrees that offer a broad liberal arts education with a major in music. The requirements of the BAMus are essentially identical to those for the BA in the Weinberg College of Arts and Sciences; the requirements for the BSMus are the same as those for the BAMus except that the BSMus has no foreign language requirement. Within these degrees' focus on music, there are a wide range of possibilities for study; students may choose to specialize in one of the available academic areas (music cognition, music composition, music education, musicology, or music theory) by fulfilling their Music Electives with courses in their area of interest, they may choose not to specialize (in which case the Music Electives are fulfilled with any music courses), or they may design an ad hoc specialization, consisting of 10 units which substitute for the Music Electives category below.

For BAMus and BSMus degrees, 45 units are required:

Course	Title
MUSIC 111-1 & MUSIC 111-2 & MUSIC 111-3	Music Theory I and Music Theory II and Music Theory III

MUSIC 211-1 & MUSIC 211-2 & MUSIC 211-3	Music Theory IV and Music Theory V and Music Theory VI
MUSIC 126-1 & MUSIC 126-2 & MUSIC 126-3	Aural Skills I and Aural Skills II and Aural Skills III
MUSIC 214-0 & MUSIC 215-0 & MUSIC 216-0	Western Music Cultures Before 1600 and Western Music Cultures 1600-1800 and Western Music Cultures After 1800
MUSIC 213-0	World Music Cultures
Three quarters ensemble (1.5 units)	
Music electives (10 units)	
Distribution Courses (13 units): Area I Natural Sciences (2), Area II Formal Studies (2), Area III Social/Behavioral Sciences (2), Area IV Historical Studies (2), Area V Ethics and Values (2), Area VI Literature/Fine Arts (2), and English Composition (1)	
Non-Music Electives (12 units, 6 of these are foreign language courses for BAMus students)	

Overlay Requirement in Business or Finance

All Bienen School undergraduates are required to complete an “overlay” course in business or finance. The requirement does not add to the existing number of courses required for undergraduate degrees; depending on which course is chosen, the course counts toward the student’s general education or free electives requirement. See the Office of Student Affairs in the Bienen School of Music for a list of recommended courses.

For all undergraduate degrees, students must also complete the Undergraduate Registration Requirement (p. 26) along with the degree requirements of their home school.

Grading

Music majors must earn a grade of C or above in all courses required in the major, including all music 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 non-dual degree 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 six courses in non-music 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.

Applied Music Study

Bachelor of Music degrees require four years of individual instruction for performance majors in piano, strings, voice, winds and percussion, jazz, and in composition. One year is required for academic majors in music cognition, musicology, and music theory; three years are required for music education. Concurrent registration in a major ensemble (<https://www.music.northwestern.edu/academics/ensembles>) is required in each quarter of applied study, with the exception of piano majors and composition majors. Applied study must be with a faculty instructor in the program area to fulfill degree requirements.

Attendance Policy

Students are expected to attend all sessions of courses and ensembles for which they are registered. It is the responsibility of students enrolled in the Bienen School of Music to acquaint themselves and comply

with the attendance policy of their departments, class instructors, and ensemble conductors. In addition, students who are absent from classes for three or more consecutive days because of illness are required to notify the Bienen School’s Office of Student Affairs.

Outside professional opportunities may arise for music students. If such an opportunity directly interferes in any way with curricular responsibilities, students must first obtain permission from the faculty of record for courses potentially affected, including classes, rehearsals, and performances, along with the signature of the program coordinator and a signature from one of the co-chairs of the Department of Music Performance. Noncompliance may be cause for failure in the courses or ensembles for which a student is registered during that quarter.

Double Majors

Students may earn a double major in four years by fulfilling the requirements of both majors. Typically, the double major within the Bienen School of Music combines a specialization in a performance area with one in an academic area, although double majors in two academic areas are also possible. A double major in two performance areas is not permitted.

Four-year music students may also complete a second major outside the music school but may earn only one bachelor’s degree. Second majors from the Weinberg College of Arts and Sciences are available to Bienen School of Music students without transferring into that school. Majors in the other four undergraduate schools at Northwestern may only be completed by students in that school; in these cases, interested music students may either pursue a dual degree with the second school, or transfer to the other school and complete the music major as a second major, in which case no degree from the Bienen School is awarded.

Ad Hoc Majors

It is possible to design an ad hoc (self-designed) major that cuts across specializations to meet a particular student’s needs and career ambitions. Bachelor of Music degree students may design an ad hoc major as a second major; 12 units are required, and may not be double counted in the primary major. Bachelor of arts in music and bachelor of science in music degree students may pursue an ad hoc concentration within the degree; 10 units are required for the concentration. Ad hoc programs are designed in consultation with faculty with expertise in the particular area of interest. Specializations have included areas such as arts administration, music criticism, music theater production, and popular musicology.

Dual Bachelor’s Degree Programs

The Bienen School of Music offers dual bachelor’s degree programs with the Weinberg College of Arts and Sciences (music and liberal arts), the School of Communication (music and communication), the School of Education and Social Policy (music and education and social policy), the McCormick School of Engineering and Applied Science (music and engineering), and the Medill School of Journalism, Media, Integrated Marketing Communications (music and journalism). For information on program requirements, see Dual Bachelor’s Degrees (p. 35).

Minor Programs

Music minors are offered in arts administration (p. 47), commercial music (p. 47), general music (p. 55), music cognition (p. 57), music composition (p. 49), music criticism (p. 47), music education (p. 54), musicology (p. 59), music technology (p. 49), and music theory (p. 57). The minors in arts administration, music criticism, music education, and music theory are open to music majors only. The minor in general music is open only to non-music majors.

Minor programs include a minimum of 6 and a maximum of 9 courses, of which a minimum of 5 courses are not double-counted toward the major. Students must receive a grade of C or above in all courses counted toward the minor; no P/N grades are allowed. Students who wish to complete a minor program should fill out a Minor Declaration Form, available in the Office of Student Affairs, and should fill out a minor petition form one year before graduation. Students may pursue more than one Bienen School of Music minor.

Requirements for minors in general music (for non-majors), music cognition, music composition, music education, musicology, music technology, and music theory can be found on the corresponding program page. See below for requirements for minors in arts administration, commercial music, and music criticism.

Minor in Arts Administration (8 units chosen from the list below, music majors only)

- ECON 201-0 Introduction to Macroeconomics
- ECON 202-0 Introduction to Microeconomics
- MUSIC 360-0 Career Innovation in Music and the Performing Arts
- MUSIC 398-0 Internship
- Any courses from BUS_INST (Business Institutions), IMC (Integrated Marketing/Communication), or ENTREP (Entrepreneurship)
- Any courses in ORG BEH (Organizational Behavior), ACCOUNT (Accounting), MKTG (Marketing), or ADVT (Advertising) through the School of Professional Studies

Minor in Commercial Music (8 units, open to music majors and non-majors)

- JAZZ_ST 330-1 Jazz Composition and Arranging I and JAZZ_ST 330-2 Jazz Composition and Arranging II
- RTVF 383-0 Introduction to Sound Production
- MUS_COMP 111-0 Class Composition or MUS_COMP 311-0 Class Composition
- MUS_COMP 314-1 Instrumentation
- One course in popular music chosen from GEN_MUS or MUSICOL
- Two courses chosen from MUS_TECH

Minor in Music Criticism (6 units, music majors only)

- MUSICOL 399-0 Independent Study or MUSIC 398-0 Internship
- JOUR 201-1 Reporting & Writing
- JOUR 201-2 Multimedia Storytelling
- JOUR 301-0 Journalism in Practice
- JOUR 202-0 Philosophy of Modern Journalism or JOUR 370-0 Media Law & Ethics
- JOUR 310-0 Media Presentation: News, JOUR 311-0 Media Presentation: Magazine, or JOUR 312-0 Media Presentation: Video Producing for Broadcast & the Web

Program Honors

Each year faculty are invited to nominate graduating students for program honors. To be eligible for program honors, students must have a cumulative GPA of 3.0 or above and be outstanding contributors to their respective programs. Additional criteria govern the selection of voice majors; see the coordinator of the voice and opera program for details. Faculty select only a small number of students in each program for program honors in a given year; for more information, contact the Office of Student Affairs in the Bienen School of Music.

Composition and Music Technology

music.northwestern.edu/academics/areas-of-study/composition

Composition students pursue a course of study that develops analytical and creative skills and enjoy several opportunities to hear their works performed. Students intending to major in composition may substitute composition class for applied studies during their first and second years.

Courses in music technology are offered primarily for music majors but are open to students from across the University as space permits.

Programs of Study

- Composition Major (p. 48)
- Composition Minor (p. 49)
- Music Technology Minor (p. 49)

Music Composition Courses

MUS_COMP 111-0 Class Composition (1 Unit) Class instruction in techniques of composition. Open to non-music majors.

MUS_COMP 112-0 Applied Composition for Music Majors (1 Unit) Original composition; individual instruction.

MUS_COMP 212-0 Applied Composition for Music Majors (1 Unit) Original composition; individual instruction.

MUS_COMP 311-0 Class Composition (1 Unit) Class instruction in techniques of composition. Open to non-music majors. Prerequisite: at least one quarter of MUS_COMP 111-0 or consent of instructor.

MUS_COMP 312-0 Applied Composition for Music Majors (1 Unit) Original composition; individual instruction.

MUS_COMP 335-0 Selected Topics (1 Unit) Topics vary; announced before registration. Writing projects; analysis of scores; contemporary stylistic techniques, performers, composers, and materials; in-class performances of original work. May be repeated for credit.

MUS_COMP 336-0 Contemporary Repertoire (1 Unit)

MUS_COMP 337-0 Topics in Contemporary Repertoire (1 Unit) Topics vary by quarter. Close study of specific recent compositional styles, which may include minimalism, complexity, music of the last decade, experimental music. Prerequisite: consent of instructor.

MUS_COMP 338-0 Composer Portraits (1 Unit) Composers vary by quarter. Portrait studies of the work of a major composer or composers, e.g., Fernyough; Lutoslawski; Cage; Birtwistle and Maxwell Davies. Prerequisite: consent of instructor.

MUS_COMP 339-0 Compositional Concepts and Techniques (1 Unit) Topics vary by quarter. Content, musical spaces, extended techniques, and spectralism. Prerequisite: consent of instructor.

MUS_COMP 340-0 Composition Workshop (1 Unit) Topics vary by quarter. Examples include Composer/Performer, Composing for Percussion, Composing for Dance, Composing for Solo Instrument. Prerequisite: consent of instructor.

MUS_COMP 370-0 Junior Recital (0 Unit)

MUS_COMP 380-0 Senior Recital (0 Unit)

MUS_COMP 390-0 Composition Colloquium (0 Unit) Discussion of contemporary compositional techniques.

MUS_COMP 399-0 Independent Study (0.5-1 Unit)

Music Technology Courses

MUS_TECH 259-0 Introduction to Music Technology (1 Unit) 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 300-0 Foundations of Music Tech for Music Majors (1 Unit) Introduction of key concepts in acoustics, digital audio theory, production, and postproduction. Through projects and presentations, students will learn to record and edit their work, use notation software, communicate with recording engineers, and prepare and present work online.

MUS_TECH 321-0 Producing in the Virtual Studio (1 Unit) Techniques for creating and producing music in the context of a computer-based audio production environment. Topics include MIDI, audio editing, plugins, effects processing, mastering, and basic surround mixing. Assignments include creative projects. Prerequisite: MUS_TECH 259-0 or equivalent experience and consent of instructor.

MUS_TECH 322-0 Recording Techniques (1 Unit) Microphone and placement techniques including stereo and close/distant miking of voices, acoustic instruments, and ensembles. Console design, signal flow, and dynamics processing. Projects include recording assignments. Prerequisite: MUS_TECH 259-0 or equivalent experience and consent of instructor.

MUS_TECH 335-0 Selected Topics (1 Unit) Topics vary; announced before registration. May be repeated with change of topic.

MUS_TECH 340-0 Composing With Computers (1 Unit) Foundational techniques of composition using music and audio software. Techniques of algorithmic composition, sound processing. Analysis of electroacoustic music. Assignments include student compositions. Prerequisite: MUS_TECH 259-0 or equivalent experience.

MUS_TECH 342-1 Computer Sound Synthesis I (1 Unit) Synthesis of musical sounds, including the characteristics of digital audio signals, wavetable synthesis, modulation, and sample-based synthesis.

MUS_TECH 342-2 Computer Sound Synthesis II (1 Unit) Processing of audio signals, including digital filtering, reverberation, and effects processing; physical modeling synthesis. Assignments include sound synthesis programming. Prerequisite: MUS_TECH 259-0 or equivalent experience.

MUS_TECH 345-0 Technology-Based Performance (1 Unit) 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 350-0 Studio Techniques for Electroacoustic Music (1 Unit) Advanced projects in electroacoustic composition, audio programming (Max/MSP), audio engineering, or electronic instrument design; includes a largescale project, typically developed from the student's previous music technology course work. Prerequisite: MUS_TECH 340-0, MUS_TECH 345-0, or equivalent experience.

MUS_TECH 355-1 History and Analysis of Electroacoustic Music (1 Unit) Survey of electronic music repertoire from 1948 through the end of the analog era and the introduction of digital music. Examination of the aesthetic motivations and technical approaches that have shaped electroacoustic music throughout its history, focusing on the interaction between technical innovation and creativity.

MUS_TECH 355-2 History and Analysis of Electroacoustic Music (1 Unit) Survey of electronic music repertoire from 1948 through the end of the analog era and the introduction of digital music. Examination of the aesthetic motivations and technical approaches that have shaped electroacoustic music throughout its history, focusing on the interaction between technical innovation and creativity.

MUS_TECH 385-0 Senior Project (1 Unit) Independent project in music technology. Prerequisite: permission of department.

MUS_TECH 399-0 Independent Study (0.5-1 Unit)

Composition Major

Bachelor of Music degrees in composition require a minimum of 50 units, and include core music requirements (16 units), major requirements (19 units), and distribution and elective requirements (15 units).

Music Core Requirements (16 units)

Course	Title
MUSIC 111-1 & MUSIC 111-2 & MUSIC 111-3	Music Theory I and Music Theory II and Music Theory III
MUSIC 211-1 & MUSIC 211-2 & MUSIC 211-3	Music Theory IV and Music Theory V and Music Theory VI
MUSIC 126-1 & MUSIC 126-2 & MUSIC 126-3	Aural Skills I and Aural Skills II and Aural Skills III
MUSIC 226-1 & MUSIC 226-2 & MUSIC 226-3	Aural Skills IV and Aural Skills V and Aural Skills VI
MUSIC 127-1 & MUSIC 127-2 & MUSIC 127-3	Keyboard Skills 1 and Keyboard Skills 2 and Keyboard Skills 3 (or higher course number based on placement)
MUSIC 214-0 & MUSIC 215-0 & MUSIC 216-0	Western Music Cultures Before 1600 and Western Music Cultures 1600-1800 and Western Music Cultures After 1800
MUSIC 213-0	World Music Cultures
CONDUCT 326-0	Basic Conducting
One MUSICOL elective	
One 20th/21st century Music Studies elective	
Three quarters ensemble (1.5 units)	

Composition Major Requirements (19 units)

Course	Title
MUS_COMP 112-0	Applied Composition for Music Majors (3 units)
MUS_COMP 212-0	Applied Composition for Music Majors (3 units)
MUS_COMP 312-0	Applied Composition for Music Majors (6 units)
MUS_COMP 314-1	Instrumentation (1 unit)
MUS_COMP 314-2	Orchestration (1 unit)
MUS_THRY 316-0	16th Century Counterpoint (1 unit)

Three elective courses in MUS_COMP or MUS_THRY

One elective course in MUS_TECH

MUS_COMP 380-0 Senior Recital (0 units)

MUS_COMP 390-0 Composition Colloquium (12 quarters, 0 units)

Distribution and Elective Requirements (15 units)

Course	Title
Area I Natural Sciences or Area II Formal Studies or Music Technology (1 unit)	
Area III Social/Behavioral Sciences (1 unit)	
Area IV Historical Studies (1 unit)	
Area V Ethics and Values (1 unit)	
Area VI Literature/Fine Arts (1 unit)	
English Composition course (1 unit)	
Non-Music Electives (6 units)	
Free Electives (3 units, either music or non-music courses)	
Business/Finance Overlay course (may double count with any other requirement)	

Composition Minor

A minor in composition requires 9 units, of which a minimum of 5 courses are not double-counted toward the major.

Course	Title
MUS_COMP 111-0	Class Composition (6 quarters)
or MUS_COMP 311-0	Class Composition
MUS_COMP 314-1	Instrumentation
or MUS_COMP 314-2	Orchestration
One elective course in MUS_COMP	
One elective course in MUS_TECH	
MUS_COMP 390-0	Composition Colloquium (6 quarters, 0 units)

Music Technology Minor

A minor in music technology requires 6 units, of which a minimum of 5 courses are not double-counted toward the major. The 6 units required for the minor in music technology are to be chosen from any 200- or 300-level courses in MUS_TECH.

Conducting and Ensembles

music.northwestern.edu/academics/ensembles

Courses in the Conducting and Ensembles Program are available to all music majors. Non-music majors may be eligible for ensembles by audition and as space is available.

CONDUCT 323-0 Marching Band Techniques (0.5 Unit) Writing for marching and pep bands; rehearsing for the marching band.

CONDUCT 326-0 Basic Conducting (1 Unit) Fundamentals in both instrumental and choral conducting; transpositions, ranges, and podium technique. Extensive laboratory experience with videotaped evaluation.

CONDUCT 335-0 Selected Topics (1 Unit) Topics relevant to the professional needs of conducting students.

CONDUCT 340-1 Advanced Conducting Band (1 Unit) Separate quarters of band, orchestral, and choral conducting that emphasize the techniques

of score preparation and analysis, repertoire, and rehearsal methods. May be repeated for credit. Prerequisite: CONDUCT 326-0 or equivalent.

CONDUCT 340-2 Advanced Conducting Choral (1 Unit) Separate quarters of band, orchestral, and choral conducting that emphasize the techniques of score preparation and analysis, repertoire, and rehearsal methods. May be repeated for credit. Prerequisite: CONDUCT 326-0 or equivalent.

CONDUCT 340-3 Advanced Conducting Orchestral (1 Unit) Separate quarters of band, orchestral, and choral conducting that emphasize the techniques of score preparation and analysis, repertoire, and rehearsal methods. May be repeated for credit. Prerequisite: CONDUCT 326-0 or equivalent.

CONDUCT 345-0 Orchestral Bowing: Style and Function (1 Unit) Bowing principles for nonstring-playing conductors, teachers, and composers; teaching concepts and in-depth bowing analyses for string players. Topics include sound production principles, applied bowing techniques and pedagogy, performance practice, interpretation, and analysis.

CONDUCT 364-0 Choral Organizations (0.5 Unit) University Chorale, University Singers, University Chorus, Alice Millar Chapel Choir, and Northwestern Camerata. Open to all qualified students.

CONDUCT 374-0 Band Organizations (0.5 Unit) Marching Band, Concert Band, Symphonic Band, Symphonic Wind Ensemble. Open to all qualified students.

CONDUCT 378-0 Contemporary Music Ensemble (0.5 Unit) Membership by audition.

CONDUCT 391-0 Chamber Music (0.5 Unit) Performance of chamber music literature in a variety of small-ensemble settings.

CONDUCT 393-0 Orchestral Organizations (0.5 Unit) Membership by audition in Symphony Orchestra, Chamber Orchestra, or Philharmonia.

CONDUCT 395-0 Baroque Music Ensemble (0.5 Unit) Performance of choral, solo, and instrumental music of the Middle Ages through the early baroque.

CONDUCT 399-0 Independent Study (0.5-1 Unit)

Jazz

music.northwestern.edu/academics/areas-of-study/jazz-studies.html

The jazz program offers courses in jazz improvisation, composition and arranging, history, and ensembles.

Program of Study

- Jazz Studies Major (p. 50)

JAZZ_ST 162-0 Applied Jazz for Music Majors (1 Unit)

JAZZ_ST 210-1 Jazz History I (1 Unit) The origins of jazz, its performers, and their contributions. Includes a look at contemporaneous social conditions during its development.

JAZZ_ST 210-2 Jazz History II (1 Unit) The origins of jazz, its performers, and their contributions. Includes a look at contemporaneous social conditions during its development.

JAZZ_ST 236-1 Jazz Improvisation I (0.5 Unit) The language of jazz. Focus is on melodic development and ear training via repertoire and solos of jazz's most influential figures.

JAZZ_ST 236-2 Jazz Improvisation II (0.5 Unit) The language of jazz. Focus is on melodic development and ear training via repertoire and solos of jazz's most influential figures.

JAZZ_ST 236-3 Jazz Improvisation III (0.5 Unit) The language of jazz. Focus is on melodic development and ear training via repertoire and solos of jazz's most influential figures.

JAZZ_ST 262-0 Applied Jazz for Music Majors (1 Unit)

JAZZ_ST 305-0 Optional Recital (0 Unit)

JAZZ_ST 330-1 Jazz Composition and Arranging I (1 Unit) The techniques of composing and arranging for large and small ensembles in the jazz tradition. Study of scores by major composers and arrangers from throughout jazz history.

JAZZ_ST 330-2 Jazz Composition and Arranging II (1 Unit) The techniques of composing and arranging for large and small ensembles in the jazz tradition. Study of scores by major composers and arrangers from throughout jazz history.

JAZZ_ST 335-0 Selected Topics (1 Unit) Topics vary. May be repeated for credit as topics change.

JAZZ_ST 336-1 Jazz Improvisation IV (0.5 Unit) Continuation of JAZZ_ST 236-3.

JAZZ_ST 336-2 Jazz Improvisation V (0.5 Unit) Continuation of JAZZ_ST 336-1.

JAZZ_ST 336-3 Jazz Improvisation VI (0.5 Unit) Continuation of JAZZ_ST 336-2.

JAZZ_ST 337-0 Business of Jazz (0.5 Unit) A survey of the music industry as it pertains to jazz. Includes discussions on songwriting, music publishing, national and international copyright law, music licensing, artist management, music production, and related topics.

JAZZ_ST 361-1 Jazz Keyboard I (0.5 Unit) Basic keyboard skills, with an emphasis on jazz voicing, harmonization, and analysis.

JAZZ_ST 361-2 Jazz Keyboard II (0.5 Unit) Basic keyboard skills, with an emphasis on jazz voicing, harmonization, and analysis.

JAZZ_ST 362-0 Applied Jazz for Music Majors (1 Unit)

JAZZ_ST 370-0 Junior Recital (0 Unit)

JAZZ_ST 377-0 Jazz Orchestra for Music Majors (0.5 Unit)

JAZZ_ST 380-0 Senior Recital (0 Unit)

JAZZ_ST 391-0 Small Ensemble (0.5 Unit)

JAZZ_ST 399-0 Independent Study (0.5-1 Unit)

Jazz Studies Major

Bachelor of Music degrees in jazz require a minimum of 52.5 units, and include core music requirements (11 units), major requirements (29.5 units), and distribution and elective requirements (12 units).

Music Core Requirements (11 units)

Course	Title
MUSIC 111-1 & MUSIC 111-2 & MUSIC 111-3	Music Theory I and Music Theory II and Music Theory III
MUSIC 211-1 & MUSIC 211-2 & MUSIC 211-3	Music Theory IV and Music Theory V and Music Theory VI
MUSIC 126-1 & MUSIC 126-2 & MUSIC 126-3	Aural Skills I and Aural Skills II and Aural Skills III
MUSIC 226-1 & MUSIC 226-2 & MUSIC 226-3	Aural Skills IV and Aural Skills V and Aural Skills VI
MUSIC 214-0 & MUSIC 215-0 & MUSIC 216-0	Western Music Cultures Before 1600 and Western Music Cultures 1600-1800 and Western Music Cultures After 1800
MUSIC 213-0	World Music Cultures
CONDUCT 326-0	Basic Conducting

Jazz Major Requirements (29.5 units)

Course	Title
JAZZ_ST 162-0	Applied Jazz for Music Majors (3 quarters)
JAZZ_ST 262-0	Applied Jazz for Music Majors (3 quarters)
JAZZ_ST 362-0	Applied Jazz for Music Majors (6 quarters)
JAZZ_ST 210-1 & JAZZ_ST 210-2	Jazz History I and Jazz History II
JAZZ_ST 236-1 & JAZZ_ST 236-2 & JAZZ_ST 236-3	Jazz Improvisation I and Jazz Improvisation II and Jazz Improvisation III
JAZZ_ST 336-1 & JAZZ_ST 336-2 & JAZZ_ST 336-3	Jazz Improvisation IV and Jazz Improvisation V and Jazz Improvisation VI
JAZZ_ST 330-1 & JAZZ_ST 330-2	Jazz Composition and Arranging I and Jazz Composition and Arranging II
JAZZ_ST 337-0	Business of Jazz
JAZZ_ST 361-1 & JAZZ_ST 361-2	Jazz Keyboard I and Jazz Keyboard II
JAZZ_ST 377-0	Jazz Orchestra for Music Majors (12 quarters)
JAZZ_ST 391-0	Small Ensemble (6 quarters)
JAZZ_ST 380-0	Senior Recital (0 units)

Distribution and Elective Requirements (12 units)

Course	Title
Area I Natural Sciences or Area II Formal Studies or Music Technology (1 unit)	
Area III Social/Behavioral Sciences (1 unit)	
Area IV Historical Studies (1 unit)	
Area V Ethics and Values (1 unit)	
Area VI Literature/Fine Arts (1 unit)	
English Composition course (1 unit)	
Non-Music Electives (6 units)	
Business/Finance Overlay course (may double count with any other requirement)	

Music Cognition

See Music Theory and Cognition (p. 56).

Music Core

Courses listed under the category MUSIC include required core courses in music theory, aural skills, keyboard skills, and music history, as well as elective courses that are of school-wide interest, including alexander technique, career classes, student organized seminars and internship credit.

MUSIC 111-1 Music Theory I (0.5 Unit) Music as sound in time. Analytical studies in forms, media, textures, and harmonic and melodic materials.

MUSIC 111-2 Music Theory II (0.5 Unit) Music as sound in time. Analytical studies in forms, media, textures, and harmonic and melodic materials. Prerequisite: MUSIC 111-1.

MUSIC 111-3 Music Theory III (0.5 Unit) Music as sound in time. Analytical studies in forms, media, textures, and harmonic and melodic materials. Prerequisite: MUSIC 111-2.

MUSIC 126-1 Aural Skills I (0.5 Unit) 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 126-2 Aural Skills II (0.5 Unit) 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 126-3 Aural Skills III (0.5 Unit) 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 127-1 Keyboard Skills 1 (0.5 Unit) This is the first quarter of a year-long sequence. This track is for beginning piano students. Topics include repertoire, a healthful approach to piano technique, scales, keyboard harmony, ensemble, sight reading, and creative work.

MUSIC 127-2 Keyboard Skills 2 (0.5 Unit) Class instruction in keyboard skills.

MUSIC 127-3 Keyboard Skills 3 (0.5 Unit) Class instruction in keyboard skills.

MUSIC 128-1 Keyboard Skills 1+ (0.5 Unit) This is the first quarter of a year-long sequence. This track is for students with a little piano background, typically 1-2 years of previous study. Topics include repertoire, technique, scales, and keyboard harmony. Ensemble, sight reading, and creative work are covered as well.

MUSIC 128-2 Keyboard Skills 2+ (0.5 Unit) Class instruction in keyboard skills.

MUSIC 128-3 Keyboard Skills 3+ (0.5 Unit) Keyboard Skills 3+.

MUSIC 129-1 Keyboard Skills 1-2-3 (0.5 Unit) This course is for students with piano background. Topics include sight reading, keyboard theory, harmonizing melodies, solo repertoire, and ensemble.

MUSIC 129-2 Keyboard Skills 4-5-6 (0.5 Unit) Class instruction in keyboard skills.

MUSIC 130-1 Keyboard Skills for Piano Majors (0.5 Unit) This is the first quarter of a year-long sequence. Topics include vocal and string

quartet score reading, keyboard theory, sight reading including 18th century examples, with corresponding harmonic language, rhythmic, and idiomatic patterns. Other topics include harmonizing melodies, creative work, and ensemble.

MUSIC 130-2 Keyboard Skills for Piano Majors (0.5 Unit) Class instruction in keyboard skills.

MUSIC 130-3 Keyboard Skills for Piano Majors (0.5 Unit) Class instruction in keyboard skills.

MUSIC 211-1 Music Theory IV (0.5 Unit) Music as sound in time. Analytical studies in forms, media, textures, and harmonic and melodic materials. Prerequisite: MUSIC 111-3 or consent of instructor.

MUSIC 211-2 Music Theory V (0.5 Unit) Music as sound in time. Analytical studies in forms, media, textures, and harmonic and melodic materials. Prerequisite: MUSIC 211-1.

MUSIC 211-3 Music Theory VI (0.5 Unit) Music as sound in time. Analytical studies in forms, media, textures, and harmonic and melodic materials. Prerequisite: MUSIC 211-2.

MUSIC 213-0 World Music Cultures (1 Unit) Introduction to both the world's musical variety and common issues related to music cultures worldwide.

MUSIC 214-0 Western Music Cultures Before 1600 (1 Unit) An introduction to selected musical cultures of the Western world from before 1600; focus on music, its intellectual and cultural contexts, its creators, and its performance practices. Also introduces traditions of performing this music today and tools for music research. As a core component for music majors, this course assumes completion of MUSIC 111-3 and MUSIC 126-3 or their equivalents as prerequisites.

MUSIC 215-0 Western Music Cultures 1600-1800 (1 Unit) An introduction to selected musical cultures of the Western world from 1600 to 1800; focus on music, its intellectual and cultural contexts, its creators, and its performance practices. Also introduces traditions of performing this music today and tools for music research. As a core component for music majors, this course assumes completion of MUSIC 111-3 and MUSIC 126-3 or their equivalents as prerequisites.

MUSIC 216-0 Western Music Cultures After 1800 (1 Unit) An introduction to selected musical cultures of the Western world from 1800 to the present; focus on music, its intellectual and cultural contexts, its creators, and its performance practices. Also introduces traditions of performing this music today and tools for research. As a core component for music majors, this course assumes completion of MUSIC 111-3 and MUSIC 126-3 or their equivalents as prerequisites.

MUSIC 226-1 Aural Skills IV (0.5 Unit) 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 226-2 Aural Skills V (0.5 Unit) 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 226-3 Aural Skills VI (0.5 Unit) 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 227-1 Keyboard Skills 4 (0.5 Unit) This is the first quarter of a second, year-long sequence required but not limited to Music Ed majors. Students who were placed in both Level 1 and the Level 1+ tracks will take this course. Topics include repertoire, technique, harmonizing melodies, sight reading, score reading, ensemble and creative work.

MUSIC 227-2 Keyboard Skills 5 (0.5 Unit) Class instruction in keyboard skills.

MUSIC 227-3 Keyboard Skills 6 (0.5 Unit) Class instruction in keyboard skills.

MUSIC 298-0 Student Organized Seminar (0.5-1 Unit)

MUSIC 327-1 Keyboard Skills 7 (0.5 Unit) This is the first quarter of a year-long sequence required but not restricted to Choral Music Ed majors. Topics include vocal scores, sight reading, solo piano repertoire, and technique.

MUSIC 327-2 Keyboard Skills 8 (0.5 Unit) Class instruction in keyboard skills.

MUSIC 327-3 Keyboard Skills 9 (0.5 Unit) Class instruction in keyboard skills.

MUSIC 330-0 Materials, Performance, Practice & Pedagogy (0.5 Unit)

MUSIC 335-0 Selected Topics (1 Unit) Topics vary; announced before registration. May be repeated.

MUSIC 350-0 Alexander Technique (0.5 Unit) Methods of using the body efficiently to reduce unnecessary tension and stress in instrumental and vocal performance.

MUSIC 360-0 Career Innovation in Music and the Performing Arts (1 Unit) Models of performing arts careers; innovative approaches to existing career paths. Case studies, guest speakers. Topics include fee and contract negotiation, artist and booking management, fundraising and grant writing, marketing and public relations, social media, and organizational and business structures. Open to music majors only.

MUSIC 397-0 Summer Internship (0 Unit) Field experience as an intern.

MUSIC 398-0 Internship (0.5-4 Units) Field experience as an intern. Requirements include journal and final paper.

MUSIC 399-0 Independent Study (0.5-1 Unit)

Music Education

music.northwestern.edu/academics/areas-of-study/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. A combined track is also available for students interested in a hybrid version of the music education major; see the music education program coordinator for advising on this option. All music education majors are required to complete 100 hours of clinical observation.

Programs of Study

- Music Education Major (p. 53)
- Music Education Minor (p. 54)

MUSIC_ED 230-0 Woodwind Class (0.5 Unit)

MUSIC_ED 231-0 Guitar Class (0.5 Unit)

MUSIC_ED 232-0 Voice Class (0.5 Unit)

MUSIC_ED 234-0 Double Reeds Class (0.5 Unit)

MUSIC_ED 235-0 High Brass Class (0.5 Unit)

MUSIC_ED 236-0 Low Brass Class (0.5 Unit)

MUSIC_ED 237-0 String Class (0.5 Unit)

MUSIC_ED 239-0 Percussion Class (0.5 Unit)

MUSIC_ED 240-0 Classroom Instruments (0.5 Unit)

MUSIC_ED 260-0 Introduction to Music Education (1 Unit) Discussion and observation of school music programs and effective presentational skills.

MUSIC_ED 314-0 Practicum (0 Unit) (0) Practicum lab linked to MUSIC_ED 361-0, MUSIC_ED 362-0, MUSIC_ED 364-0, MUSIC_ED 365-0, MUSIC_ED 366-0, and MUSIC_ED 367-0.

MUSIC_ED 326-0 World Music Pedagogy (1 Unit) Philosophies and practices of music education that either promote or hinder democratic approaches to student learning.

MUSIC_ED 327-0 Teaching Exceptional Children (1 Unit) Teaching Exceptional Children.

MUSIC_ED 335-0 Selected Topics (1 Unit) Topics vary; announced before registration. May be repeated.

MUSIC_ED 345-0 Music in the Interdisciplinary Curriculum (1 Unit)

Promoting music and arts-based interdisciplinary experiences for elementary and secondary school students. Curriculum developing interrelating arts disciplines (such as music, art, and literature) and connecting the arts with non-arts disciplines (such as history and social studies).

MUSIC_ED 358-0 Philosophy of Music Education (1 Unit) Philosophical issues in music education relating to the teaching and learning of music in schools.

MUSIC_ED 361-0 Teaching General Music I (1 Unit) 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. Prerequisite: MUSIC_ED 240-0.

MUSIC_ED 362-0 Teaching General Music II (1 Unit) For grades 6-12, effective teaching of general music classes in middle and high school. Available curriculum materials; innovative approaches. Prerequisite: MUSIC_ED 231-0.

MUSIC_ED 363-0 Teaching High School Nonperformance Courses (1 Unit) Planning and teaching high school music, arts, humanities courses. Present practices; development of exemplary course plans.

MUSIC_ED 364-0 Teaching Instrumental Music I (1 Unit) Teaching and administrative principles for elementary and middle school instrumental music programs. Rehearsal dynamics, conducting, rehearsal room management, and pedagogy for school ensembles. Prerequisite: MUSIC_ED 237-0.

MUSIC_ED 365-0 Teaching Instrumental Music II (1 Unit) Teaching and administrative principles for secondary school instrumental music programs. Rehearsal dynamics, conducting, rehearsal room management, and pedagogy for school ensembles. Prerequisite: MUSIC_ED 364-0.

MUSIC_ED 366-0 Teaching Choral Music I (1 Unit) 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 (1 Unit) Continuation of MUSIC_ED 366-0. High school choral program, curriculum model, repertoire, sight-reading, rehearsal techniques, programming, administration.

MUSIC_ED 368-0 Teaching Composition in the Schools (1 Unit) 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 (1 Unit) Procedures and issues in research and evaluation in music teaching. Practical application of research to decision making.

MUSIC_ED 370-0 Student Teaching in the Elementary School: General Music (1-4 Units)

MUSIC_ED 371-0 Student Teaching in the Middle School/Junior High School: General/Choral (1-4 Units)

MUSIC_ED 373-0 Student Teaching in the Senior High School: Choral and Nonperformance (1-4 Units)

MUSIC_ED 375-0 Student Teaching in the Elementary School: Instrumental (1-4 Units)

MUSIC_ED 376-0 Student Teaching in the Middle School/Junior High School: Instrumental (1-4 Units)

MUSIC_ED 377-0 Student Teaching in the Senior High School: Instrumental and Nonperformance (1-4 Units)

MUSIC_ED 380-0 Student Teaching in the Elementary School: General Music (1-4 Units)

MUSIC_ED 381-0 Student Teaching in the Middle School/Junior High School: General/Choral (1-4 Units)

MUSIC_ED 383-0 Student Teaching in the Senior High School: Choral and Nonperformance (1-4 Units)

MUSIC_ED 385-0 Student Teaching in the Elementary School: Instrumental (1-4 Units)

MUSIC_ED 386-0 Student Teaching in the Middle School/Junior High School: Instrumental (1-4 Units)

MUSIC_ED 387-0 Student Teaching in the Senior High School: Instrumental and Nonperformance (1-4 Units)

MUSIC_ED 390-0 Student Teaching Colloquium (0 Unit)

MUSIC_ED 399-0 Independent Study (0.5-1 Unit)

Music Education Major

Bachelor of Music degrees in music education require a minimum of 50.5 to 53.5 units, and include core music requirements (16 units), major requirements (21 units), certification track requirements (9.5-12.5 units), distribution requirements (4 units), and non-registration requirements.

Music Core Requirements (16 units)

Course	Title
MUSIC 111-1 & MUSIC 111-2 & MUSIC 111-3	Music Theory I and Music Theory II and Music Theory III
MUSIC 211-1 & MUSIC 211-2 & MUSIC 211-3	Music Theory IV and Music Theory V and Music Theory VI
MUSIC 126-1 & MUSIC 126-2 & MUSIC 126-3	Aural Skills I and Aural Skills II and Aural Skills III
MUSIC 226-1 & MUSIC 226-2 & MUSIC 226-3	Aural Skills IV and Aural Skills V and Aural Skills VI
MUSIC 127-1 & MUSIC 127-2 & MUSIC 127-3	Keyboard Skills 1 and Keyboard Skills 2 and Keyboard Skills 3 (or higher course number based on placement)
MUSIC 227-1 & MUSIC 227-2 & MUSIC 227-3	Keyboard Skills 4 and Keyboard Skills 5 and Keyboard Skills 6
MUSIC 214-0 & MUSIC 215-0 & MUSIC 216-0	Western Music Cultures Before 1600 and Western Music Cultures 1600-1800 and Western Music Cultures After 1800
MUSIC 213-0	World Music Cultures
CONDUCT 326-0	Basic Conducting
One MUSICOL elective	
One 20th/21st century Music Studies elective	

Music Education (21 units)

Course	Title
Applied lessons (9 quarters)	
MUSIC_ED 260-0	Introduction to Music Education
CONDUCT 340-1 or CONDUCT 340-2 or CONDUCT 340-3	Advanced Conducting Band Advanced Conducting Choral Advanced Conducting Orchestral
MUSIC_ED 361-0	Teaching General Music I
MUSIC_ED 364-0	Teaching Instrumental Music I
MUSIC_ED 366-0	Teaching Choral Music I
MUSIC_ED 314-0	Practicum (4 quarters)
MUSIC_ED 327-0	Teaching Exceptional Children

MUSIC_ED 358-0	Philosophy of Music Education
SESP 201-0	Human Development: Childhood and Adolescence
or PSYCH 218-0	Developmental Psychology
TEACH_ED 322-0	Content Area Reading and Writing
Student Teaching, selected from MUSIC_ED 380-387 (1 quarter)	
MUSIC_ED 390-0	Student Teaching Colloquium

Choral Track (12.5 units)

Course	Title
MUSIC 327-1 & MUSIC 327-2 & MUSIC 327-3	Keyboard Skills 7 and Keyboard Skills 8 and Keyboard Skills 9
VOICE 111-1 & VOICE 111-2 & VOICE 111-3	Phonetics and Diction I and Phonetics and Diction II and Phonetics and Diction III
VOICE 311-0	Vocal Solo Class (11 quarters)
CONDUCT 364-0	Choral Organizations (11 quarters)
MUSIC_ED 200-level Instrumental Techniques Elective (2 quarters)	
MUSIC_ED 231-0	Guitar Class
MUSIC_ED 240-0	Classroom Instruments
MUSIC_ED 362-0	Teaching General Music II
or MUSIC_ED 368-0	Teaching Composition in the Schools
MUSIC_ED 367-0	Teaching Choral Music II

General Track (9.5 units)

Course	Title
Major Ensemble (11 quarters)	
MUSIC_ED 200-level Instrumental Techniques elective (1 quarter)	
MUSIC_ED 231-0	Guitar Class
MUSIC_ED 232-0	Voice Class
MUSIC_ED 240-0	Classroom Instruments
MUSIC_ED 362-0	Teaching General Music II
MUSIC_ED 365-0	Teaching Instrumental Music II
or MUSIC_ED 367-0	Teaching Choral Music II
or MUSIC_ED 368-0	Teaching Composition in the Schools

Instrumental Track (11.5 units)

Course	Title
Major Ensemble (10 quarters)	
CONDUCT 391-0	Chamber Music
MUSIC_ED 230-0	Woodwind Class
MUSIC_ED 232-0	Voice Class
MUSIC_ED 234-0	Double Reeds Class
MUSIC_ED 235-0	High Brass Class
MUSIC_ED 236-0	Low Brass Class
MUSIC_ED 237-0	String Class (2 quarters)
or CONDUCT 345-0	Orchestral Bowing: Style and Function
MUSIC_ED 239-0	Percussion Class
MUSIC_ED 362-0	Teaching General Music II
or MUSIC_ED 368-0	Teaching Composition in the Schools
MUSIC_ED 365-0	Teaching Instrumental Music II

Distribution Requirements (4 units)

Course	Title
Area I (Natural Sciences) (1 unit)	
Area III Social and Behavioral Sciences (1 unit)	
Area IV Historical Studies and/or Area V Ethics and Values (2 units)	

All distribution courses must be non-music.

Non-Registration Requirements

Course	Title
By May 1 of sophomore year.	
Orientation CEF	
Illinois Basic Skills Test	
Petition for Advanced Standing	
By December 1 of junior year.	
Illinois Content Area Test #143 (K-12 Music)	
Petition for Student Teaching	
By May 1 of junior year.	
Practicum CEF	
Senior Year.	
Teacher Performance Assessment (TPA)	
Completion of Health and Safety Module (Music Education CANVAS page)	
After Student Teaching:	
APT Test#104	
Two additional CEF Student Surveys	

Music Education Minor

A minor in music education requires 6 units, of which a minimum of 5 courses are not double-counted toward the major. The minor in music education is open to music majors only.

Course	Title
MUSIC_ED 260-0	Introduction to Music Education
MUSIC_ED 358-0	Philosophy of Music Education
2 methods classes (2 units), chosen from:	
MUSIC_ED 361-0	Teaching General Music I
MUSIC_ED 362-0	Teaching General Music II
MUSIC_ED 364-0	Teaching Instrumental Music I
MUSIC_ED 365-0	Teaching Instrumental Music II
MUSIC_ED 366-0	Teaching Choral Music I
MUSIC_ED 367-0	Teaching Choral Music II
1 300-level music education elective (1 unit), chosen from:	
MUSIC_ED 345-0	Music in the Interdisciplinary Curriculum
MUSIC_ED 368-0	Teaching Composition in the Schools
other courses that may be offered	
One capstone project (1 unit)	

Music Studies for Nonmajors

music.northwestern.edu/academics/nonmajors

Students from all schools at Northwestern 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 Bienen School's Office of Student Affairs.

Individual and Group Lessons for Non-Majors

Non-music majors may take individual music lessons for either 0 or 0.5 unit in voice, piano, organ, strings, winds, brass, percussion, and jazz. Group lessons are offered in voice, piano, and guitar. See the list of GEN_MUS courses for all available options. Students are accepted for lessons based on an audition and the availability of an instructor. An applied lesson fee is required for each registration and is billed to the student's account.

Ensemble Participation

Non-music majors interested in auditioning for Bienen School ensembles should contact the ensemble director for audition information. If admitted, non-majors register under the following course numbers for 0 unit, or, non-majors may register under the corresponding ensemble under CONDUCT for 0.5 unit.

Course	Title
GEN_MUS 364-0	Choral Organizations
GEN_MUS 374-0	Band Organizations
GEN_MUS 393-0	Orchestral Organizations
GEN_MUS 395-0	Baroque Music Ensemble

Minor Programs

Students outside the Bienen School have a variety of minor options from which to choose. The minor in general music is open only to non-music majors and is outlined below. Minors in music cognition (p. 57), music composition (p. 49), music technology (p. 49), and musicology (p. 59) are also open to non-music majors.

Minor in General Music (6 units)

Course	Title
One course in Music Theory (GEN_MUS 252-0 or equivalent)	
One course in Music History chosen from GEN_MUS or MUSICOL	
One course in World Music chosen from MUSICOL or MUSIC 213-0	
One music academic course chosen from GEN_MUS, MUSICOL, MUS_TECH, MUS_COMP, or MUSIC_ED	
Two units of music electives; may be academic or performance	

GEN_MUS 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

GEN_MUS 115-0 Non-Major Piano and Organ (0.5 Unit) Private lessons for non-majors; audition required.

GEN_MUS 116-0 Non-Major Piano (0 Unit) Private lessons for non-majors; audition required.

GEN_MUS 120-0 Non-Major Strings (0.5 Unit) Private lessons for non-majors; audition required.

GEN_MUS 121-0 Non-Major Guitar Class-Beginning (0.5 Unit) Class instruction in classical guitar.

GEN_MUS 125-0 Non-Major Winds/Percussion (0.5 Unit) Private lessons for non-majors; audition required.

GEN_MUS 130-0 Non-Major Jazz (0.5 Unit) Private lessons for non-majors; audition required.

GEN_MUS 133-0 Non-Major Class Voice-Beginning (0.5 Unit) Audition required.

GEN_MUS 160-0 Non-Major Private Voice-Beginning (0.5 Unit) Private lessons for non-majors; audition required.

GEN_MUS 170-0 Introduction to Music (1 Unit) Key concepts and contexts for becoming an informed listener and critical thinker with respect to a broad range of musical styles and genres and for acquiring the skills and vocabulary to discuss and write about music effectively. Individual sections may vary from quarter to quarter; see specific section descriptions for more information. No previous musical training or ability to read music notation is required. (VI. Literature and fine arts) *Literature Fine Arts Distro Area*

GEN_MUS 175-0 Selected Topics in Music Literature for Non-Majors (1 Unit) Topics vary; announced before registration. May be repeated. (VI. Literature and fine arts) *Literature Fine Arts Distro Area*

GEN_MUS 176-0 Selected Topics in Applied Music for Non-Majors (1 Unit) Topics vary; announced before registration. May be repeated.

GEN_MUS 220-0 History of the Symphony (1 Unit) Study of music for the symphony orchestra from the 17th century to the modern period. (VI. Literature and fine arts) *Literature Fine Arts Distro Area*

GEN_MUS 230-0 History of Opera (1 Unit) History of opera from its origins in Italy at the end of the 16th century to the modern period. (VI. Literature and fine arts) *Literature Fine Arts Distro Area*

GEN_MUS 250-0 History of Rock (1 Unit) The basic elements of rock from its roots in pop, country and western, and rhythm and blues to the present. (VI. Literature and fine arts) *Literature Fine Arts Distro Area*

GEN_MUS 252-0 Harmony (1 Unit) A basic course in music theory fundamentals, including harmonic materials and tonal structures. Analysis of harmonic structures; harmonization of melodies. (II. Formal studies) *Formal Studies Distro Area*

GEN_MUS 253-0 Form and Analysis (1 Unit) Nature of musical forms found in musical literature from renaissance to the present; analysis of musical examples. Prerequisite: GEN_MUS 252-0, or music-reading skills and some understanding of harmony. *Formal Studies Distro Area*

GEN_MUS 260-0 Non-Major Private Voice-Intermediate (0.5 Unit) Private lessons for non-majors; audition required.

GEN_MUS 270-1 Western Musical Tradition (1 Unit) Major genres and composers from 1600 to 1825. Primary emphasis on the generations of Bach and Handel, Haydn and Mozart, Beethoven and Schubert. (VI. Literature and fine arts) Prerequisite: GEN_MUS 170-0 or equivalent. *Literature Fine Arts Distro Area*

GEN_MUS 270-2 Western Musical Tradition (1 Unit) Major genres and composers from 1825 to the present. (VI. Literature and fine arts) Prerequisite: GEN_MUS 170-0 or equivalent. *Literature Fine Arts Distro Area*

GEN_MUS 315-0 Non-Major Piano and Organ (0.5 Unit) Private lessons for non-majors; audition required.

GEN_MUS 335-0 Selected Topics for Non-Majors (1 Unit) Topics vary; announced before registration. May be repeated.

GEN_MUS 360-0 Non-Major Private Voice-Advanced (0.5 Unit) Private lessons for non-majors; audition required.

GEN_MUS 364-0 Choral Organizations (0 Unit) Non-music majors interested in auditioning for Bienen School ensembles should contact the ensemble director for audition information. Register under GEN MUS for 0 unit, or under CONDUCT for 0.5 unit.

GEN_MUS 374-0 Band Organizations (0 Unit) Non-music majors interested in auditioning for Bienen School ensembles should contact the ensemble director for audition information. Register under GEN MUS for 0 unit, or under CONDUCT for 0.5 unit.

GEN_MUS 378-0 Contemporary Music Ensemble (0 Unit) Non-music majors interested in auditioning for Bienen School ensembles should contact the ensemble director for audition information. Register under GEN MUS for 0 unit, or under CONDUCT for 0.5 unit.

GEN_MUS 393-0 Orchestral Organizations (0 Unit) Non-music majors interested in auditioning for Bienen School ensembles should contact the ensemble director for audition information. Register under GEN MUS for 0 unit, or under CONDUCT for 0.5 unit.

GEN_MUS 395-0 Baroque Music Ensemble (0 Unit) Non-music majors interested in auditioning for Bienen School ensembles should contact the ensemble director for audition information. Register under GEN MUS for 0 unit, or under CONDUCT for 0.5 unit.

Music Technology

See Composition and Music Technology (p. 47).

Music Theory and Cognition

music.northwestern.edu/academics/areas-of-study/music-theory-and-cognition

Undergraduates majoring in theory or cognition receive a broad education in music analysis 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.

Programs of Study

- Music Cognition Major (p. 56)
- Music Cognition Minor (p. 57)
- Music Theory Major (p. 57)
- Music Theory Minor (p. 57)

Music Theory Courses

MUS_THRY 251-0 Music and Mind (1 Unit) An introduction to music cognition for music undergraduates as well as students with limited music backgrounds. Readings primarily from secondary sources, with some primary sources as well.

MUS_THRY 316-0 16th Century Counterpoint (1 Unit) Contrapuntal textures from two to four voices. Cadence and form, melodic line and motive, rhythm, simple and complex imitation, and treatment of dissonance in the sacred music of Lassus, Josquin, and Palestrina.

MUS_THRY 317-0 Figured Bass (1 Unit) The study of harmony at the keyboard as learned by musicians since the early 17th century. Figured bass is an essential subject for performers of early music (including Bach and Mozart) and a key to the analysis of most pre-20th century European music.

MUS_THRY 318-0 18th Century Counterpoint (1 Unit) 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 (1 Unit) Detailed analysis of all parameters of selected musical examples; compositional procedures as a means of developing an intelligent rationale for interpretation. Prerequisite: MUSIC 211-3 or consent of instructor.

MUS_THRY 322-0 Rhythm and Meter (1 Unit) Close reading and discussion of key canonical texts from the last three decades' rich scholarship in rhythm and meter as well as innovative new work. Each student completes a substantial analytical and/or theoretical paper.

MUS_THRY 331-0 Analytical Studies (1 Unit) Extension and refinement of concepts and techniques acquired in first and second year music theory.

MUS_THRY 335-0 Selected Topics in Music Theory (1 Unit) Topics vary; announced before registration. May be repeated.

MUS_THRY 336-0 Selected Topics in Music Cognition (1 Unit) Topics vary; announced before registration. May be repeated.

MUS_THRY 355-0 Atonal Analysis (1 Unit) Techniques for analysis of atonal and nonfunctional tonal music, including serial, set-theoretic, and parametric approaches. Emphasis on music of Schoenberg, Webern, Berg, Stravinsky, and Debussy. Selected readings in analytic literature. Prerequisite: MUSIC 211-3 or equivalent.

MUS_THRY 385-0 Senior Project (1 Unit)

MUS_THRY 390-0 Music Theory Colloquium (0 Unit) (0) Discussion of current research in music theory and cognition.

MUS_THRY 399-0 Independent Study (0.5-1 Unit)

Music Cognition Major

Bachelor of Music degrees in music cognition require a minimum of 50 units, and include core music requirements (19 units), major requirements (15-16 units), and distribution and elective requirements (15-16 units).

Music Core Requirements (19 units)

Course	Title
MUSIC 111-1 & MUSIC 111-2 & MUSIC 111-3	Music Theory I and Music Theory II and Music Theory III
MUSIC 211-1 & MUSIC 211-2 & MUSIC 211-3	Music Theory IV and Music Theory V and Music Theory VI
MUSIC 126-1 & MUSIC 126-2 & MUSIC 126-3	Aural Skills I and Aural Skills II and Aural Skills III
MUSIC 226-1 & MUSIC 226-2 & MUSIC 226-3	Aural Skills IV and Aural Skills V and Aural Skills VI
MUSIC 127-1 & MUSIC 127-2 & MUSIC 127-3	Keyboard Skills 1 and Keyboard Skills 2 and Keyboard Skills 3 (or higher course number based on placement)
MUSIC 214-0 & MUSIC 215-0 & MUSIC 216-0	Western Music Cultures Before 1600 and Western Music Cultures 1600-1800 and Western Music Cultures After 1800
MUSIC 213-0	World Music Cultures
CONDUCT 326-0	Basic Conducting
One MUSICOL elective	
One 20th/21st century Music Studies elective	

Three quarters applied lessons (3 units)

Three quarters ensemble (1.5 units)

Music Cognition Major Requirements (15-16 units)

Course	Title
MUS_THRY 251-0	Music and Mind (1 unit)
MUS_THRY 336-0	Selected Topics in Music Cognition (2 units)
PSYCH 201-0	Statistical Methods in Psychology (1 unit)
PSYCH 205-0	Research Methods in Psychology (1 unit)
Cognate areas (3 units)	
Music Studies electives (4 units)	
Applied lessons/performance experience (3 units)	
MUS_THRY 385-0	Senior Project (1 unit, optional)

Distribution and Elective Requirements (15-16 units)

Course	Title
Area I Natural Sciences or Area II Formal Studies or Music Technology (1 unit)	
Area III Social/Behavioral Sciences (1 unit)	
Area IV Historical Studies (1 unit)	
Area V Ethics and Values (1 unit)	
Area VI Literature/Fine Arts (1 unit)	
English Composition course (1 unit)	
Non-Music Electives (6 units)	
Free Electives (3 units if completing Senior Project or 4 units; either music or non-music courses)	
Business/Finance Overlay course (may double count with any other requirement)	

Music Cognition Minor

A minor in music cognition requires 9 units, of which a minimum of 5 courses are not double counted toward the major.

- 3 units in music cognition: MUS_THRY 251-0 Music and Mind (1 unit) and MUS_THRY 336-0 Selected Topics in Music Cognition (2 units)
- 3 units in music analysis and music technology chosen from MUS_THRY and MUS_TECH
- 3 units in cognate areas (psychology, linguistics, and/or communication sciences and disorders)

Music Theory Major

Bachelor of Music degrees in music theory require a minimum of 50 units, and include core music requirements (19 units), major requirements (15-17 units), and distribution and elective requirements (14-16 units).

Music Core Requirements (19 units)

Course	Title
MUSIC 111-1 & MUSIC 111-2 & MUSIC 111-3	Music Theory I and Music Theory II and Music Theory III
MUSIC 211-1 & MUSIC 211-2 & MUSIC 211-3	Music Theory IV and Music Theory V and Music Theory VI
MUSIC 126-1 & MUSIC 126-2 & MUSIC 126-3	Aural Skills I and Aural Skills II and Aural Skills III

MUSIC 226-1 & MUSIC 226-2 & MUSIC 226-3	Aural Skills IV and Aural Skills V and Aural Skills VI
MUSIC 127-1 & MUSIC 127-2 & MUSIC 127-3	Keyboard Skills 1 and Keyboard Skills 2 and Keyboard Skills 3 (or higher course number based on placement)
MUSIC 214-0 & MUSIC 215-0 & MUSIC 216-0	Western Music Cultures Before 1600 and Western Music Cultures 1600-1800 and Western Music Cultures After 1800
MUSIC 213-0	World Music Cultures
CONDUCT 326-0	Basic Conducting
One MUSICOL elective	
One 20th/21st century Music Studies elective	
Three quarters applied lessons (3 units)	
Three quarters ensemble (1.5 units)	

Music Theory Major Requirements (15-17 units)

Course	Title
Six elective courses in MUS_THRY (6 units)	
Two elective courses in MUSICOL (2 units)	
One elective course in MUS_TECH (1 unit)	
Cognate areas (3 units)	
Applied lessons/performance experience (3 units)	
Senior project (optional): MUS_THRY 399-0 Independent Study (1 unit) and MUS_THRY 385-0 Senior Project (1 unit)	

Distribution and Elective Requirements (14-16 units)

Course	Title
Area I Natural Sciences or Area II Formal Studies or Music Technology (1 unit)	
Area III Social/Behavioral Sciences (1 unit)	
Area IV Historical Studies (1 unit)	
Area V Ethics and Values (1 unit)	
Area VI Literature/Fine Arts (1 unit)	
English Composition course (1 unit)	
Non-Music Electives (6 units)	
Free Electives (2 units if completing Senior Project or 4 units; either music or non-music courses)	
Business/Finance Overlay course (may double count with any other requirement)	

Music Theory Minor

A minor in music theory requires 6 units, of which a minimum of 5 courses are not double counted toward the major. The minor in music theory is open to music majors only. All available courses are listed under MUS_THRY.

- Three 300-level music theory courses in music analysis
- Three 300-level courses in music cognition

Musicology

music.northwestern.edu/academics/areas-of-study/musicology

Encompassing much more than music history, the musicology major approaches music as a social activity shaped by aesthetic movements

and intellectual theories – in essence, the humanistic study of music in culture.

Programs of Study

- Musicology Major (p. 59)
- Musicology Minor (p. 59)

MUSICOL 323-0 Topics in Ethnomusicology (1 Unit) Ethnomusicology history, bibliographical resources, methods, and theories. *Literature Fine Arts Distro Area*

MUSICOL 326-0 Topics in World Music: Asia (1 Unit) 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 (1 Unit) Introduction to Africa's diverse musics 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 (1 Unit) An ethnomusicological perspective on music of the Americas as influenced by 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 Topics in Middle Eastern Music (1 Unit) 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, postcolonial theory, and religion. *Literature Fine Arts Distro Area*

MUSICOL 330-0 Russian Fairy Tale and Opera (1 Unit) Russian cultural and national identity studied through folk tales and their musical counterparts in Russian opera. Current critical theory, the portrayal of women, the interplay of nationalism and gender, and the East-West dichotomy. *Literature Fine Arts Distro Area*

MUSICOL 331-0 Orientalism and Music (1 Unit) 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, developed by John MacKenzie, and clarified through references in literature and the visual arts. *Literature Fine Arts Distro Area*

MUSICOL 332-0 Music and Gypsies (1 Unit) Romany music from Hungary, Spain, the Balkans, Turkey, the Middle East, and India; Andalusian flamenco; 19th-century opera and operetta (Bizet's *Carmen*, Verdi's *La Traviata*); instrumental works by Haydn, Liszt, Brahms, and others; and more recent "world" music phenomena.

MUSICOL 333-0 Topics in Popular Music (1 Unit) Topics vary; announced before registration. May be repeated.

MUSICOL 334-0 Russian Modernism (1 Unit) Russian music after Tchaikovsky, notably Scriabin, Rachmaninoff, Stravinsky, Prokofiev, and Shostakovich.

MUSICOL 335-0 Selected Topics (1 Unit) Topics vary; announced before registration. May be repeated. *Literature Fine Arts Distro Area*

MUSICOL 335-SA Selected Topics (1 Unit) Topics vary; announced before registration. May be repeated. *Literature Fine Arts Distro Area*

MUSICOL 338-0 Expressionism (1 Unit) The interaction of music (Schoenberg, Berg, Webern, Weill, Hindemith, et al.) with painting (Kandinsky et al.), poetry (Stefan George et al.), theater (Wedekind, Brecht, et al.), and dance (Kurt Jooss et al.) in early-20th-century Germany and Austria.

MUSICOL 339-0 Music and Gender (1 Unit) The many intersections between music and ideas of gender; focus on composition, characterization, patronage, and performance. Elite and popular Western musical forms from the Middle Ages to 2000 in relation to gender issues in other cultures' musics. *Literature Fine Arts Distro Area*

MUSICOL 341-0 Music and the Visual Arts (1 Unit) 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 (1 Unit) Authenticity in music at the turn of the 21st century, focusing on three music genres most closely associated with that idea's cultural and philosophical considerations: early music, country music, and world or ethnic music. *Literature Fine Arts Distro Area*

MUSICOL 343-0 Music and Shakespeare (1 Unit) An exploration of some of the many intersections between Shakespearean drama and music from the late 16th through early 21st centuries, including study of plays, opera, ballet, film, musical theater, art song, popular music, and the symphony.

MUSICOL 344-0 Music and Film (1 Unit) Theory and practice of music as a part of the processes of making and viewing films, from the beginning of the sound era to the present. Topic varies but typically focuses on a specific film genre's musical traditions, techniques, personalities, and problems.

MUSICOL 345-0 From Literature to Opera to Film (1 Unit) Selected operas, based on literary or theatrical works, that in turn inspired films. Examination of the literary or theatrical inspiration, the opera as written for stage, and film and video adaptations.

MUSICOL 346-0 Composer Topics (1 Unit) Topics vary; announced before registration. May be repeated.

MUSICOL 347-0 The Lied (1 Unit) Survey of voice-piano settings of German poems, from Mozart through Richard Strauss.

MUSICOL 348-0 Bel Canto Opera (1 Unit) Italian opera in the early-to-mid-19th century. The relations of Rossini, Donizetti, and Bellini to the operatic culture of their time.

MUSICOL 350-0 Topics in Medieval Music (1 Unit) Gregorian and medieval chant, secular monophony, and the development of polyphony from the earliest records through the music of Ockeghem and Busnois. *Literature Fine Arts Distro Area*

MUSICOL 351-0 Topics in 16th Century Music (1 Unit) Middle and late renaissance and early manifestations of the baroque, from Josquin through the Gabriellis. *Literature Fine Arts Distro Area*

MUSICOL 352-0 Topics in 17th Century Music (1 Unit) The baroque from Monteverdi through Bach and Handel.

MUSICOL 353-0 Topics in 18th Century Music (1 Unit) 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 (1 Unit) 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 (1 Unit) Representative works and critical studies of art music from Debussy to the late 20th century.

MUSICOL 356-0 Topics in Contemporary Music (1 Unit) Representative works and critical studies of art music from 2000 to the present.

MUSICOL 385-0 Senior Project (1 Unit)

MUSICOL 390-0 Musicology Colloquium (0 Unit)

MUSICOL 399-0 Independent Study (0.5-1 Unit)

Musicology Major

Bachelor of Music degrees in musicology require a minimum of 50 units, and include core music requirements (19 units), major requirements (16 units), and distribution and elective requirements (15 units).

Core Music Requirements (19 units)

Course	Title
MUSIC 111-1 & MUSIC 111-2 & MUSIC 111-3	Music Theory I and Music Theory II and Music Theory III
MUSIC 211-1 & MUSIC 211-2 & MUSIC 211-3	Music Theory IV and Music Theory V and Music Theory VI
MUSIC 126-1 & MUSIC 126-2 & MUSIC 126-3	Aural Skills I and Aural Skills II and Aural Skills III
MUSIC 226-1 & MUSIC 226-2 & MUSIC 226-3	Aural Skills IV and Aural Skills V and Aural Skills VI
MUSIC 127-1 & MUSIC 127-2 & MUSIC 127-3	Keyboard Skills 1 and Keyboard Skills 2 and Keyboard Skills 3 (or higher course number based on placement)
MUSIC 214-0 & MUSIC 215-0 & MUSIC 216-0	Western Music Cultures Before 1600 and Western Music Cultures 1600-1800 and Western Music Cultures After 1800
MUSIC 213-0	World Music Cultures
CONDUCT 326-0	Basic Conducting
One MUSICOL elective	
One 20th/21st century Music Studies elective	
Three quarters applied lessons (3 units)	
Three quarters ensemble (1.5 units)	

Musicology Major Requirements (16 units)

Historical Musicology Track

Course	Title
History of Music Courses (6 units)	
MUSICOL 350-0	Topics in Medieval Music

MUSICOL 351-0	Topics in 16th Century Music
MUSICOL 352-0	Topics in 17th Century Music
MUSICOL 353-0	Topics in 18th Century Music
MUSICOL 354-0	Topics in 19th Century Music
MUSICOL 355-0	Topics in 20th Century Music
Musicology electives or cognates (6 units)	
Applied lessons/performance experience (3 units)	
MUSICOL 385-0	Senior Project (1 unit)
MUSICOL 390-0	Musicology Colloquium (12 quarters, 0 units)

Ethnomusicology Track

Course	Title
Ethnomusicology courses (3 units)	
Area and topics courses (9 units)	
Applied lessons/performance experience (3 units)	
MUSICOL 385-0	Senior Project (1 unit)
MUSICOL 390-0	Musicology Colloquium (12 quarters, 0 units)

Distribution and Elective Requirements (15 units)

Course	Title
Area I Natural Sciences or Area II Formal Studies or Music Technology (1 unit)	
Area III Social/Behavioral Sciences (1 unit)	
Area IV Historical Studies (1 unit)	
Area V Ethics and Values (1 unit)	
Area VI Literature/Fine Arts (1 unit)	
English Composition course (1 unit)	
Non-Music Electives (6 units)	
Free Electives (3 units, either music or non-music courses)	
Business/Finance Overlay course (may double count with any other requirement)	

Musicology Minor

A minor in musicology requires 6 units, of which a minimum of 5 courses are not double counted toward the major. The minor in musicology is open to all undergraduates.

Course	Title
One course on Music of the World's Cultures chosen from:	
MUSICOL 323-0 or MUSICOL 326-0 or MUSICOL 327-0 or MUSICOL 328-0 or MUSICOL 329-0	Topics in Ethnomusicology Topics in World Music: Asia Topics in World Music: Africa Topics in World Music: The Americas Topics in Middle Eastern Music
One course on Historical Art Music chosen from:	
MUSICOL 350-0	Topics in Medieval Music
MUSICOL 351-0	Topics in 16th Century Music
MUSICOL 352-0	Topics in 17th Century Music
MUSICOL 353-0	Topics in 18th Century Music
MUSICOL 354-0	Topics in 19th Century Music
MUSICOL 355-0	Topics in 20th Century Music
Four remaining courses may be chosen from any courses in MUSICOL.	

Piano

music.northwestern.edu/academics/areas-of-study/piano

The major in piano performance focuses on private lessons, studio classes, piano repertoire, piano pedagogy, and accompanying classes. Frequent performances as a soloist and as an assisting musician develop skills in public presentation. Solo recitals, required in both the junior and senior years, are considered an integral part of the program.

Program of Study

- Piano Major (p. 60)

PIANO 161-0 Applied Piano for Music Majors (1 Unit)

PIANO 255-0 Piano Sight Reading (0.5 Unit)

PIANO 261-0 Applied Piano for Music Majors (1 Unit)

PIANO 305-0 Optional Recital (0 Unit)

PIANO 313-1 Piano Repertoire I (1 Unit) Analytical and historical study of piano solo and concerto repertoire from early keyboard literature to the present.

PIANO 313-2 Piano Repertoire II (1 Unit) Analytical and historical study of piano solo and concerto repertoire from early keyboard literature to the present.

PIANO 313-3 Piano Repertoire III (1 Unit) Analytical and historical study of piano solo and concerto repertoire from early keyboard literature to the present.

PIANO 315-1 Piano Pedagogy I (1 Unit) 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 315-2 Piano Pedagogy II (1 Unit) 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 315-3 Piano Pedagogy III (1 Unit) 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 328-1 Collaborative Piano-Beginning I (0.5 Unit) Piano students work with a singer and instrumentalist in the preparation and performance of mainstream recital repertoire.

PIANO 328-2 Collaborative Piano-Beginning II (0.5 Unit) Piano students work with a singer and instrumentalist in the preparation and performance of mainstream recital repertoire.

PIANO 328-3 Collaborative Piano-Beginning III (0.5 Unit) Piano students work with a singer and instrumentalist in the preparation and performance of mainstream recital repertoire.

PIANO 329-0 Duo Class (0.5 Unit) Provides an opportunity for pianists and their vocal and/or instrumental partners to receive intensive coaching on works of their choice. A final performance is required.

PIANO 335-0 Selected Topics (1 Unit) Topics vary; announced before registration. May be repeated.

PIANO 340-0 Piano Recital Hour (0 Unit)

PIANO 358-0 Applied Keyboard for Music Majors (0.5 Unit)

PIANO 361-0 Applied Piano for Music Majors (1 Unit)

PIANO 370-0 Junior Recital (0 Unit)

PIANO 380-0 Senior Recital (0 Unit)

PIANO 390-0 Studio Class (0 Unit)

PIANO 392-0 Studio Ensemble for Music Majors (0.5 Unit)

PIANO 393-0 Repertoire Studies (0.5 Unit) Topics vary by quarter.

PIANO 399-0 Independent Study (0.5-1 Unit)

Piano Major

Bachelor of Music degrees in piano require a minimum of 50 units, and include core music requirements (16 units), major requirements (20 units), and distribution and elective requirements (14 units).

Core Music Requirements (16 units)

Course	Title
MUSIC 111-1 & MUSIC 111-2 & MUSIC 111-3	Music Theory I and Music Theory II and Music Theory III
MUSIC 211-1 & MUSIC 211-2 & MUSIC 211-3	Music Theory IV and Music Theory V and Music Theory VI
MUSIC 126-1 & MUSIC 126-2 & MUSIC 126-3	Aural Skills I and Aural Skills II and Aural Skills III
MUSIC 226-1 & MUSIC 226-2 & MUSIC 226-3	Aural Skills IV and Aural Skills V and Aural Skills VI
MUSIC 130-1 & MUSIC 130-2 & MUSIC 130-3	Keyboard Skills for Piano Majors and Keyboard Skills for Piano Majors and Keyboard Skills for Piano Majors
MUSIC 214-0 & MUSIC 215-0 & MUSIC 216-0	Western Music Cultures Before 1600 and Western Music Cultures 1600-1800 and Western Music Cultures After 1800
MUSIC 213-0	World Music Cultures
CONDUCT 326-0	Basic Conducting
One MUSICOL elective	
One 20th/21st century Music Studies elective	
Three quarters ensemble (1.5 units)	

Piano Major Requirements (20 units)

Course	Title
PIANO 161-0	Applied Piano for Music Majors (3 quarters)
PIANO 261-0	Applied Piano for Music Majors (3 quarters)
PIANO 361-0	Applied Piano for Music Majors (6 quarters)
PIANO 313-1 & PIANO 313-2 & PIANO 313-3	Piano Repertoire I and Piano Repertoire II and Piano Repertoire III
PIANO 315-1 & PIANO 315-2 & PIANO 315-3	Piano Pedagogy I and Piano Pedagogy II and Piano Pedagogy III
PIANO 328-1 & PIANO 328-2 & PIANO 328-3	Collaborative Piano-Beginning I and Collaborative Piano-Beginning II and Collaborative Piano-Beginning III
CONDUCT 391-0	Chamber Music

PIANO 340-0	Piano Recital Hour (12 quarters)
PIANO 370-0	Junior Recital
PIANO 380-0	Senior Recital

Distribution and Elective Requirements (14 units)

Course	Title
Area I Natural Sciences or Area II Formal Studies or Music Technology (1 unit)	
Area III Social/Behavioral Sciences (1 unit)	
Area IV Historical Studies (1 unit)	
Area V Ethics and Values (1 unit)	
Area VI Literature/Fine Arts (1 unit)	
English Composition course (1 unit)	
Non-Music Electives (6 units)	
Free Electives (2 units, either music or non-music courses)	
Business/Finance Overlay course (may double count with any other requirement)	

String Instruments

music.northwestern.edu/academics/areas-of-study/strings

Majors in string instruments prepare for professional performance and teaching as well as for advanced study. The curriculum is built around individual study and ensemble participation, including chamber music and orchestra, with orchestral repertoire studies and string pedagogy available to qualified juniors and seniors. A junior recital and a senior recital are required. Students in this program may major in violin, viola, cello, double bass, harp, or classical guitar.

Program of Study

- String Instruments Major (p. 62)

STRINGS 141-0 Applied Violin for Music Majors (1 Unit)

STRINGS 142-0 Applied Viola for Music Majors (1 Unit)

STRINGS 143-0 Applied Cello for Music Majors (1 Unit)

STRINGS 144-0 Applied Double Bass for Music Majors (1 Unit)

STRINGS 151-0 Applied Harp for Music Majors (1 Unit)

STRINGS 171-0 Applied Guitar for Music Majors (1 Unit)

STRINGS 241-0 Applied Violin for Music Majors (1 Unit)

STRINGS 242-0 Applied Viola for Music Majors (1 Unit)

STRINGS 243-0 Applied Cello for Music Majors (1 Unit)

STRINGS 244-0 Applied Double Bass for Music Majors (1 Unit)

STRINGS 251-0 Applied Harp for Music Majors (1 Unit)

STRINGS 271-0 Applied Guitar for Music Majors (1 Unit)

STRINGS 305-0 Optional Recital (0 Unit)

STRINGS 311-0 Suzuki Pedagogy (0.5 Unit) Fundamental principles of Suzuki philosophy and materials, with emphasis on application to violin. Open to all string players.

STRINGS 315-1 Violin and Viola Pedagogy I (0.5 Unit) Developmental approach to teaching beginning through advanced precollege violin and viola students. Includes apprenticeship teaching and observations. Designed as a one-year sequence. Open to all violinists and violists.

STRINGS 315-2 Violin and Viola Pedagogy II (0.5 Unit) Developmental approach to teaching beginning through advanced precollege violin and viola students. Includes apprenticeship teaching and observations. Designed as a one-year sequence. Open to all violinists and violists.

STRINGS 315-3 Violin and Viola Pedagogy III (0.5 Unit) Developmental approach to teaching beginning through advanced precollege violin and viola students. Includes apprenticeship teaching and observations. Designed as a one-year sequence. Open to all violinists and violists.

STRINGS 316-1 Cello and Double Bass Pedagogy I (0.5 Unit) Developmental approach to teaching beginning through advanced precollege cello and double bass students.

STRINGS 316-2 Cello and Double Bass Pedagogy II (0.5 Unit) Developmental approach to teaching beginning through advanced precollege cello and double bass students.

STRINGS 316-3 Cello and Double Bass Pedagogy III (0.5 Unit) Developmental approach to teaching beginning through advanced precollege cello and double bass students.

STRINGS 318-1 Harp Technique and Pedagogy I (0.5 Unit) Pedagogical instruction and demonstration of teaching techniques for all levels and ages.

STRINGS 318-2 Harp Technique and Pedagogy II (0.5 Unit) Pedagogical instruction and demonstration of teaching techniques for all levels and ages.

STRINGS 318-3 Harp Technique and Pedagogy III (0.5 Unit) Pedagogical instruction and demonstration of teaching techniques for all levels and ages.

STRINGS 319-1 Orchestral Repertoire I (Violin, Viola, Cello, Dbl Bass, Harp) (0.5 Unit)

STRINGS 319-2 Orchestral Repertoire II (Violin, Viola, Cello, Dbl Bass, Harp) (0.5 Unit)

STRINGS 319-3 Orchestral Repertoire III (Violin, Viola, Cello, Dbl Bass, Harp) (0.5 Unit)

STRINGS 335-0 Selected Topics (0.5-1 Unit) Topics vary; announced before registration. May be repeated.

STRINGS 341-0 Applied Violin for Music Majors (1 Unit)

STRINGS 342-0 Applied Viola for Music Majors (1 Unit)

STRINGS 343-0 Applied Cello for Music Majors (1 Unit)

STRINGS 344-0 Applied Double Bass for Music Majors (1 Unit)

STRINGS 351-0 Applied Harp for Music Majors (1 Unit)

STRINGS 370-0 Junior Recital (0 Unit)

STRINGS 371-0 Applied Guitar for Music Majors (1 Unit)

STRINGS 374-0 Guitar Ensemble for Music Majors (0.5 Unit) 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 Lute and Guitar History and Literature I (0.5 Unit)

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 375-2 Lute and Guitar History and Literature II (0.5 Unit)

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 375-3 Lute and Guitar History and Literature III (0.5 Unit)

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 Guitar Pedagogy I (0.5 Unit) 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 376-2 Guitar Pedagogy II (0.5 Unit) 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 376-3 Guitar Pedagogy III (0.5 Unit) 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 Unit)

STRINGS 390-0 Studio Class (0 Unit)

STRINGS 392-0 Studio Ensemble for Music Majors (0.5 Unit) Small ensembles based on studio instruments.

STRINGS 393-0 Repertoire Studies (0.5 Unit) Topics vary by quarter.

STRINGS 399-0 Independent Study (0.5-1 Unit)

String Instruments Major

Bachelor of Music degrees in string instruments require a minimum of 50 to 50.5 units, and include core music requirements (14.5 units), major requirements (23.5-24 units), and distribution and elective requirements (12 units).

Music Core Requirements (14.5 units)

Course	Title
MUSIC 111-1 & MUSIC 111-2 & MUSIC 111-3	Music Theory I and Music Theory II and Music Theory III
MUSIC 211-1 & MUSIC 211-2 & MUSIC 211-3	Music Theory IV and Music Theory V and Music Theory VI

MUSIC 126-1 & MUSIC 126-2 & MUSIC 126-3	Aural Skills I and Aural Skills II and Aural Skills III
MUSIC 226-1 & MUSIC 226-2 & MUSIC 226-3	Aural Skills IV and Aural Skills V and Aural Skills VI
MUSIC 127-1 & MUSIC 127-2 & MUSIC 127-3	Keyboard Skills 1 and Keyboard Skills 2 and Keyboard Skills 3 (or higher course number based on placement)
MUSIC 214-0 & MUSIC 215-0 & MUSIC 216-0	Western Music Cultures Before 1600 and Western Music Cultures 1600-1800 and Western Music Cultures After 1800
MUSIC 213-0	World Music Cultures
CONDUCT 326-0	Basic Conducting
One MUSICOL elective	
One 20th/21st century Music Studies elective	

Violin, Viola, and Cello Performance (24 units)

Course	Title
100-level applied study (3 quarters)	
200-level applied study (3 quarters)	
300-level applied study (6 quarters)	
CONDUCT 393-0	Orchestral Organizations (12 quarters)
CONDUCT 391-0	Chamber Music (6 quarters)
String Pedagogy, selected from STRINGS 311-0, STRINGS 315-1,2,3 or STRINGS 316-1,2,3 (3 quarters)	
STRINGS 319-1 & STRINGS 319-2 & STRINGS 319-3	Orchestral Repertoire I (Violin,Viola,Cello,DbI Bass,Harp) and Orchestral Repertoire II (Violin,Viola,Cello,DbI Bass,Harp) and Orchestral Repertoire III (Violin,Viola,Cello,DbI Bass,Harp)
STRINGS 370-0	Junior Recital
STRINGS 380-0	Senior Recital

Double Bass Performance (23.5 units)

Course	Title
STRINGS 144-0	Applied Double Bass for Music Majors (3 quarters)
STRINGS 244-0	Applied Double Bass for Music Majors (3 quarters)
STRINGS 344-0	Applied Double Bass for Music Majors (6 quarters)
CONDUCT 393-0	Orchestral Organizations (12 quarters)
CONDUCT 391-0	Chamber Music (3 quarters)
STRINGS 316-1 & STRINGS 316-2 & STRINGS 316-3	Cello and Double Bass Pedagogy I and Cello and Double Bass Pedagogy II and Cello and Double Bass Pedagogy III
STRINGS 319-1 & STRINGS 319-2 & STRINGS 319-3	Orchestral Repertoire I (Violin,Viola,Cello,DbI Bass,Harp) and Orchestral Repertoire II (Violin,Viola,Cello,DbI Bass,Harp) and Orchestral Repertoire III (Violin,Viola,Cello,DbI Bass,Harp)
STRINGS 370-0	Junior Recital (0 units)
STRINGS 380-0	Senior Recital (0 units)
Free Electives (1 unit; may be music or non-music courses)	

Harp Performance (23.5 units)

Course	Title
STRINGS 151-0	Applied Harp for Music Majors (3 quarters)
STRINGS 251-0	Applied Harp for Music Majors (3 quarters)
STRINGS 351-0	Applied Harp for Music Majors (6 quarters)
CONDUCT 393-0	Orchestral Organizations (12 quarters)
or CONDUCT 374-0	Band Organizations
or CONDUCT 378-0	Contemporary Music Ensemble
CONDUCT 391-0	Chamber Music (3 quarters)
STRINGS 318-1 & STRINGS 318-2 & STRINGS 318-3	Harp Technique and Pedagogy I and Harp Technique and Pedagogy II and Harp Technique and Pedagogy III
STRINGS 319-1 & STRINGS 319-2 & STRINGS 319-3	Orchestral Repertoire I (Violin, Viola, Cello, Db) Bass, Harp) and Orchestral Repertoire II (Violin, Viola, Cello, Db) Bass, Harp) and Orchestral Repertoire III (Violin, Viola, Cello, Db) Bass, Harp)
STRINGS 380-0	Senior Recital

Free Electives (1 unit; may be music or non-music courses)

Guitar Major Requirements (23.5 units)

Course	Title
STRINGS 171-0	Applied Guitar for Music Majors (3 quarters)
STRINGS 271-0	Applied Guitar for Music Majors (3 quarters)
STRINGS 371-0	Applied Guitar for Music Majors (6 quarters)
STRINGS 374-0	Guitar Ensemble for Music Majors (12 quarters)
STRINGS 376-1 & STRINGS 376-2 & STRINGS 376-3	Guitar Pedagogy I and Guitar Pedagogy II and Guitar Pedagogy III
STRINGS 375-1 & STRINGS 375-2 & STRINGS 375-3	Lute and Guitar History and Literature I and Lute and Guitar History and Literature II and Lute and Guitar History and Literature III
STRINGS 370-0	Junior Recital
STRINGS 380-0	Senior Recital

Free Electives (2.5 units; may be music or non-music courses)

Distribution and Elective Requirements (12 units)

Course	Title
Area I Natural Sciences or Area II Formal Studies or Music Technology (1 unit)	
Area III Social/Behavioral Sciences (1 unit)	
Area IV Historical Studies (1 unit)	
Area V Ethics and Values (1 unit)	
Area VI Literature/Fine Arts (1 unit)	
English Composition course (1 unit)	
Non-Music Electives (6 units)	
Business/Finance Overlay course (may double count with any other requirement)	

Voice and Opera

music.northwestern.edu/academics/areas-of-study/voice-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 vocal pedagogy, conducting, opera workshop, repertoire, and diction. A senior recital is

required, and students are urged to take advantage of the numerous other performance opportunities offered by the school.

The opera program generally presents three opera productions each year, including two with full orchestra.

Program of Study

- Voice and Opera Major (p. 64)

VOICE 110-0 Applied Voice for Music Majors (1 Unit) Lessons consist of individual instruction, with each student receiving the equivalent of 50 minutes of instruction weekly.

VOICE 111-1 Phonetics and Diction I (0.5 Unit) Required of first-year and transfer students majoring in voice. Three quarters: Italian, German, French.

VOICE 111-2 Phonetics and Diction II (0.5 Unit) Required of first-year and transfer students majoring in voice. Three quarters: Italian, German, French.

VOICE 111-3 Phonetics and Diction III (0.5 Unit) Required of first-year and transfer students majoring in voice. Three quarters: Italian, German, French.

VOICE 210-0 Applied Voice for Music Majors (1 Unit) Lessons consist of individual instruction, with each student receiving the equivalent of 50 minutes of instruction weekly.

VOICE 305-0 Optional Recital (0 Unit)

VOICE 310-0 Applied Voice for Music Majors (1 Unit) Lessons consist of individual instruction, with each student receiving the equivalent of 50 minutes of instruction weekly.

VOICE 311-0 Vocal Solo Class (0 Unit) Weekly recital hour. Required for any student registered for full-credit private voice lessons.

VOICE 323-0 Vocal Pedagogy for Undergraduates (0.5 Unit) The fundamentals of vocal production, including laryngeal anatomy, posture, breathing, resonance, articulation, and registration. Topics also include health care of the professional voice and some pathologies of the vocal folds.

VOICE 335-0 Selected Topics in Voice (0.5-1 Unit) Topics vary; announced before registration. May include chanson, recitative, and non-English languages. May be repeated.

VOICE 351-1 Undergraduate Opera Workshop I (0.5 Unit) Advanced techniques for the performance of arias; methods of text and character analysis; audition techniques; study of opera scenes.

VOICE 351-2 Undergraduate Opera Workshop II (0.5 Unit) Advanced techniques for the performance of arias; methods of text and character analysis; audition techniques; study of opera scenes.

VOICE 351-3 Undergraduate Opera Workshop III (0.5 Unit) Advanced techniques for the performance of arias; methods of text and character analysis; audition techniques; study of opera scenes.

VOICE 355-0 Vocal Coaching (0.5 Unit)

VOICE 365-0 Professional Preparation For Singers (0.5 Unit) Designed to help the aspiring singer make the leap into professional work. Covers

the musical, physical, and business aspects of being a professional musician. Includes teaching by guest artists.

VOICE 370-0 Junior Recital (0 Unit)

VOICE 380-0 Senior Recital (0 Unit)

VOICE 390-0 Studio Class (0 Unit)

VOICE 393-0 Repertoire Studies (0.5 Unit) Topics vary by quarter and may include the German Lied, chanson, oratorio repertoire, and recitative.

VOICE 399-0 Independent Study (0.5-1 Unit) Permission of instructor and department required.

Voice and Opera Major

Bachelor of Music degrees in voice and opera require a minimum of 50 units, and include core music requirements (14.5 units), major requirements (22.5 units), and distribution and elective requirements (13 units).

Music Core Requirements (14.5 units)

Course	Title
MUSIC 111-1 & MUSIC 111-2 & MUSIC 111-3	Music Theory I and Music Theory II and Music Theory III
MUSIC 211-1 & MUSIC 211-2 & MUSIC 211-3	Music Theory IV and Music Theory V and Music Theory VI
MUSIC 126-1 & MUSIC 126-2 & MUSIC 126-3	Aural Skills I and Aural Skills II and Aural Skills III
MUSIC 226-1 & MUSIC 226-2 & MUSIC 226-3	Aural Skills IV and Aural Skills V and Aural Skills VI
MUSIC 127-1 & MUSIC 127-2 & MUSIC 127-3	Keyboard Skills 1 and Keyboard Skills 2 and Keyboard Skills 3 (or higher course number based on placement)
MUSIC 214-0 & MUSIC 215-0 & MUSIC 216-0	Western Music Cultures Before 1600 and Western Music Cultures 1600-1800 and Western Music Cultures After 1800
MUSIC 213-0	World Music Cultures
CONDUCT 326-0	Basic Conducting
One MUSICOL elective	
One 20th/21st century Music Studies elective	

Voice and Opera Performance (22.5 units)

Course	Title
VOICE 110-0	Applied Voice for Music Majors (3 quarters)
VOICE 210-0	Applied Voice for Music Majors (3 quarters)
VOICE 310-0	Applied Voice for Music Majors (6 quarters)
CONDUCT 364-0	Choral Organizations (12 quarters)
VOICE 111-1 & VOICE 111-2 & VOICE 111-3	Phonetics and Diction I and Phonetics and Diction II and Phonetics and Diction III
VOICE 311-0	Vocal Solo Class (12 quarters)
VOICE 323-0	Vocal Pedagogy for Undergraduates
VOICE 351-1 & VOICE 351-2 & VOICE 351-3	Undergraduate Opera Workshop I and Undergraduate Opera Workshop II and Undergraduate Opera Workshop III

VOICE 393-0 Repertoire Studies (2 quarters)

VOICE 380-0 Senior Recital

Distribution and Elective Requirements (13 units)

Course	Title
Area I Natural Sciences or Area II Formal Studies or Music Technology (1 unit)	
Area III Social/Behavioral Sciences (1 unit)	
Area IV Historical Studies (1 unit)	
Area V Ethics and Values (1 unit)	
Area VI Literature/Fine Arts (1 unit)	
English Composition course (1 unit)	
Non-Music Electives (6 units)	
Free Electives (1 unit; may be music or non-music courses)	
Business/Finance Overlay course (may double count with any other requirement)	

Winds and Percussion Instruments

music.northwestern.edu/academics/areas-of-study/woodwinds

music.northwestern.edu/academics/areas-of-study/brass

music.northwestern.edu/academics/areas-of-study/percussion

Designed to prepare students for professional performance and teaching as well as for advanced study, the major in winds and percussion instruments offers a concentrated curriculum emphasizing applied studies, master classes, required participation in large and small ensembles, and recitals.

Program of Study

- Winds and Percussion Instruments Major (p. 65)

WIND_PER 111-0 Applied Flute for Music Majors (1 Unit)

WIND_PER 112-0 Applied Oboe for Music Majors (1 Unit)

WIND_PER 113-0 Applied Clarinet for Music Majors (1 Unit)

WIND_PER 114-0 Applied Saxophone for Music Majors (1 Unit)

WIND_PER 115-0 Applied Bassoon for Music Majors (1 Unit)

WIND_PER 121-0 Applied Trumpet for Music Majors (1 Unit)

WIND_PER 122-0 Applied French Horn for Music Majors (1 Unit)

WIND_PER 123-0 Applied Euphonium for Music Majors (1 Unit)

WIND_PER 124-0 Applied Trombone for Music Majors (1 Unit)

WIND_PER 125-0 Applied Tuba for Music Majors (1 Unit)

WIND_PER 131-0 Applied Percussion for Music Majors (1 Unit)

WIND_PER 211-0 Applied Flute for Music Majors (1 Unit)

WIND_PER 212-0 Applied Oboe for Music Majors (1 Unit)

WIND_PER 213-0 Applied Clarinet for Music Majors (1 Unit)

WIND_PER 214-0 Applied Saxophone for Music Majors (1 Unit)

WIND_PER 215-0 Applied Bassoon for Music Majors (1 Unit)

WIND_PER 221-0 Applied Trumpet for Music Majors (1 Unit)

WIND_PER 222-0 Applied French Horn for Music Majors (1 Unit)

WIND_PER 223-0 Applied Euphonium for Music Majors (1 Unit)

WIND_PER 224-0 Applied Trombone for Music Majors (1 Unit)

WIND_PER 225-0 Applied Tuba for Music Majors (1 Unit)

WIND_PER 231-0 Applied Percussion for Music Majors (1 Unit)

WIND_PER 302-0 Warm-Up Class (0 Unit)

WIND_PER 305-0 Optional Recital (0 Unit)

WIND_PER 311-0 Applied Flute for Music Majors (1 Unit)

WIND_PER 312-0 Applied Oboe for Music Majors (1 Unit)

WIND_PER 313-0 Applied Clarinet for Music Majors (1 Unit)

WIND_PER 314-0 Applied Saxophone for Music Majors (1 Unit)

WIND_PER 315-0 Applied Bassoon for Music Majors (1 Unit)

WIND_PER 321-0 Applied Trumpet for Music Majors (1 Unit)

WIND_PER 322-0 Applied French Horn for Music Majors (1 Unit)

WIND_PER 323-0 Applied Euphonium for Music Majors (1 Unit)

WIND_PER 324-0 Applied Trombone for Music Majors (1 Unit)

WIND_PER 325-0 Applied Tuba for Music Majors (1 Unit)

WIND_PER 331-0 Applied Percussion for Music Majors (1 Unit)

WIND_PER 335-0 Selected Topics (0.5-1 Unit) Topics vary; announced before registration. May be repeated.

WIND_PER 347-0 Percussion Pedagogy (0.5 Unit) Methods, materials, and writings related to percussion playing and teaching.

WIND_PER 352-0 Preparing for an Audition (0.5 Unit)

WIND_PER 357-0 Reed Making (0.5 Unit)

WIND_PER 359-0 Teaching Techniques (0.5 Unit)

WIND_PER 360-0 Bass Clarinet (0.5 Unit)

WIND_PER 361-0 English Horn (0.5 Unit)

WIND_PER 362-0 Baroque Flute (0.5 Unit)

WIND_PER 370-0 Junior Recital (0 Unit)

WIND_PER 380-0 Senior Recital (0 Unit)

WIND_PER 390-0 Studio Class (0 Unit)

WIND_PER 392-0 Studio Ensemble for Music Majors (0.5 Unit)

WIND_PER 393-0 Repertoire Studies (0.5 Unit) Includes winds/ brass/ percussion orchestral repertoire, clarinet orchestral studies, and studies in woodwind and brass literature.

WIND_PER 399-0 Independent Study (0.5-1 Unit)

Winds and Percussion Instruments Major

Bachelor of Music degrees in winds and percussion require a minimum of 50 units, and include core music requirements (14.5 units), major requirements (23.5 units), and distribution and elective requirements (12 units).

Music Core Requirements (14.5 units)

Course	Title
MUSIC 111-1 & MUSIC 111-2 & MUSIC 111-3	Music Theory I and Music Theory II and Music Theory III
MUSIC 211-1 & MUSIC 211-2 & MUSIC 211-3	Music Theory IV and Music Theory V and Music Theory VI
MUSIC 126-1 & MUSIC 126-2 & MUSIC 126-3	Aural Skills I and Aural Skills II and Aural Skills III
MUSIC 226-1 & MUSIC 226-2 & MUSIC 226-3	Aural Skills IV and Aural Skills V and Aural Skills VI
MUSIC 127-1 & MUSIC 127-2 & MUSIC 127-3	Keyboard Skills 1 and Keyboard Skills 2 and Keyboard Skills 3 (or higher course number based on placement)
MUSIC 214-0 & MUSIC 215-0 & MUSIC 216-0	Western Music Cultures Before 1600 and Western Music Cultures 1600-1800 and Western Music Cultures After 1800
MUSIC 213-0	World Music Cultures
CONDUCT 326-0	Basic Conducting
One MUSICOL elective	
One 20th/21st century Music Studies elective	

Flute, Saxophone, Bassoon, Trumpet, Horn, Euphonium, Trombone, and Tuba Performance (23.5 units)

Course	Title
100-level applied study (3 quarters)	
200-level applied study (3 quarters)	
300-level applied study (6 quarters)	
CONDUCT 374-0 or CONDUCT 393-0 or CONDUCT 378-0	Band Organizations (12 quarters) Orchestral Organizations Contemporary Music Ensemble
CONDUCT 391-0	Chamber Music (6 quarters)
WIND_PER 359-0	Teaching Techniques
WIND_PER 393-0	Repertoire Studies
WIND_PER 370-0	Junior Recital (Flute, Trumpet, and Horn only)
WIND_PER 380-0	Senior Recital
Free Electives (1.5 units; may be music or non-music courses)	

Oboe Performance (23.5 units)

Course	Title
WIND_PER 112-0	Applied Oboe for Music Majors (3 quarters)
WIND_PER 212-0	Applied Oboe for Music Majors (3 quarters)

WIND_PER 312-0	Applied Oboe for Music Majors (6 quarters)
CONDUCT 374-0	Band Organizations (12 quarters)
or CONDUCT 393-0	Orchestral Organizations
or CONDUCT 378-0	Contemporary Music Ensemble
CONDUCT 391-0	Chamber Music (6 quarters)
WIND_PER 357-0	Reed Making (3 quarters)
WIND_PER 359-0	Teaching Techniques
WIND_PER 393-0	Repertoire Studies
WIND_PER 380-0	Senior Recital

Clarinet Performance (23.5 units)

Course	Title
WIND_PER 113-0	Applied Clarinet for Music Majors (3 quarters)
WIND_PER 213-0	Applied Clarinet for Music Majors (3 quarters)
WIND_PER 313-0	Applied Clarinet for Music Majors (6 quarters)
CONDUCT 374-0	Band Organizations (12 quarters)
or CONDUCT 393-0	Orchestral Organizations
or CONDUCT 378-0	Contemporary Music Ensemble
CONDUCT 391-0	Chamber Music (6 quarters)
WIND_PER 359-0	Teaching Techniques
WIND_PER 393-0	Repertoire Studies (Clarinet Orchestral Studies, 3 quarters)
WIND_PER 380-0	Senior Recital

Free Elective (.5 unit; may be music or non-music course)

Percussion Performance (23.5 units)

Course	Title
WIND_PER 131-0	Applied Percussion for Music Majors (3 quarters)
WIND_PER 231-0	Applied Percussion for Music Majors (3 quarters)
WIND_PER 331-0	Applied Percussion for Music Majors (6 quarters)
CONDUCT 374-0	Band Organizations (12 quarters)
or CONDUCT 393-0	Orchestral Organizations
or CONDUCT 378-0	Contemporary Music Ensemble
CONDUCT 391-0	Chamber Music (6 quarters)
WIND_PER 347-0	Percussion Pedagogy
WIND_PER 393-0	Repertoire Studies
WIND_PER 370-0	Junior Recital
WIND_PER 380-0	Senior Recital

Free Electives (1.5 units; may be music or non-music courses)

Distribution and Elective Requirements (12 units)

Course	Title
Area I Natural Sciences or Area II Formal Studies or Music Technology (1 unit)	
Area III Social/Behavioral Sciences (1 unit)	
Area IV Historical Studies (1 unit)	
Area V Ethics and Values (1 unit)	
Area VI Literature/Fine Arts (1 unit)	
English Composition course (1 unit)	
Non-Music Electives (6 units)	
Business/Finance Overlay course (may double count with any other requirement)	

SCHOOL OF COMMUNICATION

www.communication.northwestern.edu

Communication is at the root of nearly everything we do, and mastering the art of communication can open doors in a wide range of careers, from law and medicine to acting, directing, writing, and producing.

The School of Communication's mission is based on a philosophy of performance. We seek to improve the practice of communication, whether on the stage or screen, at the podium, in the clinic, or in everyday life.

The school is committed to building the basic and applied sciences of communication; developing theoretical and critical perspectives on communicative performances; creating new technologies for communication and new modes of artistic expression; and helping students to be more effective in their work, at home, and in civic life by applying principles of communication. Undergraduates work in partnerships with world-class faculty to create new understandings and develop new approaches to human communication. The curriculum provides students with a solid liberal-arts education that broadens and enriches their studies of human expression and interaction.

Founded by Robert Cumnock in 1878, the School of Communication is now the third largest of Northwestern's six undergraduate divisions. It annually enrolls approximately 1,200 undergraduate majors and 400 graduate students.

Originally, the curriculum and its related activities were concerned with public speaking and interpretative reading as performing arts. As the field grew, the school added instruction in theatre, speech pathology, audiology, radio, television, film, and other specialties in oral communication. Throughout its history the school has often been a pioneer in new fields of study, including film and audiology.

Today the five departments of instruction represent the diverse spectrum of study in the field of communication: communication sciences and disorders; communication studies; performance studies; radio/television/film; and theatre (including dance). All departments offer graduate courses. The School of Communication sponsors dance, debate, media arts, and theatre arts divisions of Northwestern's National High School Institute.

This wide range of educational activities takes place in buildings across the Evanston campus. The fifth floor of the Ryan Center for the Musical Arts houses the school's administrative offices and two departmental offices. The Frances Searle Building houses administrative offices, two departmental offices, and laboratory and research spaces. Other facilities include the school's original building, Annie May Swift Hall; two former residences on Chicago Avenue; the Virginia Wadsworth Wirtz Center for the Performing Arts; and John J. Louis Hall, a state-of-the-art studio production facility.

In 2008 Northwestern opened a branch campus in Qatar, where programs in communication and journalism are offered. (See *Campuses and Schools in The University* chapter of this catalog.)

Academic Policies

Requirements for the Degree of Bachelor of Science in Communication and the Degree of Bachelor of Arts in Communication

The School of Communication grants the degree of bachelor of science in communication upon:

1. the satisfactory completion of 42 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 Registration Requirement.

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. (Regardless of whether the BA or BS is sought, the required programs of study for majors in the Departments of Communication Studies and Radio/Television/Film include specific foreign language requirements; for details, see the major requirements for each of those programs.) 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 defined as competence in the work covered through the final quarter of a college-level second-year language course sequence (or equivalent as determined by each foreign language department). Students who enroll for course credit to satisfy the proficiency requirement must earn a grade no lower than C– in the final course of the second-year course sequence. This proficiency is established in precisely the same manner as in the Weinberg College of Arts and Sciences; see page 37 in the Weinberg College chapter of this catalog.

General Requirements

Of the 42 units of credit required for all major programs in the School of Communication, 35 must be completed with grades of A, B, or C (grades of C– do not satisfy this requirement). A minimum of 18 units of credit must be taken outside the major department (see distribution requirements below). All distribution courses and all courses applied to a major or a minor must be completed with a grade of C– or higher. Courses offered by the major department may not be taken for a P grade regardless of how they are applied to degree requirements. D and P grades may apply only to the elective requirement.

A transfer student will be required to complete at least 11 units of credit 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 units of credit outside the major department in the following areas:

- Science, mathematics, and technology
- Individual and social behavior
- Humanities and fine arts

Students should consult the department concerned for the range of disciplines within each category and the number of courses required.

Major Programs in Communication and Related Requirements

All students in the School of Communication must meet the requirements of one of the following major programs: human communication sciences, communication studies, performance studies, radio/television/film, theatre, or dance.

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. They also are responsible for compliance with the following standards:

- Attendance is required in all courses, and excessive absence is cause for failure.
- 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.

Academic Advising

communication.northwestern.edu/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. First-year students have a separate advising period before the fall registration and then have a total of three required advising meetings, one each quarter. Sophomores are required to have two advising meetings during the academic year. Ultimate responsibility for meeting degree requirements rests with the student.

Cocurricular Activities and Programs

A variety of cocurricular opportunities are available to School of Communication students. Each fall Northwestern's Activities Fair offers information on options in addition to those listed here.

In order to participate in cocurricular and student group activities, students must be simultaneously enrolled in classes at Northwestern. Students who have graduated or who are taking a quarter off from enrollment may not participate in cocurricular or student group activities. This includes all department-sponsored and student-run theatre and film projects and productions.

Arts in the City

Arts in the City is a program offered exclusively to students of the School of Communication. It gives them the opportunity to experience the best arts in Chicago for a nominal fee that includes ticket and transportation. These events particularly showcase the talents of those connected with Northwestern and allow students to socialize with faculty and peers.

Block Cinema

Dedicated to providing the campus, the North Shore, and Chicago with a high-quality venue for repertory cinema, Block Cinema screens classic and contemporary films three nights a week in the Block Museum's state-of-the-art projection facility.

Dean's Advisory Council

The Dean's Advisory Council consists of approximately 18 students representing the three divisions of the school: division I (theatre, performance studies, and dance), division II (communication studies and radio/television/film), and division III (communication sciences and disorders). The council meets once each quarter and holds additional meetings as needed.

Debate Society

The Northwestern debate program was founded in 1855, making it the oldest in the country. Debaters develop valuable analytical and communication skills by participating in more than 600 rounds of intercollegiate competition each season, in addition to hosting debate tournaments on campus and debating teams from other countries. Headquartered in Hardy House, the debate program has achieved unequalled success in competition, winning the National Debate Tournament a record 15 times. For more information see debate.northwestern.edu.

Inspire Media

Inspire Media is a Northwestern student initiative aiming to produce social-issue media that engage with topics affecting our local and international communities. Believing that media have the power to motivate thoughtful discussion and action, Inspire Media produces media and relevant programs that inspire thought, dialogue, critical discussion, and action with regard to various social issues. Inspire's goal is to create an interdisciplinary approach to media making, allowing students from across disciplines to collaborate in creating socially responsible and critical work.

Lambda Pi Eta

Lambda Pi Eta is the official communication studies honor society of the National Communication Association. Its purpose is to recognize, foster, and reward outstanding scholastic achievement in communication studies; stimulate interest in the field of communication; promote and encourage professional development among communication majors; provide an opportunity to discuss and exchange ideas in the field of communication; establish and maintain closer relationships between faculty and students; and explore options for graduate education in communication studies.

National Student Speech Language Hearing Association

The National Student Speech Language Hearing Association, founded in 1972, is a preprofessional association for graduate and undergraduate students interested in the study of communication sciences and disorders. NSSLHA has member representation on the policy-making board and selected committees and boards of the American Speech-Language-Hearing Association. The Northwestern chapter is dedicated to providing opportunities for members to have access to educational, social, and philanthropic experiences during their tenure at the University. For more information, see communication.northwestern.edu/departments/csd/student_activities.php.

Niteskool

Niteskool Productions is Northwestern's student-run music, music video, and concert production company. It is the oldest undergraduate student-run label in the country. Supported by the School of Communication and Northwestern's Associated Student Government, Niteskool has established itself as the leader in promoting and producing student music in the Chicago area. Niteskool's goal is to develop and distribute

the nation's highest-quality music album that is completely conceived, performed, directed, and produced by students.

Speech Team

Sponsored by the School of Communication, Northwestern's speech team serves to develop what is arguably the most important skill of any profession—the art of communication. Through the forum of public speaking, students learn to communicate effectively in a competitive environment that stresses logic, quick thinking, breadth of knowledge, and, ultimately, persuasion. Eligibility is open to any Northwestern undergraduate, regardless of major, who wishes to explore or cultivate public speaking skills. No prior experience is necessary. For more information see communication.northwestern.edu/learn/student_activities/speech.

Student Academy of Audiology

The Student Academy of Audiology is a national student organization dedicated to advancing the interests of students pursuing careers in audiology. Northwestern's SAA chapter takes part in this collective mission in a number of ways: holding triquarterly meetings to discuss current topics in audiology and ways to advance the group; organizing and participating in community outreach programs; sponsoring relevant speakers; maintaining contact with Northwestern alumni; and engaging in a variety of social events. For more information, see communication.northwestern.edu/departments/csd/student_activities.php.

Student Theatre and Performance Groups

Northwestern offers many performance-oriented student theatre groups. For a listing see northwestern.campuslabs.com/engage.

Studio 22

Studio 22 Productions is a student-run not-for-profit film production company dedicated to student productions and creativity. All Studio 22 productions are screened in the Technological Institute's Ryan Family Auditorium the first week of June. For more information see studio22nu.com.

Theatre, Performance Studies, and Dance Productions

All students are eligible to audition for theatre, performance studies, and dance productions. Audition notices are posted on the Wirtz Center's first-floor bulletin board. For more information on the school's mainstage productions, see communication.northwestern.edu/wirtz.

Undergraduate RTVF Student Association

The Undergraduate RTVF Student Association is the official student council of the Department of Radio/Television/Film. The council meets with faculty to voice student concerns, fosters community within the program, and develops programs to enhance the radio/television/film experience.

WNUR

WNUR 89.3 FM is a noncommercial radio station operated and managed by students. Staff membership is open to all Northwestern students. WNUR's studios are located in John J. Louis Hall. For more information see wnur.org.

Facilities

The School of Communication provides outstanding facilities in which students and faculty work, perform, pursue research, engage in media ventures, and connect with their community. The Patrick G. and

Shirley W. Ryan Center for the Musical Arts, one of the campus's latest additions, is the home of the School of Communication Dean's Office and Undergraduate Student Resource Center. The building also houses the departmental and faculty offices of the Departments of Theatre and Performance Studies.

Annie May Swift Hall—a beautifully restored legacy of Northwestern's early days that once housed all of the school's programs—is now home to the Department of Radio/Television/Film as well as the department's film library and the Peggy Dow Helmerich Auditorium. Students in this department also have access to the Fisk Digital Media Studio, the Kresge Digital Media Lab, and John J. Louis Hall—home to production and postproduction facilities, the film equipment center, the studios of WNUR-FM, and the Barbara and Garry Marshall Studio wing, a film soundstage.

The Virginia Wadsworth Wirtz Center for the Performing Arts, recently renovated to increase student performance and rehearsal space, houses the Josephine Louis Theater, a 369-seat proscenium theatre; the Ethel M. Barber Theater, a 439-seat thrust theatre; two black box spaces, the Hal and Martha Hyer Wallis and the Mussetter-Struble Theaters; and production facilities, including scene and costume shops. In addition, the Department of Theatre sponsors occasional productions in Cahn Auditorium, a 1,000-seat proscenium space. The Marjorie Ward Marshall Dance Center features two dance studios.

The Frances Searle Building is home to the School of Communication's science and research programs, including the Roxelyn and Richard Pepper Department of Communication Sciences and Disorders and the Department of Communication Studies. Across the street is the state-of-the-art facility for the school's Center for Audiology, Speech, Language, and Learning, which serves the community's communication health needs. Additional communication studies offices are located at 1815 Chicago Avenue. Next door, Hardy House provides a home to the Northwestern Debate Society.

On Northwestern's Chicago campus are offices for the School of Communication master's program in communication and health and for its treatment programs in voice, speech, and swallowing disorders.

Minor Programs

The School of Communication offers six minor programs: dance, film and media studies, human communication sciences, performance studies, sound design, and theatre. Students may not earn both a major and a minor in the same area, except that radio/television/film majors may earn a minor in sound design. Students wishing to pursue a minor should contact the appropriate department to be assigned a minor adviser. No course for the minor may be taken utilizing the P/N option, and all classes must be completed at a grade of C– or higher in order to be counted toward the minor. School of Communication minors are open to all Northwestern undergraduate students. Please see the appropriate departmental sections for descriptions of the minors in human communication sciences, theatre, and dance. The Department of Radio/Television/Film (p. 81) administers the minor programs in film and media studies and sound design.

Dual Bachelor's Degree Programs

Two programs allow undergraduates to combine a bachelor's degree in communication with a bachelor's degree in another Northwestern undergraduate school. One results in a BA or BS from the School of Communication and a BS from the McCormick School of Engineering and Applied Science, and the other results in a BA or BS from the School of

Communication and a BMus or BAMus from the Bienen School of Music. Both options typically require five years of study.

Certificate Program

The Department of Theatre administers the Music Theatre Certificate Program (p. 93).

Modules

Modules are extended, structured learning experiences that take a student from an entry point to mastery of a specific learning objective. Modules are built around 4 to 6 courses that provide formal instruction related to the learning goal. Formal coursework is paired with cocurricular experiences that provide appropriate opportunities for application and practice. Modules provide a flexible way to build student-faculty cohorts, promote in-depth learning in areas of special significance, and guarantee that students can articulate what they have learned and demonstrate it through performance. For more information about modules, visit the School of Communication Learning Communities website at society.northwestern.edu.

Independent Study

Independent study is available by petition to juniors and seniors who have a minimum 3.0 grade-point average. Sophomores who have a compelling academic rationale to do so are also encouraged to petition to take an independent study. Petitions are available in the Undergraduate Resource Center on the fifth floor of the Ryan Center for the Musical Arts, in department offices, and online at communication.northwestern.edu/advising/forms. Students must secure a faculty sponsor to guide their independent study. The undergraduate dean must approve all independent study proposals. No more than one independent study will be approved per student per quarter. The School of Communication does not limit the number of independent studies that a student may take, but only 2 units of 399 may apply to the major degree requirements. Requests for independent study in the Weinberg College of Arts and Sciences must go through that school's approval procedure. Regardless of the number of independent studies approved in Weinberg, no more than 2 units of 399 may be applied to the distribution requirements. Additional units of 399 are counted as electives. Independent study may not be taken using the P/N option. Some majors have additional rules regarding independent study; see the major requirements for details.

Internships

communication.northwestern.edu/EPICS/find_an_internship

Internships (also sometimes referred to as field studies) allow students to gain valuable organizational experience and apply theoretical knowledge to situations outside the classroom. Students may receive up to four academic credits by enrolling in a weekly seminar led by an internship coordinator as well as working at an internship. One credit may be applied to the major requirements, and the remaining credits are electives. Full-time internships are available in Chicago, Los Angeles, and New York City and may be coordinated in other cities on a case-by-case basis. Internships are coordinated through the Office of External Programs, Internships, and Career Services (EPICS). Interested students should visit the website and contact their advisers.

Junior Tutorials

Junior tutorials are small seminars, open to juniors only, taught by School of Communication professors on unique topics. The tutorials may count as School of Communication courses and as major courses if taught by

a professor in the student's major department. They are listed in CAESAR under CMN-related courses and are listed in Spotlight every quarter. Students may take one junior tutorial in the course of their undergraduate career; additional enrollments require approval of the undergraduate dean.

Student-Organized Seminars

A student-organized seminar (SOS) consists of a small group of students (under the sponsorship of one or more faculty members) who explore a specific topic not covered in the University curriculum. Typically, nine or fewer students participate, each preparing a written seminar paper and making an oral presentation at one of the class meetings. Before the School of Communication approves an SOS course, a copy of the seminar's proposal, signed by the sponsor and the department chair, must be submitted to the undergraduate dean for approval. Guidelines for proposing an SOS are available in the Student Resource Center on the fifth floor of the Ryan Center for the Musical Arts and online at communication.northwestern.edu/advising/forms.

Research Practica

Opportunities sometimes arise for a student to work on a faculty member's research or project team. Sometimes faculty will invite students to participate in a practicum, but students may also approach a professor whose research or project particularly interests them.

Students are registered for research practica through the Student Resource Office on the fifth floor of the Ryan Center for the Musical Arts or via permission number from the professor or department. Professor approval is required to register.

Study Abroad

northwestern.edu/abroad

Students are encouraged to study abroad because it is an important educational experience. Most aspects of study abroad are handled by the Undergraduate Learning Abroad Office, 1800 Sherman Ave, Suite 4-400. For more information see the Undergraduate Education chapter of this catalog.

Graduate Study

The School of Communication has been a national center for graduate study and research in the fields of communication arts and sciences for many years. Programs for the master of arts, master of fine arts, master of science, 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 of Communication itself offers the doctor of audiology, the master of arts in sound arts and industries, and master of science degrees in communication, health communication, leadership for creative enterprises, and speech, language, and learning.

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 available from the Graduate School. Requirements for the doctor of audiology degree, the master of arts degree in sound arts and industries, and the master of science degrees in communication, health communication, leadership for creative enterprises, and speech, language, and learning are available from the School of Communication.

Communication Sciences and Disorders

communication.northwestern.edu/departments/csd

The Roxelyn and Richard Pepper Department of Communication Sciences and Disorders offers a major in human communication sciences, providing undergraduate students with a foundation for the study of disorders of hearing, speech, language, and learning. The department's classroom, clinical, and research facilities are located in the Frances Searle Building on the Evanston campus. The undergraduate program emphasizes the basic science principles underlying all human communication and cognition and introduces students to clinical issues and research findings that pertain to disorders of communication and learning. The major in human communication sciences is particularly appealing to students who plan to attend graduate or professional school in fields such as medicine, audiology, speech and language pathology, learning disabilities, dentistry, and biomedical engineering. Students who do not pursue medical, clinically based, or research graduate degrees may enter careers in health-related private industry or the public sector.

Undergraduate majors in human communication sciences have the option of pursuing a general course of study, typical for most premed students, or of choosing among three areas of concentration: audiology and hearing sciences, learning disabilities, and speech and language pathology.

Audiology and hearing sciences encompasses the study of hearing, hearing disorders, and the treatment of hearing disorders. Emphasis is on basic communication science, including study of the anatomical, physiological, and physical bases of hearing. Undergraduate courses present information on normal communication processes and provide an introduction to audiologic assessment and hearing loss management.

Learning disabilities is concerned with learning processes and their dysfunctions, including disorders of perception, memory, language, and conceptualization. Such disorders lead to problems in the acquisition and use of oral language, reading, writing, and math skills that require specialized remediation. Undergraduate coursework stresses theoretical, scientific, clinical, and educational issues as a foundation for advanced training.

Speech and language pathology introduces students to the psychological, linguistic, neurological, acoustic, anatomical, and physiological bases of normal speech and language behavior. As their knowledge of normal speech, language, learning, and hearing processes increases, students are introduced to the communicative disorders that result from the disruption of these processes. Advanced undergraduate courses are concerned with the nature, recognition, and management of common communicative disorders and present issues related to administration and public policy.

Accelerated Degree Program in Medical Education

Human communication sciences is an attractive major for students admitted to the Honors Program in Medical Education, providing opportunities for students to connect their study of basic scientific principles to research and clinical activities as well as real-life issues.

For information on applying to HPME, see Special Admission Programs (p. 10). For a description of the program, see Honors Program in Medical Education (p. 34).

Research Practicum

Students may register for a research practicum in which they gain research experience by working with a faculty member on design, execution, and presentation of a research project. Students may develop ideas for an independent study based on their research practicum experience.

Independent Study

Students may register for units of independent study, in which they work closely with a faculty member on a topic of mutual interest. Students interested in independent study should select courses that may lead to more advanced library or laboratory research.

Programs of Study

- Human Communication Sciences Major (p. 72)
- Human Communication Sciences Minor (p. 73)

Undergraduates may take 400-level courses with permission of the instructor.

CSD 108-0 Sound and Communication Health (1 Unit) Introduction to communication sciences and disorders. Role of sound in basic human communication; hearing, speech, language, and learning mechanisms required to process and produce sound; assessment and treatment of disorders caused by a breakdown in sound processing. May not be taken with or after CSD 318-0, CSD 320-0, or CSD 373-0.

CSD 110-0 Introduction to Hearing and Speech Acoustics (1 Unit) Introduction to acoustics, measurement of hearing, and the acoustical properties of speech sounds. Sound waves; standards of measuring magnitude; audiograms; source-filter theory; spectrograms.

CSD 112-0 The Scientific Exploration of Communication (1 Unit) Introduction to biology and physics of human communication. Basic properties of speech sounds and how they are produced and received; relation between human anatomical structures involved in sound production, modulation, and reception; brain mechanisms of processing speech sounds. *Natural Sciences Distro Area*

CSD 202-0 Neurobiology of Communication (1 Unit) Human anatomy, physiology, and neurology in relation to communicative behavior. Sensory, perceptual, cognitive, and motor processes. *Natural Sciences Distro Area*

CSD 205-0 Study of Learning and Learning Problems in the Classroom (1 Unit) 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 & Disorders (1 Unit) Major topics of research interest in communicative disorders. Principles of research in communicative disorders.

CSD 301-0 Anatomy and Physiology of the Vocal Mechanism (1 Unit) Anatomical and physiological mechanisms of breathing, phonation, and articulation. Laboratories include dissection and participation in physiological research. Prerequisite: sophomore standing or above. *Natural Sciences Distro Area*

CSD 302-0 Anatomy and Physiology of the Peripheral Hearing

Mechanism (1 Unit) Gross and fine structure; function of the peripheral auditory system. Prerequisites: junior standing or above, CSD 202-0, or consent of instructor. *Natural Sciences Distro Area*

CSD 303-0 Brain and Cognition (1 Unit) Neural bases of cognitive processing with emphases on neuroimaging approaches in the areas of encoding, perception, attention, memory, language, reading, motor control, and executive functioning. Taught with PSYCH 365-0; students may not earn credit for both courses. *Interdisciplinary Distro - See Rules* (p. 175) *Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

CSD 304-0 Statistics in Communication Sciences and Disorders (1 Unit) Introduction to research design and data analysis in communication sciences and disorders; statistical inference. *Formal Studies Distro Area*

CSD 305-0 Phonetics (1 Unit) Training in transcription of English speech sounds. Introduction to phonological analysis, dynamics of articulation, and dialect variations. *Interdisciplinary Distro - See Rules* (p. 175) *Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

CSD 306-0 Psychoacoustics (1 Unit) 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. *Social Behavioral Sciences Distro Area*

CSD 309-0 Culture, Language and Learning (1 Unit) 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. *Social Behavioral Sciences Distro Area*

CSD 310-0 Biological Foundations of Speech and Music (1 Unit) 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. Crosslisted with CSD 410-0 and SAI 502-0. Prerequisite: junior standing or consent of instructor. *Natural Sciences Distro Area*

CSD 318-0 Introduction to Audiology (1 Unit) Introduction to the measurement of hearing in humans. Basic anatomy of the ear, measurement of hearing, potential disorders of hearing. *Natural Sciences Distro Area*

CSD 319-0 Aural Rehabilitation (1 Unit) Principles and practices in rehabilitation of children and adults, including use of sensory aids, counseling, communication remediation (emphasizing speech reading), and auditory training techniques.

CSD 320-0 Introduction to Speech, Language, Learning, and Their Disorders (1 Unit) Overview of normal and disordered communication. Speech, language, hearing, and cognitive development disorders and their psychosocial effects, across the age continuum according to etiology, clinical manifestations, and intervention. Anatomy and physiology of speech, language, and hearing. Service-delivery settings; ethical and legal considerations; professional issues.

CSD 332-0 Clinical Assisting in Speech and Language Pathology (1 Unit) Introduction to clinical practice, the dynamics of the client-clinician relationship and general clinical protocol, and the development and

execution of therapy goals and procedures. Prerequisites: CSD 392-0 and CSD 305-0, or consent of instructor.

CSD 334-0 Delivery Systems in Speech & Language Pathology (1 Unit) Organization and administration of speech language pathology services in schools, health care agencies, and private practice. *Social Behavioral Sciences Distro Area*

CSD 342-0 Language and Cognition in Atypical Development (1 Unit) Description and theory relevant to the cognitive, linguistic, and social development of individuals with different developmental disorders throughout the lifespan. *Social Behavioral Sciences Distro Area*

CSD 369-0 Special Topics in Communication Sciences and Disorders (0.5-1 Unit) Current scientific and professional problems in communication sciences and disorders. Topics vary by quarter.

CSD 373-0 Learning Disabilities (1 Unit) Psychological, neurological, and linguistic theories of language and learning as related to learning disabilities. *Social Behavioral Sciences Distro Area*

CSD 376-0 Diagnostic & Remedial Approaches for Children With Learning Problems (1 Unit) Introduction to the field of learning disabilities and its theoretical perspectives, assessment, and instruction principles and to the process of clinical teaching. Emphasis on instruction, accommodation, service delivery, progress monitoring, and transition. *Social Behavioral Sciences Distro Area*

CSD 380-0 Introduction to Clinical Procedures in Learning Disabilities (1 Unit) Practicum experience in clinical settings. Learning processes and application of instructional approaches. Field studies, reading, and weekly seminars. Prerequisite: CSD 376-0.

CSD 382-0 Autism Spectrum Disorders (1 Unit) Overview of autism, focusing on its clinical presentation and potential causes, diagnosis, assessments for characterizing autistic features in research, evaluation (based on behavior, cognition, neuroimaging, and genetics) of theories of autism's causes, and controversies (changing prevalence, myths about causation).

CSD 392-0 Language Development and Usage (1 Unit) 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. *Social Behavioral Sciences Distro Area*

CSD 398-0 Research Practicum in Communication Sciences and Disorders (0.5-1 Unit) Working with a faculty member on design, execution, and presentation of a research project. Activities may include a review of literature, design of an experiment, data collection, coding, analysis, and spoken or written presentation of experimental results.

CSD 399-0 Independent Study (0.5-1 Unit) Prerequisite: consent of undergraduate dean after submission of petition.

Human Communication Sciences Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

There is one set of requirements for a major in human communication sciences. However, well-designed course plans are recommended for

each area of concentration. Students should consult their adviser for details.

Major Requirements (12 units)

Introductory Courses (1 unit)

1 Comm_St course which must be passed with a grade of C (not C–) or higher

Course	Title
COMM_ST 101-0	Interpersonal Communication
or COMM_ST 102-0	Public Speaking

CSD Courses (11 units)

11 CSD courses, all of which must be passed with a grade of C (not C–) or higher, and which include the following:

Course	Title
CSD 110-0	Introduction to Hearing and Speech Acoustics
CSD 392-0	Language Development and Usage
CSD 318-0	Introduction to Audiology
CSD 320-0	Introduction to Speech, Language, Learning, and Their Disorders

7 additional CSD courses ¹

¹ Excluding CSD 108-0 Sound and Communication Health, CSD 202-0 Neurobiology of Communication, and CSD 304-0 Statistics in Communication Sciences and Disorders; no more than two research and/or internship credits may be counted toward the total required

Additional Requirements (30 units)

Writing Proficiency

Requirement for all students

Distribution Requirements (18 units)

18 units of credit outside the department, including:

- 5 in the School of Communication's science, mathematics, and technology distribution area, including:

- **Statistics (1 course)**

Course	Title
CSD 304-0	Statistics in Communication Sciences and Disorders
or PSYCH 201-0	Statistical Methods in Psychology
or STAT 232-0	Applied Statistics

- **Neurobiology (1 course)**

Course	Title
CSD 202-0	Neurobiology of Communication
or PSYCH 212-0	Introduction to Neuroscience
or BIOL_SCI 302-0	Fundamentals of Neurobiology
or NEUROSCI 202-0	Cellular and Molecular Neuroscience

- **Mathematics (1 course)**
- **Animal-related Biology (1 course)**

Course	Title
Excluding:	
BIOL_SCI 104-0	Plant-People Interactions
BIOL_SCI 109-0	The Nature of Plants

- **Physics or Chemistry (1 course)**

- Either the biology or the physics/chemistry course must have a lab component
- 3 in the school's individual and social behavior distribution area
- 3 in the school's humanities and fine arts distribution area
- 7 additional units of credit outside the department

Electives

Electives in communication and other areas to complete a minimum of 42 units of credit

Honors in Communication Sciences and Disorders

An honors program is available for students in their senior year who have maintained an outstanding undergraduate record through their junior year. Upon successful completion of an honors project, they will graduate with honors in communication sciences and disorders. Also see Honors and Prizes (p. 23).

Human Communication Sciences Minor

communication.northwestern.edu/programs/minor_human_communication_sciences

A minor in human communication sciences requires 7 units of credit, of which 6 credits must be in the communication sciences and disorders department. No courses for the minor may be taken using the P/N option, and all classes must be completed with a grade of C– or higher in order to be counted toward the minor.

Minor Requirements (7 units)

Course **Title**
1 neurobiology course selected from the following options:

CSD 202-0	Neurobiology of Communication
or PSYCH 212-0	Introduction to Neuroscience
or BIOL_SCI 302-0	Fundamentals of Neurobiology
or NEUROSCI 202-0	Cellular and Molecular Neuroscience

3 core CSD courses:

CSD 108-0 & CSD 110-0 & CSD 392-0	Sound and Communication Health and Introduction to Hearing and Speech Acoustics and Language Development and Usage
-----------------------------------	--

Any 3 additional CSD courses, excluding CSD 202-0

Communication Studies

communication.northwestern.edu/departments/communicationstudies

The Department of Communication Studies offers courses that explore the major media, practices, and problems of a communication-

intensive society. Topics include—but are not limited to—bargaining and negotiation, collective decision making, organizational innovation, human-computer interaction, Internet use, popular culture, social movements, and the history of political discourse in the United States. Students work with scholarship from the humanities and the social sciences, and coursework emphasizes the analytical and ethical requirements of responsible persuasion. Both required and elective courses are intended to prepare students for personal success and civic leadership.

Program of Study

- Communication Studies Major (p. 77)

COMM_ST 101-0 Interpersonal Communication (1 Unit) Laboratory experience in human interaction. Analysis of communication within groups.

COMM_ST 102-0 Public Speaking (1 Unit) Theory, composition, delivery, and criticism of public speeches.

COMM_ST 103-0 Argumentation and Debate (1 Unit) Theories of argumentation and debate, with many opportunities for practice. Analysis and evaluation of the discourse related to public controversies.

COMM_ST 159-0 Computing Everywhere (0 Unit) This course teaches computing literacy to non-technical undergraduate students.

COMM_ST 201-0 Research Methods in Comm Studies (1 Unit) 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 various other courses in the department.

COMM_ST 205-0 Theories of Persuasion (1 Unit) 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 215-0 Principles of Rhetorical Criticism (1 Unit) Introduction to techniques of rhetorical analysis for use in describing, evaluating, and participating in discussions of public issues. Historical and contemporary examples of public discourse illuminate how symbolic action affects decision making and power relations in public life.

COMM_ST 220-0 Theories of Argumentation (1 Unit) 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 (1 Unit) Theory and practice in the principles of composition and in the preparation and delivery of manuscript speeches.

COMM_ST 225-0 Communication and Culture (1 Unit) How the concept of "culture" is constituted and disseminated through practices, processes, and mechanisms of "communication." Theories of myriad forms of mediation—interpersonal, off-and- online, popular, and mass-mediated—shaping our relationships with ourselves and the world around us.

COMM_ST 227-0 Communication & Technology (1 Unit) Factors informing and shaping the design of everyday objects and our virtual world; psychological aspects of computer-mediated communication and

virtual collaboration, including impression relations, group dynamics, and social networks; social and institutional structures in which human communication is situated. Prerequisite for the Digital Media undergraduate curriculum module.

COMM_ST 229-0 Communication Technology, Community and Personal Identity (1 Unit) 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 (1 Unit) 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 246-0 Intro to Health Communication (1 Unit) Introduction to health communication. Key areas of the field, with focus on providers, patients and their families, hospital networks, nonprofit organizations, and government agencies.

COMM_ST 250-0 Team Leadership and Decision Making (1 Unit) Theories and research relating to communication in small groups and group decision making.

COMM_ST 255-0 Understanding Media Markets: Users, Makers and Metrics (1 Unit) How the preferences and habits of media users, the strategies and constraints of media makers, and the growing prevalence of data and metrics form a dynamic marketplace that shapes public attention.

COMM_ST 270-0 Theories of Mediated Communication (1 Unit) Introductory survey of current issues in research on the mass media, the Internet, and computer-mediated communication.

COMM_ST 274-0 Power in Entertainment (1 Unit) How power is created, sustained, and challenged in entertainment media; how and why individuals, groups, and corporations achieve and maintain dominance in art, film, television, gaming, and digital and social media.

COMM_ST 275-0 Persuasive Images: Rhetoric of Popular Culture (1 Unit) 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 (1 Unit) Independent research and analysis in conjunction with participation in intercollegiate forensics. Credit may not be earned for 290 more than once.

COMM_ST 294-0 First-Year Seminar (1 Unit) Study in seminar format of a topic in communication. Assignments emphasize expository writing. *SOC First-Year Seminar*

COMM_ST 298-0 Undergraduate Seminar (1 Unit) 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.

COMM_ST 301-0 Current Issues in Privacy (1 Unit) The texture of interactions affecting privacy: government and workplace monitoring and surveillance, invasion of privacy by social media, disclosure to unintended Internet audiences, database aggregation, privacy and the person.

COMM_ST 302-0 Law of the Creative Process (1 Unit) Principles of copyright, contracts, and entertainment business practices from the perspective of the producer, artist, and creator.

COMM_ST 310-0 Rhetoric, Democracy & Empire in Classical Athens (1 Unit) Students will read Thucydides' History of the Peloponnesian War along with texts in classical rhetoric to address perennial problems regarding the role of speech in a democratic society.

COMM_ST 314-0 Rhetoric and Public Commemoration (1 Unit) Public commemoration as a rhetorical phenomenon. Through discussion of scholarly literature and production of research papers, students investigate questions such as: How do societies remember the past? What do the strategies for remembering the past teach us about the present? How are 'collective memories' produced and challenged?

COMM_ST 315-0 Rhetoric of Social Movements (1 Unit) 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.

COMM_ST 317-0 Voice, Violence, and Democracy (1 Unit) Understanding how and why "democracy" has come to be regarded today as the only "legitimate" form of government; explored by examining alternative roads to modernity and democratic polity taken by different countries through the dialectic of voice (rhetoric) and violence in contemporary democracies.

COMM_ST 320-0 High School in US Public Culture (1 Unit) The US phenomenon of high school, its portrayal in public culture, and its central role in the national imaginary. Analysis of its history, culture, and social and political effects to examine its function as a social sorting mechanism and how it produces, reproduces, and maintains a differentiated society with the aid of public culture and the mass media.

COMM_ST 321-0 Media & Publics Across Cultures (1 Unit) Relationship between culture and media in an increasingly globalized world, examined through analysis of ethnographic case studies and theoretical texts.

COMM_ST 322-0 The Rhetoric of the American Presidency (1 Unit) 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 323-0 New Media as Popular Culture (1 Unit) How rituals, practices, and relationships enabled by new-media cultural forms shape and reconstitute everyday life. Emphasis on research implementing qualitative and interpretive methods.

COMM_ST 324-1 Rhetoric of U.S. Women's Rights, Part I (1 Unit) 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. Development of the new women's oratorical tradition from its origins through the early 20th century.

COMM_ST 324-2 Rhetoric of U.S. Women's Rights, 1920-Present (1 Unit) 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. Continued development from 1920 to the present.

COMM_ST 325-1 Rhetorical History of the United States I (1 Unit) History of the United States, as studied through key rhetorical texts. Focus on moments of political crisis and cultural change. Colonial period to the outbreak of the Civil War.

COMM_ST 325-2 Rhetorical History of the United States II (1 Unit) History of the United States, as studied through key rhetorical texts.

Focus on moments of political crisis and cultural change. Civil War to World War I.

COMM_ST 325-3 Rhetorical History of the United States III (1 Unit) History of the United States, as studied through key rhetorical texts. Focus on moments of political crisis and cultural change. World War I to the 1960s.

COMM_ST 326-0 African American Rhetoric (1 Unit) 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 330-1 Contemporary Problems in Freedom of Speech I (1 Unit) Personal freedom and public communication under the US Constitution. 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.

COMM_ST 330-2 Contemporary Problems in Freedom of Speech II (1 Unit) Personal freedom and public communication under the US Constitution. Analysis of selected issues introduced in 330-1. Prerequisite: COMM_ST 330-1.

COMM_ST 332-0 The Rhetoric of Multiculturalism (1 Unit) 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 333-0 Girlhood in Public Culture (1 Unit) Why girls have figured so centrally in 20th-century popular culture; why the concept of girlhood itself has been so widely debated within public culture more generally; how girls themselves have responded to public representations of girlhood.

COMM_ST 334-0 Media and the Making of Social Class (1 Unit) The nature of the relationship between the media, middlebrow culture, and the rise of the American middle class; the future of middlebrow culture in the wake of digital production, audience segmentation, and globalization.

COMM_ST 335-0 Philosophy of Language & Communication (1 Unit) 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 (1 Unit) 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 (1 Unit) Relationship between adult developmental processes and changes in communication behavior.

COMM_ST 343-0 Health Communication (1 Unit) Examination of how communication can enhance and maintain the wellbeing of citizens in intentional health care contexts.

COMM_ST 344-0 Interpersonal Conflict (1 Unit) In-depth analysis of theories and research examining conflict within relationships. Special emphasis on conflict within friendships, dating relationships, and family. Prerequisite: COMM_ST 205-0.

COMM_ST 345-0 Family Communication (1 Unit) 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: COMM_ST 241-0.

COMM_ST 350-0 Assistive Communication Design (1 Unit) Designing communication technologies for people with disabilities. The course has two components: weekly lectures by experts in the field of assistive technology and a quarter-long community-based design project.

COMM_ST 351-0 Technology & Human Interaction (1 Unit) Understanding human interactions that take place both with and through technology; design, creation, and evaluation of technologies to support such interactions.

COMM_ST 352-0 Social Network Analysis (1 Unit) Use of social network analysis to understand the growing connectivity and complexity in the world around us on different scales, ranging from small groups to the web. How we create social, economic, and technological networks; how these networks enable and constrain our attitudes and behavior.

COMM_ST 353-0 Collaboration Technology (1 Unit) Communication and behavior in groups; issues raised by collaborative use of communication and computing technologies. Topics include theories of group and organizational behavior, interpersonal awareness, privacy, trust, technology-mediated communication, and technology evaluation and adoption.

COMM_ST 354-0 Design Methods for Digital Media (1 Unit) Contextual interviewing and observation techniques for understanding the design and use of digital media. Weekly readings and class discussion on conducting contextual interviews, making and interpreting observations, and analyzing qualitative data to improve digital media design.

COMM_ST 355-0 Audience Analysis (1 Unit) Methods used to analyze electronic media audiences; emphasis on quantitative research techniques. Prerequisites: COMM_ST 201-0 (or equivalent); COMM_ST 270-0.

COMM_ST 356-0 Games and Social Change (1 Unit) Examination of the evolution of games for social change, from late-19th-century board games for moral instruction to basketball, role plays, video games, and contemporary computer-based networked simulations for civic education.

COMM_ST 357-0 Serious Games (1 Unit) Introduction to the psychological and behavioral theories of entertainment media as a basis for designing and evaluating serious video games. Focus on the games' psychological, behavioral, and social aspects more than on their technical aspects.

COMM_ST 360-0 Theories of Organizational Communication (1 Unit) Theories and research dealing with communication in formal organizations and institutions.

COMM_ST 363-0 Bargaining and Negotiation (1 Unit) Communication in bargaining and negotiation in organizational settings. Cognitive and motivational theories emphasizing bargaining and negotiation strategies.

COMM_ST 364-0 Collective Decision Making & Communication in Organizations (1 Unit) Research on how organizations make, communicate, and implement collective decisions. Assessing decision

effectiveness, group decision making, leadership in organizations, and organizational design.

COMM_ST 365-0 Solving Problems in Applied Organizational Communication (1 Unit) Advanced concepts and techniques for defining and analyzing organizational problems. Preparation for recognizing and working with problems in business organizations.

COMM_ST 366-0 Organizational Behavior & Innovation (1 Unit) Organizations and communities depend on innovative ideas, products, or processes to help solve their problems and grow in new directions. This course looks at a number of interpersonal and organizational variables as they relate to the production, acceptance, and adoption of new ideas.

COMM_ST 367-0 Nonprofit Communication Management (1 Unit) Nongovernmental organizations and the campaigns they create. Examined through three interrelated modules: differentiating nongovernmental organizations from business and government organizations; issues they face that their government and business counterparts do not; nonprofit campaigns and public communication.

COMM_ST 370-0 Ethnographies of Culture (1 Unit) This course looks at ethnographies of artistic practice to better understand how culture is made, circulated, and received in social life.

COMM_ST 371-0 Cultural Analytics (1 Unit) Big data is currency, to those initiated in the nuts and bolts of data science. This data literacy course introduces research on cultural markets, superstars, social media, and crowdsourcing, and provides you with tools to apply this research. You will learn how to plot and interpret graphs to measure performance in a cultural market; use Internet search data and Twitter conversations to forecast trends; build, visualize, and analyze networks; and to train machine learning algorithms for prediction. Except an open mind, there are no prerequisites for the class. While formal thinking is encouraged, the course focuses on providing conceptual foundations and hands-on tools that apply across a variety of fields in communication, computer science, economics, life sciences, and sociology.

COMM_ST 373-0 News Media and American Society (1 Unit) Examination of the news form, content and meaning of the news, and the role of the news media in social continuity and change. Prerequisite: COMM_ST 270-0

COMM_ST 375-0 The Sociology of Online News (1 Unit) Survey of sociological research on the production and consumption of online news.

COMM_ST 376-0 Contemporary Television (1 Unit) Changes in the art and business of television with the introduction of new media. Production, storytelling, identity, and distribution of TV and web entertainment.

COMM_ST 377-0 Development & Marketing Popular Culture (1 Unit) The invention and packaging of popular culture products, including film, music, television, and celebrities. Prerequisite: COMM_ST 275-0.

COMM_ST 378-0 Online Communities and Crowds (1 Unit) Examination of the types of collaborations that occur in online communities and crowds. Emphasis on sociological, economic, and political analysis of how and why largescale online collaborations work.

COMM_ST 380-0 Political Communication (1 Unit) 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: COMM_ST 220-0 and COMM_ST 205-0.

COMM_ST 383-0 Media, Communication, and Environment (1 Unit) Exploring, understanding, and researching questions and issues related to the environment and climate through the study of media and communication.

COMM_ST 385-0 Technology and the American Cultural Landscape (1 Unit) 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 (1 Unit) Examination of developments in information and communication technology in the larger context of American science and technology since 1900. Prerequisite: previous coursework on the historical or social dimensions of information and communication technology.

COMM_ST 388-0 Internet and Society (1 Unit) The social, cultural, political, and economic implications of information technologies.

COMM_ST 389-0 Practicum in Communication Research (1 Unit) 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.

COMM_ST 390-0 Children's Culture (1 Unit) Examination of children's media from psychological, sociological, historical, and other perspectives. Discussion of the role of media in children's development.

COMM_ST 392-0 Global Culture, Commerce and Communication (1 Unit) 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 394-0 Communication Studies Research Seminar (1 Unit) Small seminars in research topics led by different members of the department faculty. Students complete a research paper on a topic related to the seminar theme. Prerequisite: COMM_ST 294-0.

COMM_ST 395-0 Topics in Communication Studies (1 Unit) Reading, research, and discussion in areas of significance. Topics vary.

COMM_ST 395-SA Topics in Communication Studies (1 Unit) Reading, research, and discussion in areas of significance. Topics vary.

COMM_ST 397-0 Honors Seminar (1 Unit) Students work on a 2-to 3-quarter 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. Students receive 2 units of 397 Senior Honors Thesis credit for completing the thesis.

COMM_ST 398-0 Undergraduate Seminar (1 Unit) 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 (1 Unit) Enrollment only by petition in advance.

Communication Studies Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

All courses for SoC majors, minors and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

Program Requirements (12 units)

- | Course | Title |
|---------------|-----------------|
| COMM_ST 102-0 | Public Speaking |
- 3 courses, to be completed before the end of the sophomore year because the material covered is prerequisite to more advanced courses:

Course	Title
COMM_ST 205-0	Theories of Persuasion
One of:	
COMM_ST 215-0	Principles of Rhetorical Criticism
or COMM_ST 225-0	Communication and Culture
or COMM_ST 275-0	Persuasive Images: Rhetoric of Popular Culture
One of:	
COMM_ST 227-0	Communication & Technology
or COMM_ST 246-0	Intro to Health Communication
or COMM_ST 270-0	Theories of Mediated Communication
- | Course | Title |
|---------------|--|
| COMM_ST 294-0 | First-Year Seminar (the lower-division writing requirement; must be taken in fall quarter of the first year; may be substituted for transfer students) |
- | Course | Title |
|---------------|---|
| COMM_ST 394-0 | Communication Studies Research Seminar (the upper-division writing requirement; must be taken during the junior year) |
- 6 additional communication studies courses including:
 - 1 200- or 300-level COMM ST course
 - 5 300-level COMM ST courses

Course	Title
No more than 1 of the following courses may be included in these 6 courses for the major (additional courses can be applied as electives)	
COMM_ST 290-0	Forensics
CMN 340-0	Internship
COMM_ST 389-0	Practicum in Communication Research
COMM_ST 397-0	Honors Seminar
COMM_ST 399-0	Independent Study

Additional Requirements (30 units)

Concentration Outside the School of Communication (6 units)

A field of concentration outside the School of Communication (normally one of the disciplines of the Weinberg College of Arts and Sciences), consisting of at least 6 units of credit; 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 foreign language requirements (p. 175))

Distribution Requirements (18 units)

18 units of credit outside the department, including 3 units of credit from each of the three School of Communication distribution areas: science, mathematics, and technology; individual and social behavior; and humanities and fine arts

Electives

Electives in communication and other areas to complete a minimum of 42 units of credit

Courses used to satisfy the major, distribution, and field of concentration requirements must receive a grade of C– or higher and cannot be taken P/N.

Honors in Communication Studies Major

The Undergraduate Honors Program in Communication Studies offers an opportunity for highly motivated students to conduct original scholarly research. 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 Graduation Honors (p. 23).

Dance

See Theatre (p. 85).

General Communication

Interdepartmental Course

CMN 340-0 Internship (1-4 Units) Enrollment only by petition in advance. Arrangements for fall quarter must be made by September 10, for winter by December 10, for spring by March 10, and for summer by June 10.

Human Communication Sciences

See Communication Sciences and Disorders (p. 71).

Performance Studies

communication.northwestern.edu/departments/performancestudies

The Department of Performance Studies integrates artistic and analytical approaches to a wide range of performance texts, events, and processes. The courses explore an interdisciplinary range of literary, cultural, and personal texts in performance. The department has particular strengths in the study of literature through solo performance; the ensemble adaptation and staging of poetic, narrative, and nonfictional texts; intercultural performance; performance art; cultural studies and the ethnography of performance; and 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.

Programs of Study

- Performance Studies Major (p. 80)
- Performance Studies Minor (p. 80)

PERF_ST 103-0 Analysis & Performance of Literature (1 Unit) Critical reading, written analysis, and performance of literary texts; general introduction to performance studies. *Literature Fine Arts Distro Area*

PERF_ST 119-0 Production Laboratory (0 Unit) Registration for performance studies majors fulfilling production crew requirements. Students perform duties for run crews and house crews in connection with department-sponsored productions in the Krause Performance Lab of Annie May Swift Hall.

PERF_ST 200-0 Introduction to Performance Studies (1 Unit) Explores fundamental themes and debates that animate the field, introducing a range of ways of theorizing, conceptualizing, studying, and making performance. *Literature Fine Arts Distro Area*

PERF_ST 203-0 Performance Culture and Communication (1 Unit) Explores how live performance and dramatic forms of communication are methods used to examine social behavior and cultural expressions.

PERF_ST 210-1 Performance of Poetry (1 Unit) Introduction to the analysis and performance of poetry. Prerequisite: PERF_ST 103-0 or equivalent.

PERF_ST 210-2 Performance of Narrative Fiction (1 Unit) Introduction to the study of narrative performance. Prerequisite: PERF_ST 103-0 or equivalent.

PERF_ST 210-3 Performance of Drama (1 Unit) Introduction to drama and theatricality from a performance studies perspective. Prerequisite: PERF_ST 103-0 or equivalent.

PERF_ST 216-0 Theories & Methods in Performance (1 Unit) Introduction to theories of performance, methods of cultural analysis, and schools of thought in performance studies. May be repeated for credit.

PERF_ST 220-0 Sound Cultures (1 Unit) Introduction to ways of thinking culturally and historically about sound and listening. Students learn to describe, contrast, and analyze sound cultures over a wide geographical and chronological range.

PERF_ST 224-0 Adapting Narrative for Group Performance (1 Unit) Introduction to theories and methods of adapting narrative for the stage, with special emphasis on chamber theatre. Prerequisite: PERF_ST 103-0 or equivalent.

PERF_ST 300-0 Movement Based Performance (1 Unit) Movement laboratory exploring theories and techniques of movement for performance, including dance, physical theatre, and framed quotidian

action. Introduction to leading practitioners and practices in movement training, choreography, and composition.

PERF_ST 301-0 Performance and Activism in Digital Culture (1 Unit)

Exploration of the intersection between performance and digital media as tools for activism. Includes practices of hacktivism, counter-surveillance, locative media activism, and networked protest. *Literature Fine Arts Distro Area*

PERF_ST 302-0 Performance in Asian America (1 Unit) Introduction to the performance of Asian America, including popular culture, performance art, theatre, and dance. Overview of current practices in Asian American aesthetic criticism.

PERF_ST 303-0 Transnational Flows of Performance (1 Unit) Exploration of how transnationalism and globalization challenge the concept of modern nation-states as bounded territories, identities, and cultures by considering how social actors negotiate these processes through performance as an embodied, in situ-cultural practice. *Literature Fine Arts Distro Area*

PERF_ST 304-0 Sonic Practices of the Middle East and North Africa (1 Unit) Sonic and musical practices and ritual in the Middle East and North Africa in relation to modernity, transnationalism, political economy, and performance. *Literature Fine Arts Distro Area*

PERF_ST 305-0 Performance Theory (1 Unit) Introduction to theoretical approaches that animate performance studies, including Marxism, psychoanalysis, deconstruction, postcolonial theory, critical race theory, feminist theory, and queer theory. *Literature Fine Arts Distro Area*

PERF_ST 307-1 Studies in Gender and Performance (1 Unit) 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.

PERF_ST 307-2 Studies in Gender and Performance (1 Unit) 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 344-0) is offered by the Department of Theatre.

PERF_ST 308-0 Performing Modern & Contemporary Poetry (1 Unit) Use of performance in the analysis and criticism of modern and contemporary poetry.

PERF_ST 309-0 Black Performance (1 Unit) Exploration of black performance traditions; introduction to various schools of thought regarding black performance.

PERF_ST 310-0 Performance of Women of Color (1 Unit) Literary expressions by native, Latina, African, and Asian American women reflecting intersections of gender, sexuality, ethnicity, class, and culture in the United States. Feminisms considered across race and culture. Includes poetry, fiction, autobiography, drama, and critical theory.

PERF_ST 311-0 Performance in Everyday Life (1 Unit) Conceptual view of human beings as actors. Dramatism and the perspective of life as theatre.

PERF_ST 314-0 Postcolonial Theory, Fiction, & Film (1 Unit)

PERF_ST 315-0 Non-Fiction Studies (1 Unit) Exploration of the dramatic impulse in nonfiction texts. Emphasis on autobiographical one-person shows.

PERF_ST 316-0 Folklore and Oral Traditions (1 Unit) 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 (1 Unit) Use of performance in the analysis and criticism of Shakespeare's two tetralogies of English history plays.

PERF_ST 318-2 Shakespeare Adaptations (1 Unit) Use of performance in the analysis and criticism of selected Shakespeare plays and their adaptations by other writers.

PERF_ST 320-0 Languages of the Body (1 Unit) Nonverbal body movement and gestural vocabularies in theatre, dance, and performance art (with reference to cinema and to productions of the body in the visual and commercial media); uses illustrations specific to a particular genre, repertoire, historical time, cultural context, and/or performance situation.

PERF_ST 321-0 Performing the American Fifties (1 Unit) Use of performance in the analysis and criticism of selected postwar American literature.

PERF_ST 322-1 Staging the Novel (1 Unit) Theory and practice of adapting novels for stage performance. Film adaptation as a model for stage adaptation.

PERF_ST 322-2 Staging the Novel (1 Unit) Theory and practice of adapting novels for stage performance. Staging narrative voice and style; fiction in relation to nonfiction.

PERF_ST 324-1 Presentational Aesthetics (1 Unit) Theatrical convention, presentational mode, and conscious artifice in the performance of dramatic literature, poetry, and nonfiction.

PERF_ST 326-1 Performance Art (1 Unit) 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.

PERF_ST 326-2 Performance Art (1 Unit) Further theoretical and laboratory exploration of compositional processes and political strategies of performance, media, and event/ audience contexts.

PERF_ST 327-0 Performance Ethnography (1 Unit) Ethnographic approaches to the field of performance studies, including the theoretical foundations of performance ethnography and methodological approaches to its performance.

PERF_ST 328-0 Studies in James Joyce (1 Unit) 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 (1 Unit) 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 (1 Unit) 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 (1-4 Units) Intensive participation in off-campus production and/or field research experience. Departmental approval required.

PERF_ST 332-0 Urban Festivity (1 Unit) Ethnographic study of festivals, parades, exhibitions, civic celebrations, and other genres of urban cultural performance. Multiethnic expressions of Chicago identity. Field research methods.

PERF_ST 334-0 Human Rights & Performance (1 Unit) How social movements, local communities, and individual activists from specific regions around the world use performance to seek political empowerment and social justice. Performance as theory, method, and event in the arts of resistance; human rights as ideology and praxis within indigenous histories, imaginaries, and contexts.

PERF_ST 335-0 Social Art Tactics (1 Unit) Exploration of historical and theoretical foundations of social art practice, including work focused on social change in such genres as performance, digital media, relational art, and photography. Performance/art workshops; development of performance-based interventions.

PERF_ST 336-0 Latino/a Performance (1 Unit) Exploration of US Latina/o literature through narratives of migration, annexation, exile, and diaspora; focus on the arrival and development of Latina/o performance traditions in the United States.

PERF_ST 338-0 Family Stories, Memoirs and Diaries (1 Unit) Use of performance to explore family stories, memoirs, diaries, and other biographical and autobiographical sources.

PERF_ST 399-0 Independent Study (1 Unit) Prerequisite: consent of undergraduate dean after submission of petition.

Performance Studies Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Program Requirements (12 units)

All courses for SoC majors, minors and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

Introductory Courses (2 units)

Course	Title
PERF_ST 200-0	Introduction to Performance Studies
PERF_ST 103-0 or PERF_ST 203-0	Analysis & Performance of Literature Performance Culture and Communication

Advanced Courses (2 units)

A minimum of 2 other 200-level courses in the department, chosen from:

Course	Title
PERF_ST 210-1 & PERF_ST 210-2 & PERF_ST 210-3	Performance of Poetry and Performance of Narrative Fiction and Performance of Drama
PERF_ST 216-0	Theories & Methods in Performance
PERF_ST 220-0	Sound Cultures
PERF_ST 224-0	Adapting Narrative for Group Performance

Production Courses (0 units)

Course	Title
PERF_ST 119-0 or	Production Laboratory (2 quarters)

PERF_ST 119-0 & THEATRE 121-0	Production Laboratory and Production Laboratory (1 quarter each)
----------------------------------	---

Additional Courses (8 units) ¹

Course	Title
PERF_ST 326-1	Performance Art
1 course chosen from the following to fulfill the departmental diversity requirement:	
PERF_ST 302-0	Performance in Asian America
PERF_ST 303-0	Transnational Flows of Performance
PERF_ST 304-0	Sonic Practices of the Middle East and North Africa
PERF_ST 307-1 & PERF_ST 307-2	Studies in Gender and Performance and Studies in Gender and Performance
PERF_ST 309-0	Black Performance
PERF_ST 310-0	Performance of Women of Color
PERF_ST 334-0	Human Rights & Performance
PERF_ST 336-0	Latino/a Performance
4 additional 300- or 400-level courses in the department ²	
2 additional performance-focused courses from any department in the School of Communication	

- ¹ No more than 2 units of PERF_ST 399-0 Independent Study and 1 unit of PERF_ST 331-0 Field Study/Internship in Performance Studies may apply toward this requirement
- ² No more than 1 unit of either PERF_ST 399-0 Independent Study or PERF_ST 331-0 Field Study/Internship in Performance Studies may apply toward this 4-course requirement

Additional Requirements (30 units)

Distribution Requirements (18 units)

18 courses outside the school, including 2 from science, mathematics, and technology; 3 from individual and social behavior; and 3 from humanities and fine arts. In addition, 6 courses must be at the 200 level or above.

Electives (12 units)

Electives in communication and other areas to complete a minimum of 42 units of credit

Honors in Performance Studies

Performance studies majors may apply in their junior year to participate in the departmental honors program. The program is intended to provide highly qualified students with an opportunity to complete a substantial research investigation; to introduce students to graduate-level, faculty-mentored research; and to provide formal honorary recognition to students who have excelled in coursework and in independent research. More information is available from the department office.

Performance Studies Minor

communication.northwestern.edu/advising/pst/minor

The minor in performance studies offers training for students interested in pursuing the theories, methodologies, and techniques of performance to develop artistic and/or scholarly work in other primary disciplines across the University.

Minor Requirements (7 units)

All courses for SoC majors, minors and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

Introductory Courses (2 units)

Course	Title
PERF_ST 200-0	Introduction to Performance Studies
and	
PERF_ST 203-0	Performance Culture and Communication

Additional Courses (5 units)

5 courses in performance studies or related disciplines (as approved by the director of undergraduate studies).

Module Requirement

All coursework taken in fulfillment of the minor also works toward the completion of the module requirement. Students pursuing the minor are required to successfully complete 2 modules chosen from the following list:

- performance studies, analyses & applications (https://society.northwestern.edu/academic_module/performance-studies-analyses-and-applications)
- performance and activism (https://society.northwestern.edu/academic_module/performance_activism_and_human_rights)
- sound cultures (https://society.northwestern.edu/academic_module/sound_cultures)

While the majority of the courses for the minor will be divided between the 2 modules of choice, students will be allowed to count 1 of their 5 additional courses toward the requirements of both their chosen modules.

Radio/Television/Film

communication.northwestern.edu/departments/rtf

The Department of Radio/Television/Film offers education in the history, theory, and production of media. Broad-based and interdisciplinary in orientation, the department offers a range of perspectives on media forms from cinema to broadcast and cable television to alternative media to emerging technologies. Courses emphasize that media are social and cultural practices in dialogue with the broader context of the humanities. The department is dedicated to integrating theory and practice, creating intersections with other disciplines, and fostering cutting-edge media production. Originality, critical analysis, and vision are valued in both scholarly research and creative work. The department's goal is to educate students and citizens to critically interpret contemporary media, envision alternative structures in theory and practice, and reinvent the media of the future.

Production facilities include 16mm film and HD equipment, sound stage, and editing; field video and multiple-camera television studio facilities; linear and nonlinear video editing; advanced audio postproduction; and state-of-the-art computer graphics. Students operate the 7,200-watt FM radio station WNUR, which serves the Chicago area and also broadcasts on the Internet. The School of Communication funds four active student-run cocurricular production groups and offers juniors and seniors numerous opportunities for internships at television and radio stations and production companies in the Chicago, New York, and Los

Angeles areas. Frequent guest lectures are offered by alumni with careers in media and by other well-known professionals.

Programs of Study

- Film and Media Studies Minor (p. 83)
- Radio/Television/Film Major (p. 84)
- Sound Design Minor (p. 84)

RTVF 190-0 Media Construction (1 Unit) Introduces the core components of media-idea, image, sound, and sequence- with the technical fundamentals involved in shooting and editing video. Students work with SLR and digital video cameras and with Photoshop and Final Cut Pro editing software, completing four projects in different genres during the quarter. Prerequisite for all upper-level production courses. Required for majors; typically taken in first year.

RTVF 202-0 First-Year Topics Seminar (1 Unit) Beginning seminar focused around a special topic of media analysis, history, or theory. Students will learn research, analytic, and writing skills while focusing on issues relevant to film, media and/ or digital arts and culture. *SOC First-Year Seminar*

RTVF 220-0 Analyzing Media Texts (1 Unit) 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 first year. *Literature Fine Arts Distro Area*

RTVF 230-0 Understanding Media Contexts (1 Unit) Media industries as social and cultural forces; economic and political dimensions of the global media. Required for majors; typically taken in first year. *Literature Fine Arts Distro Area*

RTVF 260-0 Foundations of Screenwriting (1 Unit) 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.

RTVF 298-0 Studies in Media Topics (1 Unit) Theoretical or practical or both; emphasis on evolving trends.

RTVF 301-0 Race & Ethnicity in Film & TV (1 Unit) 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 (1 Unit) Political, cultural, social, and industrial history of television, from the classic network era to the post-network contemporary period of media convergence. Exploration of programs as well as major events and shifts in television history. *Historical Studies Distro Area*

RTVF 312-1 History of Film I (1 Unit) International survey of motion pictures as a distinctive medium of expression from its prehistory to the present. *Literature Fine Arts Distro Area*

RTVF 312-2 History of Film II (1 Unit) International survey of motion pictures as a distinctive medium of expression from its prehistory to the present. *Literature Fine Arts Distro Area*

RTVF 313-1 Doc Film History & Criticism (1 Unit) Survey of the schools, styles, and purposes of documentary film as a unique form of artistic expression and sociopolitical persuasion. *Literature Fine Arts Distro Area*

RTVF 313-2 Documentary Film & Video (1 Unit) Contemporary work and issues in documentary film and video. *Literature Fine Arts Distro Area*

RTVF 321-0 Radio/Tv/Film Authorship (1 Unit) Idea of authorship in the media and an examination of different uses of author theory related to the work of particular artists. *Literature Fine Arts Distro Area*

RTVF 322-0 Radio/Television/Film Genre (1 Unit) Concept of genre in the media, with reference to popular American forms.

RTVF 323-1 Experimentl Film: History and Criticism (1 Unit) Films and theories of experimentalists since the 1920s; contemporary underground movement. *Literature Fine Arts Distro Area*

RTVF 323-2 Experimental Film & Video (1 Unit) Contemporary work in experimental film and video. *Literature Fine Arts Distro Area*

RTVF 325-0 Film, Media & Gender (1 Unit) 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 & TV Criticism (1 Unit) 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 (1 Unit) 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 (1 Unit) Government regulation and industry self-regulation; historical perspective and examination of current issues.

RTVF 341-0 Technological Innovations (1 Unit) How technology develops and is assimilated into mass media.

RTVF 345-0 History of Hollywood Cinema (1 Unit) 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 351-0 National Cinema (1 Unit) Historical aspects of cinema in a culture outside the United States or a social/cultural/ intellectual movement within cinema's general evolution.

RTVF 353-0 Film, Media, and Globalization (1 Unit) Explores theories of media's role in the globalization of cultures. Examines transnational production, marketing, and reception of film, television, and/or digital media.

RTVF 358-0 Topics in Improv (1 Unit) In-depth study and practice of improv techniques and aesthetics. Sample topics include Intro to Improv, Improvising Characters, Writing and Performing Stand-up, Writing with Improv, Improvising the Text-based Collaborative Show, Improvised Comedy Web Series.

RTVF 360-0 Topics in Media Writing (1 Unit) 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 repeated for credit, depending on the change in topic. Prerequisite: RTVF 260-0.

RTVF 365-1 Writers Studio I (1 Unit) Exclusively for School of Communication seniors admitted to the Creative Writing for Media Module. Portfolio of written work completed in intensive two-workshop sequence. Pragmatic preparation for post-graduation career path; emphasis on participation in a supportive community for all aspects of creative endeavor.

RTVF 365-2 Writers Studio II (1 Unit) Exclusively for School of Communication seniors admitted to the Creative Writing for Media Module. Portfolio of written work completed in intensive two-workshop sequence. Pragmatic preparation for post-graduation career path; emphasis on participation in a supportive community for all aspects of creative endeavor.

RTVF 368-1 Introduction to Acting for the Screen (1 Unit) Foundational concerns and practices for screen acting. Scene analysis, rehearsal, staging and camera space, casting, editing for performance. Creating and portraying characters for most effective capture by the camera. Film directing techniques as related to the actor. Required introductory course for the Acting for Screen module sequence. Prerequisites: THEATRE 171-0.

RTVF 368-2 Diagnostic Scene Study (1 Unit) Retrospective critique of curricular and extracurricular performance work in the Acting for Screen module. Evaluation of performer's range and capabilities in terms of future projects and identity as an actor. Relationship between actor and director relative to the camera. Required course for the module. Prerequisites: RTVF 368-1 and 2 approved module electives.

RTVF 369-0 Topics in Acting for the Screen (1 Unit) Production-based courses on a range of practices and methods in acting for screen. May be repeated as topic varies. Counts as elective for the Acting for Screen module. Prerequisites: RTVF 190-0 for theatre majors; THEATRE 171-0 for RTVF majors; both courses for other School of Communication students.

RTVF 370-0 Topics in Pre-Production (1 Unit) In-depth study of preproduction film, video, and media techniques and aesthetics. Sample topics include storyboarding, producing, and motion graphics. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 372-0 Editing (1 Unit) The technique and art of editing for film. Topics include editing for continuity, controlling pace and rhythm, and editing nonlinear narratives. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 373-0 Topics in Sound (1 Unit) In-depth study of sound techniques and aesthetics. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 374-0 Topics in Cinematography (1 Unit) In-depth study of cinematography techniques and aesthetics. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 375-0 Designing for the Internet (1 Unit) Design concepts as they relate to the web in an intensive studio/workshop environment. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 376-0 Topics in Interactive Media (1 Unit) Exploration of the techniques and aesthetics of interactivity using various media. Prerequisites: RTVF 190-0, second-year standing (not through AP credits), and consent of instructor.

RTVF 377-0 Topics in Non-fiction Media (1 Unit) In-depth study of postproduction film, video, and media techniques and aesthetics. Sample topics include color correction, special-effects cinematography, and finishing. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits)

RTVF 378-0 Topics in Post-Production (1 Unit) In-depth study of postproduction film, video, and media techniques and aesthetics. Sample topics include color correction, special-effects cinematography, and finishing. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits)

RTVF 379-0 Topics in Film/Video/Audio Production (1 Unit) 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. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 380-0 Lighting and Cinematography (1 Unit) Techniques, aesthetics, and technologies of lighting and camera skills, including film and video. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 383-0 Introduction to Sound Production (1 Unit) Introduction to the theories and principles of basic sound production. Demos, lectures, readings, screenings, and exercises cover all basics of sound recording technology. Prerequisite: RTVF 190-0.

RTVF 384-0 Introduction to Sound Postproduction (1 Unit) Continuation of 383 with greater detail on sound editing, multitrack recording, sound design principles, Foley sessions, ADR recording techniques, and underscoring for media. How to work effectively in a professional mixing studio and Pro Tools environment. Prerequisite: RTVF 383-0.

RTVF 385-0 Integrated Media Arts (1 Unit) Prerequisite: RTVF 190-0 and second-year standing (not through AP credits)

RTVF 389-0 Practicum in RTVF Research (1 Unit) Collaboration with a faculty member on design and execution of a media research project. Students learn how to construct and complete a research project and document results. Requires a paper or other form of work product as determined by the faculty member.

RTVF 390-0 Directing (1 Unit) Single-camera dramatic directing, including visualization and breakdown of scripts, camera blocking, and working with actors. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 392-0 Documentary Production (1 Unit) Students examine documentary practices and produce their own shorts. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 393-0 2D Computer Animation (1 Unit) Animation techniques in the 2-D sphere and incorporation of visual design principles. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 394-0 Experimental Media Production (1 Unit) Creation of an experimental work as a linear film or video, an interactive website, an installation, a game, or a multidisciplinary performance. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 395-0 Computer Animation: 3D (1 Unit) The fundamental concepts and techniques of 3-D computer modeling and animation. Use of concepts acquired in camera-based production techniques to create a

rendered animation. Prerequisites: RTVF 190-0 and second-year standing (not through AP credits).

RTVF 397-1 Advanced Directing I (1 Unit) 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 397-2 Advanced Directing II (1 Unit) 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 RTVF (1 Unit) Special issues and topics in the analysis of radio, television, film, and popular culture.

RTVF 399-0 Independent Study (1 Unit) Prerequisite: consent of undergraduate dean after submission of petition.

Film and Media Studies Minor

communication.northwestern.edu/programs/minor_film_media_studies

The Film and Media Studies Program brings together faculty and students from across the University who are interested in thinking about film and media within a broad intellectual framework. Students in this interdisciplinary program acquire critical tools for analyzing traditional and new media, as well as knowledge of some crucial historical and interpretive problems raised by the study of media within the context of the humanities and social sciences. Students who minor in film and media studies are encouraged to participate in the rich and varied media offerings of the University, including film series and individual film screenings, workshops, performances, exhibitions, and presentations by invited speakers. Students must formally apply to minor in film and media studies in the School of Communication's Department of Radio/Television/Film.

The minor is open to all Northwestern undergraduates except radio/television/film majors.

Minor Requirements (6 units)

All courses for SoC majors, minors and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

- RTVF 220-0 Analyzing Media Texts
- 5 additional units of credit with a primary emphasis on film and/or media studies, chosen from the following and including at least 3 at the 300 level.

Course	Title
RTVF 230-0	Understanding Media Contexts
RTVF 301-0	Race & Ethnicity in Film & TV
RTVF 310-0	Television History
RTVF 312-1	History of Film I
RTVF 312-2	History of Film II
RTVF 313-1	Doc Film History & Criticism
RTVF 313-2	Documentary Film & Video

RTVF 321-0	Radio/Tv/Film Authorship
RTVF 322-0	Radio/Television/Film Genre
RTVF 323-1	Experimentl Film: History and Criticism
RTVF 323-2	Experimental Film & Video
RTVF 325-0	Film, Media & Gender
RTVF 326-0	Film & TV Criticism
RTVF 330-0	Culture Industries
RTVF 331-0	Regulation Of Broadcasting
RTVF 341-0	Technological Innovations
RTVF 345-0	History of Hollywood Cinema
RTVF 351-0	National Cinema
RTVF 353-0	Film, Media, and Globalization
COMM_ST 270-0	Theories of Mediated Communication
COMM_ST 275-0	Persuasive Images: Rhetoric of Popular Culture
COMM_ST 373-0	News Media and American Society
ART_HIST 390-0	Undergraduate Seminar
CLASSICS 245-0	Classics and the Cinema
ENGLISH 386-0	Studies in Literature and Film
COMP_LIT 305-0	Studies in Film, Media, and Visual Culture
FRENCH 375-0	French Film
GERMAN 228-0	German Film
ITALIAN 251-0	Introduction to Italian Cinema
ITALIAN 351-0	Italian Film and Transnational Cinema
SLAVIC 267-0	Czech Culture: Film, Visual Arts & Music
SLAVIC 367-1	Russian Film
SLAVIC 367-2	Russian Film

The following are topics courses and may only count with advisor approval when the primary emphasis of the course is film or media studies.

Course	Title
ART_HIST 390-0	Undergraduate Seminar
COMP_LIT 383-0	Special Topics in Theory: Critical Theory
FRENCH 390-0	Topics in Literature and Culture
SPANISH 397-0	Topics in Latin American, Latina and Latino, and Iberian Literatures and Cultures

Other courses also may be counted toward the minor with the approval of a film and media studies adviser.

Radio/Television/Film Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Program Requirements (12 units)

All courses for SoC majors, minors and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

Introductory Course (1 unit)

Course	Title
RTVF 190-0	Media Construction (and second-year standing—not through AP credits—are the prerequisites for all 300-level production courses)

Advanced Courses (11 units)

• 3 200-level courses:	
Course	Title
RTVF 220-0	Analyzing Media Texts
RTVF 230-0	Understanding Media Contexts
One additional 200-level RTVF course, which may include:	
RTVF 260-0	Foundations of Screenwriting
or RTVF 298-0	Studies in Media Topics
OR	
COMM_ST 275-0	Persuasive Images: Rhetoric of Popular Culture

- 8 additional units of credit in communication at the 300 and 400 levels, including at least 6 courses in the department at the 300 and 400 levels, and including no more than a total of 2 units of independent study, practicums, or internships

Additional Requirements (30 units)

Courses Outside Communication (6 units)

6 courses at the 200 level or above outside communication, including at least 3 courses at the 300 level or above; courses taken to meet the distribution requirement may be used to fulfill this requirement

Language Requirement

Two-year proficiency in a classical or modern foreign language as defined by the Weinberg College foreign language proficiency requirement

Distribution Requirements (18 units)

18 units of credit outside the school, including 8 units of credit from the School of Communication distribution areas: 2 from science, mathematics, and technology; 3 from individual and social behavior; and 3 from humanities and fine arts

Electives

Electives in communication and other areas to complete a minimum of 42 units

Sound Design Minor

communication.northwestern.edu/programs/minor_sound_design

The minor in sound design allows students to study and create work in sound as it relates to film/video, new media, theatre, radio, and installation/exhibition projects. The minor draws on courses offered through the School of Communication, Bienen School of Music, and Weinberg College of Arts and Sciences. The minor is open to all Northwestern undergraduate students.

Minor Requirements (6 units)

All courses for SoC majors, minors and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

Selected, in any combination, from:

• Radio/Television/Film	
Course	Title
RTVF 373-0	Topics in Sound (topics may include advanced audio postproduction; sound design for horror, comedy, or the web; advanced Foley)
RTVF 383-0	Introduction to Sound Production

RTVF 384-0	Introduction to Sound Postproduction
RTVF 398-0	Symposium: Issues in RTVF (history and aesthetics of sound design)
RTVF 399-0	Independent Study

• Theatre

Course	Title
THEATRE 223-0	Theatre Sound
THEATRE 323-0	Advanced Theatre Sound

• Music Technology

Course	Title
MUS_TECH 321-0	Producing in the Virtual Studio
MUS_TECH 335-0	Selected Topics (topics may include recording and basic audio; studio techniques for electroacoustic music)
MUS_TECH 340-0	Composing With Computers
MUS_TECH 342-1 & MUS_TECH 342-2	Computer Sound Synthesis I and Computer Sound Synthesis II

Theatre

communication.northwestern.edu/departments/theatre

Of all the performing arts, none draws on the rich variety of human experience more fully than theatre. Theatre communicates the drama of life—whether the past, present, or future, and whether real or imagined—with immediacy, excitement, and eloquence. The student of theatre, therefore, must be a student of human society and must understand how social forces impinge on human behavior. To paraphrase Boswell, students of the theatre take as their subject the entire system of human life.

For this reason students who major in theatre at Northwestern combine a liberal arts education with intensive training in the theories and arts of the theatre. At the heart of the theatre program lies the idea that the best theatre artist is the one who combines a broad knowledge of the literature and theory of the field with highly developed skills in its practice.

Students spend approximately one-third of their program studying in the Department of Theatre, including courses in history, literature, and criticism; acting, voice, and movement; directing; devising theatre; stage production; design; playwriting; dramaturgy; creative drama and theatre for young audiences; and dance. Students develop the ability to approach problems and issues from a variety of perspectives while developing skills in research and writing, laboratory work, group discussion, oral presentation, performance, and production. Another third of the program comprises distribution requirements outside the department, and a final third is devoted to elective courses selected from a wide spectrum of University offerings.

A major in dance (p. 91) 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.

Programs of Study

- Dance Major (p. 91)
- Dance Minor (p. 92)
- Music Theatre Certificate (p. 93)
- Theatre Major (p. 94)
- Theatre Minor (p. 95)

THEATRE 120-0 Production in Context (1 Unit) A combination of lecture, discussion, and production lab participation implementing the directing and design process of a theatrical production. Prerequisite: consent of department.

THEATRE 121-0 Production Laboratory (0 Unit) (0 units) Registration for students fulfilling production crew requirements.

THEATRE 140-1 Theatre in Context: Introduction (1 Unit) Introductory course that features lectures, discussion, creative assignments, theatre analysis, research, and guest artists. Prerequisite: consent of department.

THEATRE 140-2 Theatre in Context: Analysis & Research (1 Unit) Seminar that emphasizes theatre history, analysis, criticism, research, and writing skills. Prerequisite: consent of department.

THEATRE 170-0 Voice for Performance (1 Unit) The focus is on the development of vocal technique for the performer through work on body alignment, breathing, vocal placement, resonance and exploration of the sounds of English using the IPA (International Phonetic Alphabet). Individual vocal problems are analyzed and remedial work prescribed. Concentrates on developing the speaking voice using the sounds of English and their relationship to meaning through the use of poetry and selected text. Open to theatre majors only.

THEATRE 171-0 Basic Acting (1 Unit) For non-majors. Introduction to the study of acting: sensory response, imagination, and characterization work leading to prepared scenes from selected plays.

THEATRE 211-0 Fundamentals of Stage Directing (1 Unit) An introductory course focusing on defining the role of the director, as well as practical strategies for work with text and actors.

THEATRE 220-0 Introduction to Theatre Design (1 Unit) Introduces the principles and elements of visual design as they relate to the theatre design areas of scenery, costume, and lighting. Applies these principles and elements to a play by creating scenery, costume, and lighting design ideas based on text analysis, point of view, and research in a production notebook format. Does not count toward the requirements for the theatre major. Course is a requirement and prerequisite for all 200-level design courses for the theatre minor.

THEATRE 221-1 Design Process: Scene (1 Unit) 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. Prerequisite: sophomore standing and consent of instructor.

THEATRE 221-2 Design Process: Costume (1 Unit) Development of stage design for the theatrical designer, from initial reading of the script

to final design. Crew participation in department productions. 2. Costume design. Prerequisite: sophomore standing and consent of instructor.

THEATRE 221-3 Design Process: Lighting (1 Unit) Development of stage design for the theatrical designer, from initial reading of the script to final design. Crew participation in department productions. 3. Lighting design. Prerequisite: sophomore standing and consent of instructor.

THEATRE 222-0 Stage Makeup (1 Unit) Theory and practice of stage makeup. Crew participation in department productions. Prerequisite: consent of instructor.

THEATRE 223-0 Theatre Sound (1 Unit) An introductory class in sound design for the theatre. Crew participation in department productions. Prerequisite: consent of instructor.

THEATRE 231-0 Theatre for Young Audiences (1 Unit) Selection, evaluation, direction, and production of plays for children. Prerequisite: consent of instructor.

THEATRE 240-0 Special Topics in Theatre Studies (1 Unit) Content varies. Studies of individual playwrights, national or regional theatres, historical periods, performance practices, or theoretical inquiries. Prerequisite: THEATRE 140-1, THEATRE 140-2 or consent of instructor.

THEATRE 241-1 Theatre History I: Pre-1650 (1 Unit) Survey of the theory and history of world theatre and drama before 1650. Prerequisite: THEATRE 140-1, THEATRE 140-2 or consent of instructor.

THEATRE 241-2 Theatre History II: Post 1650 (1 Unit) Survey of the theory and history of world theatre and drama after 1650. Prerequisite: THEATRE 140-1, THEATRE 140-2 or consent of instructor.

THEATRE 242-0 Topics in Shakespeare (1 Unit) Critical study of Shakespeare's plays, theatrical culture, and theories and adaptations based on his work. Prerequisite: THEATRE 140-1, THEATRE 140-2 or consent of instructor.

THEATRE 244-1 Modern & Contemp Theatre: Modern (1 Unit) Critical study of major dramatists, theories, and production styles. 1870-1920.

THEATRE 244-2 Modern & Contemp Theatre: Contemporary (1 Unit) Critical study of major dramatists, theories, and production styles. 1920-present.

THEATRE 245-0 Theatre of the Americas (1 Unit) Survey of theatre and drama of the Americas; examines relevance of plays, performances such as pageants and blackface minstrelsy, theatre companies, and their original contexts to their national identity. Prerequisite: THEATRE 140-1, THEATRE 140-2 or consent of instructor.

THEATRE 251-1 Intermediate Voice I (0.5 Unit) Private instruction in vocal musical theatre technique and repertoire. Performances at studio class, juries and special topics classes required. The primary course objective is to improve your individual instrument and approach to singing. Emphasis in lessons will be placed upon strengthening technique, improve confidence for performance and application of technique to repertoire. Students continue to build musicianship skills and their understanding and assimilation of vocal technique.

THEATRE 251-2 Intermediate Voice II (0.5 Unit) Private instruction in vocal musical theatre technique and repertoire. Performances at studio class, juries and special topics classes required. The primary course objective is to improve your individual instrument and approach to singing. Emphasis in lessons will be placed upon strengthening

technique, improve confidence for performance and application of technique to repertoire. Students continue to build musicianship skills and their understanding and assimilation of vocal technique.

THEATRE 251-3 Intermediate Voice III (0.5 Unit) Private instruction in vocal musical theatre technique and repertoire. Performances at studio class, juries and special topics classes required. The primary course objective is to improve your individual instrument and approach to singing. Emphasis in lessons will be placed upon strengthening technique, improve confidence for performance and application of technique to repertoire. Students continue to build musicianship skills and their understanding and assimilation of vocal technique.

THEATRE 252-0 Intermediate MT Techniques (1 Unit)

THEATRE 253-0 Music Theatre History (1 Unit) Three-part course, covering the major movements in the histories of dance, opera, and musical comedy. Examination of artists and their works.

THEATRE 255-0 Creating the Musical (1 Unit) A large variety of topics courses designed to educate students on the various areas of musical creation. Topics will cover: lyric writing, song writing, book creation, score/scene creation, among others.

THEATRE 256-0 Musicianship for Actors (1 Unit)

THEATRE 271-0 Intermediate Acting (1 Unit)

THEATRE 272-0 Voice for Shakespeare (1 Unit) The focus of the class is on the training and development of the actor's voice integrating the work in THEATRE 170-0 Voice for Performance with the focus on Shakespeare's heightened text. Students work to develop optimal pitch, vocal range, improve articulation, intonation and stress through the performance of Shakespeare's Sonnets, scenes, monologues and group work. Prerequisites: THEATRE 170-0 and permission of instructor.

THEATRE 273-1 Acting I (1 Unit) 1. Basic concepts. Prerequisites: THEATRE 140-1, THEATRE 140-2 (or equivalent) and consent of instructor.

THEATRE 273-2 Acting I (1 Unit) 2. Dramatic imagination. Prerequisites: THEATRE 140-1, THEATRE 140-2 (or equivalent) and consent of instructor.

THEATRE 273-3 Acting I (1 Unit) 3. Dramatic characterization. Prerequisites: THEATRE 140-1, THEATRE 140-2 (or equivalent) and consent of instructor.

THEATRE 281-0 Intro to Playwriting (1 Unit) A course in which students read plays, complete writing exercises based on the reading, see plays off campus, and ultimately research and write the beginning of a full-length play of their own. The course is open to students in any major and writers of all levels.

THEATRE 292-0 Introduction to Stage Management (1 Unit) 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 310-0 Special Topics in Directing (1 Unit) Studies with Directing Faculty on special topics related to directing and theatrical forms. Prerequisites: Permission of instructor.

THEATRE 311-0 Advanced Stage Directing (1 Unit) Studies in particular aspects of directing or in forms of theatre. Students will further develop

practical and theoretical skills as directors. Prerequisites: THEATRE 211-0 Fundamentals of Directing, permission of instructor.

THEATRE 312-0 Text Analysis (1 Unit) Seminar in analysis of dramatic texts as related to the problems of realized theatrical production. Prerequisites: Permission of instructor.

THEATRE 313-0 History of Directing (1 Unit)

THEATRE 320-0 Special Topics in Theatre Design (1 Unit)

THEATRE 321-1 Advanced Design Process: Scene (1 Unit) For advanced undergraduate set design students and graduate students studying scene design as a secondary area. Lectures and design projects. Prerequisites: THEATRE 221-1 and consent of instructor.

THEATRE 321-2 Advanced Design Process: Costume (1 Unit) For advanced under-graduates studying costume design and graduate students studying costume design as a secondary area. Lectures and design projects. Prerequisites: THEATRE 221-2 and consent of instructor.

THEATRE 321-3 Advanced Design Process: Lighting (1 Unit) For advanced undergraduate lighting design students and graduate students studying lighting design as a secondary area. Lectures and design projects. Prerequisites: THEATRE 221-3 and consent of instructor.

THEATRE 322-0 History of Costume and Decor (1 Unit) 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 323-0 Advanced Theatre Sound (1 Unit) 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 324-0 Scene Painting (1 Unit) Traditional and contemporary theory and practice of scene painting. Lecture and studio. Lab fee required. Prerequisites: Permission of instructor.

THEATRE 325-1 Drawing and Painting for the Theatre: Graphic Arts for the Stage Designer (1 Unit) Techniques and materials of graphic communication for the stage designer. May be repeated for credit with change of topic. Prerequisite: consent of instructor.

THEATRE 325-2 Drawing and Painting for the Theatre: Rendering the Theatrical Space (1 Unit) Techniques and materials of graphic communication for the stage designer. May be repeated for credit with change of topic. Prerequisite: consent of instructor.

THEATRE 325-3 Drawing and Painting for the Theatre: Rendering the Theatrical Figure (1 Unit) Techniques and materials of graphic communication for the stage designer. May be repeated for credit with change of topic. Prerequisite: consent of instructor.

THEATRE 325-4 Drawing & Painting for the Theatre: Drafting (1 Unit) Techniques and materials of graphic communication for the stage designer. May be repeated for credit with change of topic. Prerequisite: consent of instructor.

THEATRE 326-1 Principles of Drawing and Composition: Freehand (1 Unit) Drawing and composition using a variety of drawing materials and media for scenery, costume, and lighting designers. Lecture and studio. Prerequisite: consent of instructor.

THEATRE 326-2 Principles of Drawing and Composition: Draw & Paint (1 Unit) Drawing and composition using a variety of drawing materials and media for scenery, costume, and lighting designers. Lecture and studio. Prerequisite: consent of instructor.

THEATRE 327-0 Textile Arts and Crafts (1 Unit) 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: THEATRE 344-0 and consent of instructor.

THEATRE 328-1 Period Pattern Drafting and Draping (1 Unit) Techniques of flat pattern drafting and advanced construction used to create historical garment patterns for the stage. 1. Flat patterns. Prerequisites: junior standing and consent of instructor.

THEATRE 328-2 Period Pattern Drafting and Draping (1 Unit) Techniques of flat pattern drafting and advanced construction used to create historical garment patterns for the stage. 2. Draping. Prerequisites: junior standing and consent of instructor.

THEATRE 328-3 Period Pattern Drafting and Draping (1 Unit) Techniques of flat pattern drafting and advanced construction used to create historical garment patterns for the stage. 3. Period patterns. Prerequisites: junior standing and consent of instructor.

THEATRE 329-0 Computer Graphics for the Theatre Artist (1 Unit) 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 330-0 Special Topics in TYA (1 Unit)

THEATRE 332-1 The Art of Storytelling (1 Unit) 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. Students use storytelling in presentations and performance.

THEATRE 332-2 Advanced Storytelling (1 Unit) 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. 2. Advanced techniques of research, preparation, and performance, culminating in a public event. Students use storytelling in presentations and performance. Prerequisites THEATRE 332-1 and consent of instructor.

THEATRE 333-1 Creative Drama (1 Unit) Applications of creative drama in many areas (e.g., teaching, performance, therapy, writing, recreation). Students explore the use of process-centered improvisations in their lives and work. Prerequisites: Permission of instructor.

THEATRE 333-2 Advanced Creative Drama (1 Unit) 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: THEATRE 333-1 (or equivalent) and consent of instructor.

THEATRE 340-0 Special Topics in Advanced Theatre Studies (1 Unit) Content varies. Advanced study of individual playwrights, practitioners,

regional theatres, historical periods, performance practices, or theoretical inquiries. Prerequisite: THEATRE 140-1, THEATRE 140-2 or consent of instructor.

THEATRE 341-0 Theatre and Social Change (1 Unit) Prerequisite: THEATRE 140-1, THEATRE 140-2 or consent of instructor.

THEATRE 342-0 Dramaturgy (1 Unit) Seminar in creative dramaturgical research as it relates to the problems of realized theatrical production. Prerequisite: THEATRE 140-1, THEATRE 140-2 or consent of instructor.

THEATRE 343-0 Puppetry History & Performance (1 Unit) Seminar in the history and theory of puppetry with an emphasis on embodied experimentation. Prerequisites: THEATRE 140-1, THEATRE 140-2 or consent of instructor.

THEATRE 344-0 Gender & Performance (1 Unit) 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.

THEATRE 345-0 African American Theatre (1 Unit) Study of African-American playwrights, practitioners, theatre companies, historical performance practices, theoretical inquiries, or transnational influences. Prerequisite: THEATRE 140-1, THEATRE 140-2 or AF_AM_ST 259-0 or consent of instructor.

THEATRE 346-0 Asian American Theatre (1 Unit)

THEATRE 347-0 Latinx Theatre (1 Unit)

THEATRE 348-0 Transnational Theatre (1 Unit)

THEATRE 350-0 Special Topics in Musical Theatre (1 Unit)

THEATRE 351-1 Advanced Voice I (0.5 Unit) Private instruction in vocal musical theatre technique and repertoire. Performances at studio class, juries and special topics classes required. The primary course objective is to improve your individual instrument and approach to singing. Emphasis in lessons will be placed upon strengthening technique, improve confidence for performance and application of technique to repertoire. Students continue to build musicianship skills and their understanding and assimilation of vocal technique.

THEATRE 351-2 Advanced Voice II (0.5 Unit) Private instruction in vocal musical theatre technique and repertoire. Performances at studio class, juries and special topics classes required. The primary course objective is to improve your individual instrument and approach to singing. Emphasis in lessons will be placed upon strengthening technique, improve confidence for performance and application of technique to repertoire. Students continue to build musicianship skills and their understanding and assimilation of vocal technique.

THEATRE 351-3 Advanced Voice III (0.5 Unit) Private instruction in vocal musical theatre technique and repertoire. Performances at studio class, juries and special topics classes required. The primary course objective is to improve your individual instrument and approach to singing. Emphasis in lessons will be placed upon strengthening technique, improve confidence for performance and application of technique to repertoire. Students continue to build musicianship skills and their understanding and assimilation of vocal technique.

THEATRE 351-4 Advanced Voice IV (0.5 Unit) Private instruction in vocal musical theatre technique and repertoire. The primary course objective

is to improve your individual instrument and approach to singing, to build endurance and stamina, and help you to transition into your professional singing career. Emphasis in lessons will be placed upon strengthening technique, perfecting cuts for optimum singing performance, vocal reliability, vocal health, and application of technique to repertoire. This year long curriculum will culminate in a capstone experience.

THEATRE 351-5 Advanced Voice V (0.5 Unit) Private instruction in vocal musical theatre technique and repertoire. The primary course objective is to improve your individual instrument and approach to singing, to build endurance and stamina, and help you to transition into your professional singing career. Emphasis in lessons will be placed upon strengthening technique, perfecting cuts for optimum singing performance, vocal reliability, vocal health, and application of technique to repertoire. This year long curriculum will culminate in a capstone experience.

THEATRE 351-6 Advanced Voice VI (0.5 Unit) Private instruction in vocal musical theatre technique and repertoire. The primary course objective is to improve your individual instrument and approach to singing, to build endurance and stamina, and help you to transition into your professional singing career. Emphasis in lessons will be placed upon strengthening technique, perfecting cuts for optimum singing performance, vocal reliability, vocal health, and application of technique to repertoire. This year long curriculum will culminate in a capstone experience.

THEATRE 352-1 Advanced Music Theatre Techniques I (1 Unit) 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. Instructor consent required.

THEATRE 352-2 Advanced Music Theatre Techniques II (1 Unit) 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. Instructor consent required.

THEATRE 353-0 Musical Theatre Techniques for Non-Music Theatre Cert (1 Unit)

THEATRE 354-0 Musical Theatre Repertoire (1 Unit)

THEATRE 355-0 Advanced Creating the Musical (1 Unit) A large variety of advanced topics courses designed to educate students on the various areas of musical creation. Topics will cover: lyric writing, song writing, book creation, score/scene creation, among others.

THEATRE 356-0 Advanced Musicianship for Actors: Theatre Styles and Genres (1 Unit)

THEATRE 357-0 Orchestration (1 Unit)

THEATRE 358-0 Showcase (1 Unit)

THEATRE 359-0 Senior Audition Techniques (1 Unit)

THEATRE 361-0 Partnered Swing Dancing (1 Unit)

THEATRE 362-0 Standing Down Straight for Actors (1 Unit) Standing Down Straight® for Actors is a holistic, universally applicable voice-and-movement technique for theatre students. Students explore using natural speech patterns and natural movement patterns as the basis of all stage expression. Thus, in class exercises, monologues, and partnered scenes, they explore using gravity-directed relaxation as a way to calm body and mind - so that both body and mind can work with power, intensity, and without strain.

THEATRE 370-0 Special Topics in Acting (1 Unit)

THEATRE 372-0 Advanced Voice Styles (1 Unit) Advanced vocal techniques for the stage actor. Vocal styles including performing the plays of language and heightened text using texts of Molière, Oscar Wilde, Bernard Shaw, Noël Coward, Tom Stoppard. Prerequisites: THEATRE 170-0 Voice for Performance, THEATRE 272-0 Voice for Shakespeare and permission of instructor.

THEATRE 373-1 Acting II: Analysis and Performance (1 Unit) Theory, principles, and techniques of interpretation of drama from the actor's point of view. 1. tragedy. Prerequisites: Permission of instructor.

THEATRE 373-2 Acting II: Analysis and Performance (1 Unit) Theory, principles, and techniques of interpretation of drama from the actor's point of view. 2. verse. Prerequisites: Permission of instructor.

THEATRE 373-3 Acting II: Analysis and Performance (1 Unit) Theory, principles, and techniques of interpretation of drama from the actor's point of view. 3. realism. Prerequisites: Permission of instructor.

THEATRE 374-0 Dialects for the Stage (1 Unit) Using the International Phonetic Alphabet, dialect recordings and selected text, students are given the tools to acquire a variety of dialects for performance in theatre and film. Principal dialects covered are standard British (Received Pronunciation), Cockney, Irish (North and South), French, Russian, German, American Southern and New York. Prerequisites: THEATRE 170-0 Voice for Performance, THEATRE 272-0 Voice for Shakespeare and permission of instructor.

THEATRE 375-0 Advanced Acting Topics (1 Unit) Special Topics for advanced senior actors explore complex forms of theatrical performance, technique, style, and cultural aspects an educated actor must consider and implement.

THEATRE 376-0 Intro to Acting for the Screen (1 Unit)

THEATRE 377-0 Topics in Acting for the Screen (1 Unit) Foundational concerns and practices for screen-specific acting. Scenic analysis, rehearsal, staging and camera space, casting, editing for performance. Creating and portraying characters for most effective capture by the camera. Film directing techniques as related to the actor. Required introductory course for the Acting for the Screen module sequence.

THEATRE 378-0 Diagnostic Scene Study for the Screen (1 Unit) Retrospective critique of curricular and extracurricular performance work in the Acting for Screen module. Evaluation of performer's range and capabilities in terms of future projects and identity as an actor. Relationship between actor and director relative to the camera. Required course for the module. Prerequisites: THEATRE 376-0 and two approved module electives.

THEATRE 380-0 Special Topics in Playwriting (1 Unit)**THEATRE 382-0 Playwriting Genres (1 Unit)**

THEATRE 383-1 Advanced Playwriting Sequence (1 Unit) Fundamental techniques of playwriting: a yearlong sequence aimed at developing original, full-length play. Prerequisites: Permission of instructor.

THEATRE 383-2 Advanced Playwriting Sequence (1 Unit) 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 383-3 Advanced Playwriting Sequence (1 Unit) 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 390-0 Special Topics in Management (1 Unit)

THEATRE 392-0 Advanced Stage Management (1 Unit) 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 393-0 Production Management (1 Unit) Production Management roles and responsibilities, production budgets, timelines and building and leading production team. Prerequisite: Introduction to Stage Management and consent of instructor.

THEATRE 394-0 Internship in Theatre Practice (1-4 Units) Practice (3 units for undergraduates; 2 units for graduates) Production and/or management activities in a theatre company. Application required.

THEATRE 395-0 Theatre Practicum (1 Unit) Enrollment for students who are members of the Northwestern Summer Theatre Festival Company.

THEATRE 396-0 Theatre Management and Arts Leadership (1 Unit) Exploring and understanding the Artistic and Business leadership and partnership in the Commercial and not for profit theatre communities. Prerequisite: Introduction to Stage Management and consent of instructor

THEATRE 397-0 Theatre Marketing (1 Unit) Partnering with the Broadway in Chicago, students will interview and be placed into marketing teams to market a new musical. Prerequisite: Consent of instructor and resume review.

THEATRE 399-0 Independent Study (1 Unit) Prerequisite: consent of undergraduate dean after submission of petition.

DANCE 101-1 Introduction to the Dance Experience (1 Unit) Foundation for further studies in dance technique, science, history, and analysis. Movement awareness: introduction to body-mind approaches to movement study, including Laban movement analysis, yoga, tai chi, body-mind centering, and Feldenkrais.

DANCE 101-2 Introduction to the Dance Experience (1 Unit) Foundation for further studies in dance technique, science, history, and analysis. Dance in the context of other aspects of human behavior; exploring social dance, ritual, and theatrical performance.

DANCE 101-3 Introduction to the Dance Experience (1 Unit) Foundation for further studies in dance technique, science, history, and analysis. Introduction to improvisation: dance and movement improvisation as a tool for developing a personal movement vocabulary.

DANCE 110-0 Movement for the Stage (0.34 Unit) 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 (0.34 Unit) Different techniques each quarter to help prepare students for performance. Techniques include Pilates, yoga, Alexander technique, and the Feldenkrais method.

DANCE 130-1 Music Theatre Ballet (0.34 Unit) Basic ballet technique. Taken during sophomore year; prerequisite for DANCE 130-2 and DANCE 130-3.

DANCE 130-2 Music Theatre Dance I (0.34 Unit) Music theatre styles, explored through the study of jazz, tap, and modern repertoire. Taken during junior year.

DANCE 130-3 Music Theatre Dance II (0.34 Unit) Advanced class focusing on a range of Broadway choreography, dance styles, specialty forms, and audition technique. Taken during junior or senior year.

DANCE 140-0 Cultural Forms (0.34 Unit) Sections offer instruction in different ethnic dance forms; sections offered in the past include flamenco, Indian, salsa, and African.

DANCE 150-0 Modern I (0.34 Unit) 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 Jazz I (0.34 Unit) 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 161-0 Jump Rhythm Technique I (0.34 Unit) Offered at levels I and II. Dancing rhythmically-using jazz rhythms and the syncopated rhythms of funk, hip-hop, and other rock-based music to generate all dance movement.

DANCE 170-0 Ballet I (0.34 Unit) 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 Tap I (0.34 Unit) 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 181-0 Jump Rhythm Tap I (0.34 Unit) Offered at levels I and II. Using not only the feet but other parts of the body as well to "play" the syncopated rhythms of swinging jazz, Latin jazz, rhythm and blues, funk, and hip-hop music.

DANCE 201-0 Cultural Studies of Dance (1 Unit) Dance as a force in culture and society amid ethnic, social, and theatrical traditions. Participation in labs, class lectures, and discussions. Required readings; independent video viewing and concert attendance.

DANCE 202-0 Anatomy (1 Unit) 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 (1 Unit) Choreographic accomplishments in the major developmental periods of American dance. Readings, discussion, video screenings, movement workshops, and research.

DANCE 225-0 Dance Composition (1 Unit) Fundamental choreographic elements: time, space, shape, form, dynamics, and design. Choreographic exploration of the basic principles of dance composition.

DANCE 235-0 Choreography for Musical Theatre (1 Unit) 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 using the previous movement studies as guideposts.

DANCE 250-0 Modern II (0.34 Unit) 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 260-0 Jazz II (0.34 Unit) 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 261-0 Jump Rhythm Technique II (0.34 Unit) Offered at levels I and II. Dancing rhythmically-using jazz rhythms and the syncopated rhythms of funk, hip-hop, and other rock-based music to generate all dance movement.

DANCE 270-0 Ballet II (0.34 Unit) 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 280-0 Tap II (0.34 Unit) 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 281-0 Jump Rhythm Tap II (0.34 Unit) Offered at levels I and II. Using not only the feet but other parts of the body as well to "play" the syncopated rhythms of swinging jazz, Latin jazz, rhythm and blues, funk, and hip-hop music. Tap technique. One level is offered each quarter, started at the beginning level. The fundamentals of tap are developed through each level, and rhythmic awareness is expanded.

DANCE 315-0 Dance Criticism (1 Unit) Critical and theoretical thought of writers on Western theatrical dance.

DANCE 325-0 Advanced Choreographic Study (1 Unit) 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: DANCE 225-0 or consent of instructor.

DANCE 326-0 Advanced Improvisation (1 Unit) Improvisation as a source for composition and performance. For musicians and actors wishing to expand dance vocabulary and for dancers exploring the musical and theatrical dimensions of their art. Focus on interrelationships between people moving and between the performing arts that students bring to the course. Prerequisite: DANCE 101-3 or consent of instructor.

DANCE 335-0 Special Topics in Dance Research (1 Unit) Research methodologies, dance scholarship, criticism, and historical reconstruction. Critical issues and contemporary problems. Content varies.

DANCE 345-0 Studies in Collaboration (1 Unit) 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 350-0 Modern III (0.34 Unit) 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 355-0 Dance in Education (1 Unit) 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 Expressive Arts Therapy (1 Unit) Overview of dance, drama, and art therapies for 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 360-0 Jazz III (0.34 Unit) 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 365-0 American Rhythm Dancing & the African American Performance Aesthetic (1 Unit) 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 370-0 Ballet III (0.34 Unit) 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 375-0 Summer Dance Institute (1 Unit) One-week summer workshop exploring various forms of dance with guest artists.

DANCE 380-0 Tap III (0.34 Unit) 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 395-1 Senior Seminar (0 Unit) 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 unit awarded in the spring.

DANCE 395-2 Senior Seminar (0 Unit)

DANCE 395-3 Senior Seminar (1 Unit)

DANCE 399-0 Independent Study (1 Unit) Prerequisite: consent of undergraduate dean after submission of petition.

Dance Major

communication.northwestern.edu/programs/major_dance

The Department of Theatre also offers a major in dance. The dance major prepares students for further advanced academic work or a wide range of positions in professional dance. The major's comprehensive curriculum emphasizes the study of dance as well as the act of dancing. Students are prepared for lifetime involvement in the field and for continued development intellectually, artistically, and professionally within the dance world. In addition to dance technique and choreography, the program provides students with opportunities for writing, research, and analysis in the field. The major presents a well-integrated view of dance while also providing sound technical training in a variety of forms, with modern dance and jazz as the foundation techniques. The department offers a number of dance organizations and performing opportunities.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Program Requirements (13 units)

All courses for SoC majors, minors and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

Introductory Courses (4 units)

Course	Title
DANCE 101-1 & DANCE 101-2 & DANCE 101-3	Introduction to the Dance Experience and Introduction to the Dance Experience and Introduction to the Dance Experience
DANCE 225-0	Dance Composition ¹

¹ DANCE 101-3 Introduction to the Dance Experience is a prerequisite

Dance Technique Courses (4 units)

A minimum of 4 units from the following list (each dance technique class carries .34 units; 3 classes add up to 1 unit of credit); classes in a dance form must be taken sequentially, each in consecutive quarters in a single academic year; classes in a sequence need not be taken at the same level. Specific Requirements:

2 yearlong sequences in Modern (2 Units)

Course	Title
DANCE 150-0	Modern I
DANCE 250-0	Modern II
DANCE 350-0	Modern III

1 yearlong sequence in Jazz (1 Unit) ¹

Course	Title
DANCE 160-0	Jazz I
DANCE 161-0	Jump Rhythm Technique I
DANCE 260-0	Jazz II
DANCE 261-0	Jump Rhythm Technique II
DANCE 360-0	Jazz III

¹ May include one .34 unit of Jump Rhythm Technique Tap or Jump Rhythm Technique Jazz

1 additional two-quarter sequence in a single form (.68 Units)

Course	Title
DANCE 110-0	Movement for the Stage
DANCE 120-0	Topics in Preparation for Performance
DANCE 130-1	Music Theatre Ballet
DANCE 130-2	Music Theatre Dance I
DANCE 130-3	Music Theatre Dance II
DANCE 140-0	Cultural Forms

DANCE 150-0	Modern I
DANCE 160-0	Jazz I
DANCE 161-0	Jump Rhythm Technique I
DANCE 170-0	Ballet I
DANCE 180-0	Tap I
DANCE 181-0	Jump Rhythm Tap I
DANCE 250-0	Modern II
DANCE 260-0	Jazz II
DANCE 261-0	Jump Rhythm Technique II
DANCE 270-0	Ballet II
DANCE 280-0	Tap II
DANCE 281-0	Jump Rhythm Tap II
DANCE 350-0	Modern III
DANCE 360-0	Jazz III
DANCE 370-0	Ballet III
DANCE 380-0	Tap III

1 Cultural Forms course (.34 Units)

Course	Title
DANCE 140-0	Cultural Forms

Additional Dance Courses (4 Units)

At least 4 courses chosen from the following categories:

Performance (2 units)

Course	Title
At least 2 units:	
DANCE 202-0	Anatomy
DANCE 235-0	Choreography for Musical Theatre
DANCE 325-0	Advanced Choreographic Study
DANCE 326-0	Advanced Improvisation
DANCE 345-0	Studies in Collaboration
DANCE 375-0	Summer Dance Institute
DANCE 465-0	Studies in Dance

Dance Studies (2 units)

Course	Title
At least 2 units:	
DANCE 201-0	Cultural Studies of Dance
DANCE 215-0	Dance History
DANCE 315-0	Dance Criticism
DANCE 335-0	Special Topics in Dance Research
DANCE 355-0	Dance in Education
DANCE 356-0	Expressive Arts Therapy
DANCE 365-0	American Rhythm Dancing & the African American Performance Aesthetic
DANCE 399-0	Independent Study
THEATRE 253-0	Music Theatre History

Senior Seminar (1 Unit)

Course	Title
DANCE 395-1 & DANCE 395-2 & DANCE 395-3	Senior Seminar and Senior Seminar and Senior Seminar (1 unit of credit received at end of sequence)

Production Courses (0 Units)

Two registrations for:

Course	Title
THEATRE 121-0	Production Laboratory (This is a 0 unit of credit requirement)

Additional Requirements (29 units)

Distribution Requirements (18 units)

18 units of credit outside the school, including 8 units of credit from the School of Communication distribution areas: 2 from science, mathematics, and technology; 3 from individual and social behavior; and 3 from humanities and fine arts. In addition, 3 courses must be at the 200 level or above, and 3 courses must be at the 300 level or above.

Electives (11 units)

Electives in communication and other areas to complete a minimum of 42 units of credit.

Honors in Dance

The Dance Program offers an honors program for students who have demonstrated academic excellence in the dance major. Contact the Dance Program for more information on eligibility and requirements.

Dance Minor

https://communication.northwestern.edu/programs/minor_dance

The Dance Program offers courses that introduce the many areas of study within the dance world as well as the many opportunities to contribute to the field. Technique study in the program focuses primarily on contemporary modern dance and Jump Rhythm Technique supported by study in ballet, tap, and other movement classes.

All students are eligible for this minor, as space allows.

Admission to the minor is by application. Applications are available in winter quarter so that students may begin the minor in spring quarter. Students must demonstrate academic progress beyond technique study within the first full year of enrollment in the minor.

Minor Requirements (6.68 units)

All courses for SoC majors, minors and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

Core courses (4 Units):

Course	Title
DANCE 101-1 & DANCE 101-2 & DANCE 101-3	Introduction to the Dance Experience and Introduction to the Dance Experience and Introduction to the Dance Experience
DANCE 225-0	Dance Composition

Technique Courses (1.68 Units)

- 1 yearlong sequence (3 .34-unit classes taken in consecutive quarters in a single year) in Modern Dance chosen from the following (classes need not all be in the same level):

Course	Title
DANCE 150-0	Modern I
DANCE 250-0	Modern II
DANCE 350-0	Modern III

- 2 classes in DANCE 140-0 Cultural Forms (.68 units); 1 class (.34 units) can be substituted by tap or jazz Jump Rhythm Technique, chosen from:

Course	Title
DANCE 161-0	Jump Rhythm Technique I
or DANCE 261-0	Jump Rhythm Technique II
or DANCE 181-0	Jump Rhythm Tap I
or DANCE 281-0	Jump Rhythm Tap II

Dance Elective Course (1 Unit)

1 elective reflecting the student's special interests (a dance technique sequence may not be used to satisfy this requirement)

Dance Elective List

Course	Title
DANCE 201-0	Cultural Studies of Dance
DANCE 202-0	Anatomy
DANCE 215-0	Dance History
DANCE 235-0	Choreography for Musical Theatre
DANCE 315-0	Dance Criticism
DANCE 325-0	Advanced Choreographic Study
DANCE 326-0	Advanced Improvisation
DANCE 335-0	Special Topics in Dance Research
DANCE 345-0	Studies in Collaboration
DANCE 355-0	Dance in Education
DANCE 356-0	Expressive Arts Therapy
DANCE 365-0	American Rhythm Dancing & the African American Performance Aesthetic
DANCE 399-0	Independent Study
DANCE 465-0	Studies in Dance

Production Course (0 Units)

1 registration in THEATRE 121-0 Production Laboratory (0 units) for students not majoring in theatre or performance studies

Music Theatre Certificate

communication.northwestern.edu/programs/certificate_music_theatre

The Certificate in Music Theatre provides the opportunity for School of Communication students majoring in theatre, dance, or performance studies and Bienen School of Music students majoring in voice 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, dance, and performance studies majors have weekly voice classes and exposure to other music offerings. Students must remain in the theatre, dance, performance studies, or voice major to remain in the Music Theatre Certificate Program; students who leave an eligible major for a noneligible one will be required to leave the program.

The prescribed sequence of courses is open only to students accepted into the program through audition. The auditions are held annually in the fall quarter. Only first- and second-year students enrolled as theatre, dance, or performance studies majors in the School of Communication or as voice majors in the Bienen School of Music are eligible to audition for the Music Theatre Certificate Program; other students will not be admitted. Auditionees are required to perform a vocal selection and a monologue and to participate in a dance audition.

Program Requirements for Theatre, Dance, and Performance Studies Majors (9 units)

All courses for SoC majors, minors and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

• Applied Voice (3 units)

Course	Title
THEATRE 251-1 & THEATRE 251-2 & THEATRE 251-3	Intermediate Voice I and Intermediate Voice II and Intermediate Voice III
THEATRE 351-1 & THEATRE 351-2 & THEATRE 351-3	Advanced Voice I and Advanced Voice II and Advanced Voice III

• Music Theatre Techniques (3 units)

Course	Title
THEATRE 252-0	Intermediate MT Techniques
THEATRE 352-1 & THEATRE 352-2	Advanced Music Theatre Techniques I and Advanced Music Theatre Techniques II (2 units)

• Theatre (2 units)

Course	Title
THEATRE 256-0	Musicianship for Actors
THEATRE 253-0	Music Theatre History

• Dance (1 unit)

Course	Title
DANCE 130-1 & DANCE 130-2 & DANCE 130-3	Music Theatre Ballet and Music Theatre Dance I and Music Theatre Dance II

Program Requirements for Voice Majors (9 units)

• 3 Quarters of Acting (3 units)

Course	Title
THEATRE 273-1 & THEATRE 273-2 & THEATRE 273-3	Acting I and Acting I and Acting I

• Music Theatre Techniques (3 units)

Course	Title
THEATRE 252-0	Intermediate MT Techniques
THEATRE 352-1	Advanced Music Theatre Techniques I
THEATRE 352-2	Advanced Music Theatre Techniques II

• Theatre (1 unit)

Course	Title
THEATRE 253-0	Music Theatre History

• Dance (1 unit)

Course	Title
DANCE 130-1 & DANCE 130-2 & DANCE 130-3	Music Theatre Ballet and Music Theatre Dance I and Music Theatre Dance II

• **Design, Dance, or Acting Elective (1 unit)**

Course	Title
Design, Dance, or Acting Elective (1 unit)	

Theatre Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Program Requirements (12 units)

All courses for SoC majors, minors and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

Introductory Courses (4 units)

Course	Title
THEATRE 140-1	Theatre in Context: Introduction
THEATRE 140-2	Theatre in Context: Analysis & Research ¹
THEATRE 120-0	Production in Context
THEATRE 170-0	Voice for Performance

¹ Students who fail to earn a C- or higher in the course are required to take ENGLISH 105-0 Expository Writing and one additional history, literature, or criticism course for the major.

Production Course

- One enrollment in THEATRE 121-0 (0 Units)

Advanced Courses (8 units)

- Four courses in Theatre at the 200 level or above
 - Four courses in Theatre at the 300 level or above
- Including at least:

• **Performance (2 courses)**

Course	Title
THEATRE 171-0	Basic Acting
THEATRE 272-0	Voice for Shakespeare
THEATRE 273-1 & THEATRE 273-2 & THEATRE 273-3	Acting I and Acting I and Acting I
THEATRE 211-0	Fundamentals of Stage Directing
THEATRE 310-0	Special Topics in Directing
THEATRE 311-0	Advanced Stage Directing
THEATRE 332-1	The Art of Storytelling
THEATRE 281-0	Intro to Playwriting
THEATRE 382-0	Playwriting Genres
THEATRE 380-0	Special Topics in Playwriting
THEATRE 373-1 & THEATRE 373-2 & THEATRE 373-3	Acting II: Analysis and Performance and Acting II: Analysis and Performance and Acting II: Analysis and Performance
THEATRE 370-0	Special Topics in Acting
THEATRE 372-0	Advanced Voice Styles
THEATRE 374-0	Dialects for the Stage
THEATRE 375-0	Advanced Acting Topics
THEATRE 376-0	Intro to Acting for the Screen
THEATRE 377-0	Topics in Acting for the Screen
THEATRE 378-0	Diagnostic Scene Study for the Screen
THEATRE 347-0	Latinx Theatre

THEATRE 383-1 & THEATRE 383-2 & THEATRE 383-3	Advanced Playwriting Sequence and Advanced Playwriting Sequence and Advanced Playwriting Sequence
---	---

• **Design/Technology (2 courses)**

Course	Title
THEATRE 220-0	Introduction to Theatre Design
THEATRE 221-1	Design Process: Scene
THEATRE 221-2	Design Process: Costume
THEATRE 221-3	Design Process: Lighting
THEATRE 222-0	Stage Makeup
THEATRE 223-0	Theatre Sound
THEATRE 321-1	Advanced Design Process: Scene
THEATRE 321-2	Advanced Design Process: Costume
THEATRE 321-3	Advanced Design Process: Lighting
THEATRE 322-0	History of Costume and Decor
THEATRE 323-0	Advanced Theatre Sound
THEATRE 324-0	Scene Painting
THEATRE 325-1	Drawing and Painting for the Theatre: Graphic Arts for the Stage Designer
THEATRE 325-2	Drawing and Painting for the Theatre: Rendering the Theatrical Space
THEATRE 325-3	Drawing and Painting for the Theatre: Rendering the Theatrical Figure
THEATRE 325-4	Drawing & Painting for the Theatre: Drafting
THEATRE 326-1	Principles of Drawing and Composition: Freehand
THEATRE 326-2	Principles of Drawing and Composition: Draw & Paint
THEATRE 327-0	Textile Arts and Crafts
THEATRE 328-1	Period Pattern Drafting and Draping
THEATRE 328-2	Period Pattern Drafting and Draping
THEATRE 328-3	Period Pattern Drafting and Draping
THEATRE 329-0	Computer Graphics for the Theatre Artist
THEATRE 357-0	Orchestration
ART 210-0	Introduction to Drawing
ART 220-0	Introduction to Painting
ART 230-0	Introduction to Time Based Arts
ART 240-0	Introduction to Sculpture (requires introductory course)
ART_HIST 232-0	Introduction to the History of Architecture and Design
DSGN 295-0	Introductory Topics in Design
MUS_TECH 259-0	Introduction to Music Technology
MUS_COMP 111-0	Class Composition
MUS_COMP 311-0	Class Composition
RTVF 190-0	Media Construction
RTVF 220-0	Analyzing Media Texts
RTVF 383-0	Introduction to Sound Production

• **History, Literature, and Criticism (2 courses)**

Course	Title
Chosen from:	
THEATRE 240-0	Special Topics in Theatre Studies
THEATRE 241-1	Theatre History I: Pre-1650
THEATRE 241-2	Theatre History II: Post 1650
THEATRE 242-0	Topics in Shakespeare
THEATRE 244-1 & THEATRE 244-2	Modern & Contemp Theatre: Modern and Modern & Contemp Theatre: Contemporary

THEATRE 244-2	Modern & Contemp Theatre: Contemporary
THEATRE 245-0	Theatre of the Americas
THEATRE 253-0	Music Theatre History
THEATRE 340-0	Special Topics in Advanced Theatre Studies
THEATRE 341-0	Theatre and Social Change
THEATRE 342-0	Dramaturgy
THEATRE 343-0	Puppetry History & Performance
THEATRE 344-0	Gender & Performance
THEATRE 345-0	African American Theatre
THEATRE 346-0	Asian American Theatre
THEATRE 347-0	Latinx Theatre
THEATRE 348-0	Transnational Theatre
AF_AM_ST 259-0	Introduction to African-American Drama
CLASSICS 210-0	The World of Homer
CLASSICS 245-0	Classics and the Cinema
CLASSICS 340-0	Greek and Roman Drama
DANCE 201-0	Cultural Studies of Dance
DANCE 215-0	Dance History
DANCE 315-0	Dance Criticism
DANCE 335-0	Special Topics in Dance Research
ENGLISH 212-0	Introduction to Drama
ENGLISH 234-0	Introduction to Shakespeare
ENGLISH 312-0	Studies in Drama
ENGLISH 322-0	Medieval Drama
ENGLISH 332-0	Renaissance Drama
ENGLISH 334-1	Shakespeare
ENGLISH 339-0	Special Topics in Shakespeare
ENGLISH 342-0	Restoration and 18th-Century Drama
FRENCH 272-0	Introducing Theatre
FRENCH 279-0	Theater in Translation
GNDR_ST 362-0	Gender, Sexuality, and Drama
GNDR_ST 372-0	Gender, Sexuality, and Performance
GERMAN 324-0	Modern German Drama
GERMAN 329-0	Brecht: Theater, Film, and Media
HUM 205-0	The World of Homer
PERF_ST 200-0	Introduction to Performance Studies
PERF_ST 305-0	Performance Theory
PERF_ST 307-1 & PERF_ST 307-2	Studies in Gender and Performance and Studies in Gender and Performance
PERF_ST 318-1 & PERF_ST 318-2	Shakespeare's English Histories and Shakespeare Adaptations
PERF_ST 321-0	Performing the American Fifties
PERF_ST 322-1	Staging the Novel
PERF_ST 336-0	Latino/a Performance
RTVF 322-0	Radio/Television/Film Genre (Genre: Musicals from Stage to Screen)
SLAVIC 369-0	200 Years of Russian Drama
SPANISH 321-0	Golden Age Drama

Additional Requirements (30 units)

Courses Outside Communication (6 units)

- Three 200 level courses outside Communication
- Three 300 level courses outside Communication

May include courses taken to meet the distribution requirement.

Distribution Requirements (18 units)

18 units of credit outside the department, including 2 units of credit from science, mathematics, and technology and 3 each from individual and social behavior and humanities and fine arts.

Electives

Electives in communication and other areas to complete a minimum of 42 units of credit

Honors in Theatre

The honors program provides theatre majors who have demonstrated records of academic achievement with the opportunity to explore a sustained project in their senior year. It exposes majors to the rigors of research and creative work comparable with graduate-level programs in theatre studies and offers preparation for future graduate-level study. Projects may be proposed in any area of the theatre department's pursuits (design, directing, choreography, performance, history, criticism, or playwriting), provided that supervisory personnel are available and willing to participate, and provided that appropriate facilities are available.

Eligibility for the honors program will be determined by the faculty. Contact the theatre department for more information.

Theatre Minor

communication.northwestern.edu/programs/minor_theatre

The minor in theatre encourages students majoring in other fields to organize their theatre studies in a coherent manner. The minor requires students to gain both depth and breadth in the study and practice of theatre.

Minor Requirements (7 units)

All courses for SoC majors, minors and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

7 courses including at least 3 at the 300-level.

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

Course	Title
THEATRE 240-0	Special Topics in Theatre Studies
THEATRE 241-1	Theatre History I: Pre-1650
THEATRE 241-2	Theatre History II: Post 1650
THEATRE 242-0	Topics in Shakespeare
THEATRE 244-1	Modern & Contemp Theatre: Modern
THEATRE 244-2	Modern & Contemp Theatre: Contemporary
THEATRE 245-0	Theatre of the Americas
THEATRE 253-0	Music Theatre History
THEATRE 340-0	Special Topics in Advanced Theatre Studies
THEATRE 341-0	Theatre and Social Change
THEATRE 342-0	Dramaturgy
THEATRE 343-0	Puppetry History & Performance
THEATRE 344-0	Gender & Performance

THEATRE 345-0	African American Theatre
THEATRE 346-0	Asian American Theatre
THEATRE 347-0	Latinx Theatre
THEATRE 348-0	Transnational Theatre
DANCE 201-0	Cultural Studies of Dance
DANCE 215-0	Dance History
DANCE 335-0	Special Topics in Dance Research (Topic approval required)
CLASSICS 210-0	The World of Homer
CLASSICS 245-0	Classics and the Cinema
CLASSICS 340-0	Greek and Roman Drama
ENGLISH 212-0	Introduction to Drama
ENGLISH 234-0	Introduction to Shakespeare
ENGLISH 312-0	Studies in Drama
ENGLISH 322-0	Medieval Drama
ENGLISH 332-0	Renaissance Drama
ENGLISH 334-1	Shakespeare
ENGLISH 334-2	Shakespeare
ENGLISH 339-0	Special Topics in Shakespeare
ENGLISH 342-0	Restoration and 18th-Century Drama
FRENCH 272-0	Introducing Theatre
FRENCH 279-0	Theater in Translation
GNDR_ST 362-0	Gender, Sexuality, and Drama
GNDR_ST 372-0	Gender, Sexuality, and Performance
GERMAN 324-0	Modern German Drama
GERMAN 329-0	Brecht: Theater, Film, and Media
PERF_ST 200-0	Introduction to Performance Studies
PERF_ST 305-0	Performance Theory
PERF_ST 307-1	Studies in Gender and Performance
PERF_ST 307-2	Studies in Gender and Performance
PERF_ST 318-1	Shakespeare's English Histories
PERF_ST 318-2	Shakespeare Adaptations
PERF_ST 321-0	Performing the American Fifties
PERF_ST 322-1	Staging the Novel
PERF_ST 336-0	Latino/a Performance
SLAVIC 369-0	200 Years of Russian Drama
SPANISH 321-0	Golden Age Drama

1 course in theatre performance

Course	Title
THEATRE 171-0	Basic Acting
THEATRE 211-0	Fundamentals of Stage Directing
THEATRE 231-0	Theatre for Young Audiences
THEATRE 271-0	Intermediate Acting
THEATRE 281-0	Intro to Playwriting
THEATRE 330-0	Special Topics in TYA
THEATRE 332-1	The Art of Storytelling
THEATRE 332-2	Advanced Storytelling
THEATRE 333-1	Creative Drama
THEATRE 333-2	Advanced Creative Drama
THEATRE 361-0	Partnered Swing Dancing
THEATRE 380-0	Special Topics in Playwriting
THEATRE 382-0	Playwriting Genres
THEATRE 383-1	Advanced Playwriting Sequence
THEATRE 383-2	Advanced Playwriting Sequence
THEATRE 383-3	Advanced Playwriting Sequence

1 course in theatre design

Course	Title
THEATRE 220-0	Introduction to Theatre Design
THEATRE 221-1	Design Process: Scene
THEATRE 221-2	Design Process: Costume
THEATRE 221-3	Design Process: Lighting
THEATRE 222-0	Stage Makeup
THEATRE 223-0	Theatre Sound
THEATRE 320-0	Special Topics in Theatre Design
THEATRE 321-1	Advanced Design Process: Scene
THEATRE 321-2	Advanced Design Process: Costume
THEATRE 321-3	Advanced Design Process: Lighting
THEATRE 357-0	Orchestration
RTVF 190-0	Media Construction
RTVF 220-0	Analyzing Media Texts
ART 210-0	Introduction to Drawing
ART 220-0	Introduction to Painting
ART 240-0	Introduction to Sculpture
DSGN 208-0	Design Thinking and Doing

- 2 additional courses in one of the above areas to form a required concentration

- 1 theatre elective course (any course within the Theatre Department)

NOTE: The sequence of courses in acting (273-1,2,3; 341-1,2,3; 373-1,2,3) is open solely to theatre majors due to the space limitations of these courses. Declaring a theatre minor will not provide access to these courses.

SCHOOL OF EDUCATION AND SOCIAL POLICY

sesp.northwestern.edu

The mission of the School of Education and Social Policy is to understand and improve learning communities, defined as groups of people working together in structured social and/or technical environments that influence human development. Learning communities include not only schools and classrooms but also workplaces, families, neighborhoods, and other societal arrangements where learning takes place. Through broad-based interdisciplinary research, teaching, and outreach activities, SESP's faculty strive to better understand how social, psychological, and economic factors shape human development and learning and how innovations in pedagogy, technology, and social policies can benefit lives. They learn to understand human development and improve learning in its various social contexts by applying the social and behavioral sciences.

The school provides undergraduates with an interdisciplinary curriculum, practical experiences, and research activities that are closely linked to its faculty and graduate programs. Five concentrations lead to the degree of bachelor of science in education and social policy. The intellectual core of the human development and psychological services and social policy concentrations comes from SESP's human development and social policy graduate program. The intellectual core of the learning and organizational change, learning sciences, and secondary teaching concentrations is grounded in the school's learning sciences graduate program.

The five concentrations offer preparation for a number of career options. Students are encouraged to design their concentrations with career objectives or graduate and professional school admission policies in mind. They enroll with a wide variety of academic and career goals. Some intend to go immediately to graduate and professional schools, while others plan to enter a profession upon graduation.

Students in Northwestern's other schools may choose to complete the requirements of SESP's secondary teaching concentration in order to qualify for teacher certification.

SESP offers advanced degrees and programs in elementary and secondary teaching, higher education administration and policy, learning and organizational change, learning sciences, and human development and social policy.

Academic Policies

Requirements for the Bachelor's Degree in Education and Social Policy

A minimum of 42 course units are required for the degree of bachelor of science in education and social policy. The concentrations in human development and psychological services, learning and organizational change, learning sciences, and social policy have similar distribution and core requirements, though each has different major courses; the secondary teaching curriculum is markedly different, largely due to Illinois Board of Education requirements.

Grade and Registration Requirements

The following requirements concerning grade point average (GPA) and registration apply to all students seeking the bachelor's degree:

- 42 course units are required for graduation.
- Students are required to maintain a minimum GPA of 2.0 in all work presented for the degree. To qualify for teacher certification, students must earn a minimum grade of C in all professional core courses and maintain minimum GPAs of 2.5 overall and 3.0 in teaching subject-area courses. Students in the human development and psychological services, learning and organizational change, learning sciences, and social policy concentrations must earn a minimum grade of C- in all distribution requirements, core courses, and concentration courses.
- Full-time students may elect to enroll in some Northwestern courses with the understanding that they will not receive a regular letter grade but the notation P (pass) or N (no credit). They may elect 1 unit per quarter under the P/N option, which may be used only toward elective requirements.
- Not more than six of the grades in courses taken at Northwestern and presented for graduation may be P's and D's.
- Students may double-count up to 3 course units from their concentration toward a second major and up to 2 units toward an adjunct major or a minor. Required related courses in Weinberg College are not subject to these limits.
- Coursework taken at institutions other than Northwestern that is to be counted toward SESP requirements must be approved in advance by the student's adviser; if a course taken for credit is outside SESP's curriculum, the relevant academic department at Northwestern must also approve. Students taking community college courses must earn a grade of B or higher for SESP to accept the credit.
- A student typically may not have more than a total of three majors plus minors: three majors, two majors and one minor, or one major and two minors. Exceptions require permission from the SESP assistant dean for student affairs and are not granted during the freshman year.
- All degree candidates must file an application for the degree with their advisers in advance of their degree completion. The adviser will forward the application, when approved, to the Office of the Registrar.
- Students who wish to transfer into SESP from another Northwestern school must
 - Have a minimum cumulative GPA of 2.0 (students in the secondary teaching concentration must maintain minimum GPAs of 2.5 overall and 3.0 in teaching subject-area courses).
 - Attend the appropriate information and orientation sessions and comply with the requirements stated on the interschool transfer application.
- Students transferring from another university must complete their final 23 units at Northwestern.

In addition to and independent of the requirements set by SESP, all students must satisfy the Undergraduate Registration Requirement (p. 26).

Student Resources

Probation

In addition to the University regulations regarding academic probation, undergraduate students in SESP are ordinarily placed on academic probation when, in any one quarter, they do not receive at least three final grades of A, B, C, or P, or they have a cumulative GPA below 2.0. Students on probation must work with their advisers to meet the conditions set by the probation and address the deficiencies that resulted in probation. Failure to do so may result in dismissal from the University.

Petitions for Exemptions

Students must petition if they wish to be exempted from or request a change in any of the SESP degree or specific course requirements of SESP. Petition forms are available electronically in the SESP Office of Student Affairs and on the SESP website. No petition is considered unless it is approved by the student's adviser. Petitions requesting that a course substitute for a degree requirement must be submitted before the posted deadline.

Additional requirements are stipulated in the *SESP Undergraduate Handbook*. All students are expected to be familiar with and observe these policies. When requirements or policies change, notification is provided by e-mail.

Academic Options

SESP concentrations are interdisciplinary and flexible, allowing many undergraduates to enroll in University-wide programs or to pursue up to two additional majors, one additional major and one minor, or as many as two minors along with their concentration. Options include the five-quarter Certificate in Civic Engagement Program and the Summer Field Studies Programs administered by SESP; Many students also elect to spend one or more quarters in a University-approved study abroad program.

Honors

Students who maintain records of academic distinction may qualify for the honors program. Any student who has attained a cumulative GPA of 3.5 or above after winter quarter of the junior year is eligible for provisional admission to the program beginning in spring quarter of the junior year. Students considering both study abroad and the honors program must plan their study abroad programs accordingly.

Students who successfully complete SESP 391-0 Advanced Research Methods in spring quarter of the junior year and are recommended for the honors program may formally enter the honors program by registering for SESP 398-0 Honors Thesis in fall quarter of the senior year. In this three-quarter program students work with a faculty adviser on a research project. If progress is satisfactory, students are eligible to register for SESP 398-0 Honors Thesis in winter and spring quarters of the senior year. Grades are based on performance throughout the program and on readers' evaluations of the project report. All honors students present their projects to SESP faculty, students, and guests at a poster session at the end of the year. Students earn 3 units for successful completion of an honors thesis. They receive departmental honors only on the recommendation of the faculty adviser and the approval of the program director.

Education and Social Policy and Music Dual Degree

Students in any SESP major except undergraduate teaching are able to earn a dual degree in education and social policy and music, developing their passion for music as a tool for creating change in learning environments, human relationships, organizations, and the field of social policy. For details of the five-year program, please see Dual Bachelor's Degree (p. 35).

Many programs offered by other Northwestern undergraduate schools or across the University are popular among SESP students. They include the following:

Student-Organized Seminar

As its title denotes, SESP 298-0 Student Organized Seminar is a course in which the topic, reading list, assignments, written examinations, prerequisites, and meeting schedule are proposed by students in consultation with a faculty sponsor. Proposals must be submitted by the posted deadline and approved by the director of undergraduate education before the seminar can be offered.

Undergraduate Research

The school's curriculum includes a variety of innovative learning opportunities. Students taking SESP 390-0 Research Apprenticeship complete an apprenticeship as assistants in faculty research projects. In SESP 399-0 Independent Study students carry out their own independent research under faculty supervision. Additional information about undergraduate research opportunities and faculty research projects may be obtained through the academic advisers in the SESP Office of Student Affairs and the *SESP Undergraduate Handbook*.

Student Resources

Academic Advising

Each student is assigned to an adviser in the SESP Office of Student Affairs. For the advising system to work, students must take all academic questions to their advisers. Advisers are responsible for helping students plan academic programs that meet the requirements for completion and graduation. Advisers also help students make use of academic, professional, and personal development resources. Students consult with faculty as well about research and professional interests. Students are encouraged to meet with their advisers at least once per quarter to develop an individualized plan of study. Failure to do so may result in a hold being placed on a student's registration.

Organizational Involvement

The SESP Leadership and Programming Board plans events and projects to improve the undergraduate experience, with committees for professional and academic opportunities, student experience and inclusion, and community engagement. More information is available in the SESP Office of Student Affairs.

Support for Research, Special Projects, and Experiences

The SESP Undergraduate Opportunities Fund provides support for special academic projects and community endeavors that students or student organizations undertake either on their own or under a faculty member's direction.

Students who pursue research may also seek support from the G. Alfred Hess Jr. Fund to defray the costs of data collection and analysis, travel, equipment, and other expenses directly related to their projects.

The Vartan Northwestern Experience Fund helps students with financial need pay for student organization or activity fees and helps subsidize expenses in cases of emergency. The fund is not designed to replace financial aid.

The Munger Family Practicum/Student Teaching Assistance Fund helps students with financial need afford the additional expenses incurred during their practicum or student teaching. Examples of expenses include transportation.

Human Development and Psychological Services

sesp.northwestern.edu/ugrad/human-development-and-psychological-services

The human development and psychological services concentration explores how human development is influenced by family, schools, community, and the workplace. Students interested in such fields as child development, social work, clinical psychology, medicine, and counseling normally enter this concentration.

Courses focus on theories of individual development and on family, group, and organizational dynamics. The interdisciplinary concentration draws from current practice and research in counseling, personality psychology, and human development as well as on the disciplines of psychology, sociology, gender studies, communication studies, cognitive science, and anthropology to give students the opportunity to combine theory with practice and develop pragmatic skills grounded in a deep understanding of human psychology, growth, and adaptation throughout the life span. Examples of interdisciplinary specializations include child development, family development, premedical studies, and gender and human development.

Students are encouraged to include in their concentration the prerequisites in psychology and quantitative methods needed for graduate work in psychology and in the human services professions.

Program of Study

- Human Development and Psychological Services Major (p. 100)

HDPS 201-0 Introduction to Psychological Services (1 Unit) Overview of professional degrees, sites and various populations in psychological services. Introduction to the most common mental disorders and counseling fundamentals used in mental health careers will also be covered. To achieve this breadth, the course is divided into three modules: history and careers in psychological services, approaches and practice in counseling, and common mental disorders.

HDPS 222-0 Career Development: Theory and Counseling (1 Unit)

The career-development process and its relation to the world of work. Discussion of career-development theories. Focus on self-assessment; decision-making and job-seeking skills; and educational, occupational, and community information.

HDPS 301-0 The Counseling Process: Theory & Practice (1 Unit)

Survey of counseling perspectives and techniques, along with the theories that form the basis of understanding these concepts. Overview of clinical assessment, client systems, counseling theories, and counseling techniques. Review how dynamics and complexity associated with counseling diverse populations and understanding the roles that diversity and personal values play in the counseling process.

HDPS 305-0 Identity and Motivation (1 Unit) Examines the connection between conceptions of the self and goal-oriented motivation, with particular attention to the influence of social, structural, and cultural forces.

HDPS 306-0 Developmental Psychopathology (1 Unit) Study of models of risk and resilience, developmental pathways, and the transactional model of development.

HDPS 340-0 Marriage 101: Building Loving and Lasting Relationships (1 Unit)

Study of the intricacies and problems of close, committed, interpersonal relationships, especially marriage. This course will increase students' formal knowledge about marriage and intimate relationships, while also improving their chances for success in such relationships. Students should be better prepared to choose compatible partners, to face inevitable relationship challenges, and to experience greater marital/relationship satisfaction.

HDPS 351-0 Special Topics in HDPS (1 Unit) Advanced work on special topics.

HDPS 399-0 Independent Study (1 Unit) SEE DEPT FOR SECTION AND PERMISSION NUMBERS.

SESP 114-0 Summer Internship (0 Unit)

SESP 115-0 Internship (0 Unit)

SESP 195-1 Community Engagement (0.5 Unit) Critical reflection on community engagement experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community. For Certificate in Civic Engagement students only.

SESP 195-2 Community Engagement (0.5 Unit) Critical reflection on community engagement experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community. For Certificate in Civic Engagement students only.

SESP 201-0 Human Development: Childhood and Adolescence (1 Unit) Personal, social, and cognitive development from birth through adolescence. Interplay of biological and experiential factors on linguistic and conceptual development, ego, and personality.

SESP 202-0 Introduction to Community Development (1 Unit) 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 (1 Unit) 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 (1 Unit) 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 291-1 Peer-Led Learning: Theory and Practice (0.25 Unit) SESP 291 is the training program for students working as first-time mentors in the Peer Leaders program. It is taken over two academic quarters, with each quarter offering .25 credit (a total of .5 credit). You will receive a "K" grade for fall quarter, which means you are continuing in the course. After winter quarter, you will receive a letter grade which will be retroactively applied to fall quarter.

SESP 291-2 Peer-Led Learning: Theory and Practice (0.25 Unit)

SESP 295-0 Theory and Practice of Community Consulting (1 Unit)

Course on the importance of community capacity building and the community-consulting process; start of preliminary work for the Certificate in Civic Engagement capstone project.

SESP 298-0 Student Organized Seminar (1 Unit) Courses proposed by students and supervised by faculty sponsors on special topics approved

by the SESP undergraduate education director. May be taken only once per quarter; pass/ no credit only. Consultation with the SESP student affairs assistant dean advised.

SESP 299-1 Civic Engagement Capstone Research (1 Unit) Independent study courses leading to completion of the Certificate in Civic Engagement capstone project.

SESP 299-2 Certificate in Civic Engagement- Capstone Project (1 Unit) Independent study courses leading to completion of the Certificate in Civic Engagement capstone project.

SESP 303-0 Designing for Social Change (1 Unit) Processes, challenges, and ethics of designing programs, at home and abroad, for realizing human rights and meaningful social change.

SESP 317-0 Gender and the Life Course (1 Unit) How gender influences major life stages. Focus on the psychosocial effects of gender on children; young, midlife, and old adults; societal institutions; and selected social policy issues.

SESP 320-0 Race and Education (1 Unit) Conceptual underpinnings of the construct of race and how conceptions of race have influenced the course of education in the United States.

SESP 351-0 Special Topics (1 Unit) Advanced work on special topics.

SESP 372-0 Methods of Observing Human Behavior (1 Unit) Guided practice in systematic and participant observation. Observer bias, field notes, unobtrusive measures.

SESP 382-0 Practicum in Human Development; Learning Sciences (4 Units) Real-world participant observation in professional activities and projects; development of analytical field studies of the practicum experience based on field notes, recorded observations, and class discussions; culminates in a final research paper. For LRN SCI students only. Prerequisites: SESP 372-0; consent of SESP practicum director 2 quarters before registration (3 quarters if a Summer Session practicum).

SESP 384-0 Practicum in Human Development - Washington, D.C. (4 Units) See description for SESP 382-0. Offered during Summer Session only. For participants in the Washington, DC, field studies program only. Prerequisites: SESP 372-0; consent of SESP practicum director 3 quarters before registration.

SESP 386-0 Practicum: Human Development & Psychological Svcs. (4 Units) See description and prerequisites for SESP 382-0. For HDPS students only.

SESP 387-0 Practicum: Learning & Organizational Change (4 Units) See description and prerequisites for SESP 382-0. For LOC students only.

SESP 388-0 Practicum: Social Policy (4 Units) See description and prerequisites for SESP 382-0. For SOC POL students only.

SESP 389-0 Practicum in Human Development - San Francisco (4 Units) See description and prerequisites for SESP 382-0. Offered during Summer Session only. For participants in the San Francisco field studies program only.

SESP 390-0 Research Apprenticeship (1 Unit) Opportunity to participate in faculty research projects. Prerequisites: consent of the faculty member and the SESP assistant dean for student affairs; submission of completed Request for Independent Study/Special Courses Form at registration.

SESP 391-0 Advanced Research Methods (1 Unit) Overview of research methods that may be used to design and implement the honors thesis. Prerequisites: SESP 210-0 and SESP 372-0 recommended.

SESP 398-0 Honors Thesis (1 Unit) Students develop, design, implement, and evaluate a research project under a faculty adviser's guidance. Prerequisites: senior status; cumulative GPA by the end of winter quarter of the junior year; recommendation for the honors program from SESP 391-0 instructor(s); consent of program director.

SESP 399-0 Independent Study (1 Unit) Faculty-supervised study of special topics of the student's own choosing and not covered in regular courses. Prerequisites: consent of the supervising faculty member(s) and the SESP assistant dean for student affairs; submission of completed Request for Independent Study/Special Courses Form at registration.

Human Development and Psychological Services Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Concentration Program—16 units

Course	Title
Required Courses (6 units)	
SESP 201-0 or SESP 203-0	Human Development: Childhood and Adolescence Human Development: Adulthood and Aging
HDPS 201-0	Introduction to Psychological Services
HDPS 301-0	The Counseling Process: Theory & Practice
3 courses chosen from the following, with no more than 1 in CSD:	
HDPS 305-0	Identity and Motivation
HDPS 351-0	Special Topics in HDPS (Team Dynamics)
PSYCH 215-0	Psychology of Personality
SESP 303-0	Designing for Social Change
SOC_POL 304-0	Social Policy & the Human Services
CSD 303-0	Brain and Cognition
CSD 342-0	Language and Cognition in Atypical Development
CSD 373-0	Learning Disabilities
CSD 392-0	Language Development and Usage

Concentration Courses (10 units)

Must be selected from an approved list of courses in human development and psychological services, other SESP concentrations, and disciplines such as anthropology, communication studies, linguistics, psychology, and sociology. Must include at least 4 courses at the 300 level. Up to 3 units of SESP 390-0 Research Apprenticeship or SESP 399-0 Independent Study and 3 units of SESP 398-0 Honors Thesis may be counted toward this requirement.

SESP Core (8 units)

Course	Title
Basic courses—2 units	
SESP 201-0 or SESP 203-0	Human Development: Childhood and Adolescence Human Development: Adulthood and Aging
1 inequality and diversity issues course, chosen from:	
LRN_SCI 202-0	Culture, Language, & Identity
LOC 214-0	Culture and Cognition
SESP 317-0	Gender and the Life Course
SESP 320-0	Race and Education
TEACH_ED 302-0	Social Contexts of Education
or an approved equivalent	

Research methods—2 units

SESP 210-0	Introduction to Statistics and Research Methodology
SESP 372-0	Methods of Observing Human Behavior

Practicum—4 units¹

SESP 382-0	Practicum in Human Development; Learning Sciences
or SESP 384-0	Practicum in Human Development - Washington, D.C.
or SESP 386-0	Practicum: Human Development & Psychological Svcs.
or SESP 387-0	Practicum: Learning & Organizational Change
or SESP 388-0	Practicum: Social Policy
or SESP 389-0	Practicum in Human Development - San Francisco

¹ Practicum course must be in concentration field.

This 4-unit course may be taken either for 1 quarter during the junior year or for nine weeks during the Summer Session before or after the junior year; no fifth unit may be taken concurrently without special permission. At least 2 quarters before registering for the course, students must consult the SESP practicum director regarding procedures and site-placement application materials; for Summer Session practicums, consultation should be scheduled at least 3 quarters in advance.

Distribution Requirements (10 units)

- 2 natural sciences courses
- 2 formal studies courses (mathematics, logic, etc.)
- 2 historical studies courses
- 2 ethics and values courses (philosophy, religion, etc.)
- 2 literature and fine arts courses

Selected courses from Weinberg College and professional schools across the University may be used to fulfill distribution requirements with the consent of the student's adviser and the SESP assistant dean for student affairs.

Electives (8 units)

Courses from any school across the University may be used to fulfill elective requirements. 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

sesp.northwestern.edu/ugrad/learning-and-organizational-change

Students who are interested in such fields as management, consulting, change management, training, design of knowledge systems, and human resources in for-profit and not-for-profit organizations normally enter the learning and organizational change concentration. They combine core coursework 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.

Program of Study

- Learning and Organizational Change Major (p. 102)

LOC 211-0 Intro to Organization Theory & Practice (1 Unit) Examines major organizational behavior theories and practices through organizational analysis.

LOC 214-0 Culture and Cognition (1 Unit) Research and theory on the interrelatedness of culture and thought. Combined with LRN_SCI 214-0; may not receive credit for both courses.

LOC 214-BR Culture and Cognition (1 Unit) Research and theory on the interrelatedness of culture and thought. Combined with LRN_SCI 214-0; may not receive credit for both courses.

LOC 216-0 Introduction to Organizational Learning (1 Unit) Looks at perspectives on learning across levels from individuals to groups to organizations. The goal of the course is to set the foundation for comparing and contrasting different views of learning and making assessments of how each permit us to understand individual and collective processes and outcomes. The course emphasizes explanation, design, and critique through a combination of case analyses, primary empirical research, and project-based learning.

LOC 306-0 Studies in Organizational Change (1 Unit) Examines theories and methods of organizational change through analysis of organizational adaptations; applies theories from learning sciences and organizational behavior.

LOC 308-0 Redesigning Everyday Organizations (1 Unit) Concepts and methods for understanding and studying cognition and learning and putting these concepts and methods to use in a design/change project. Taught with LRN_SCI 308-0; may not receive credit for both courses.

LOC 310-0 Learning Organizations for Complex Environments (1 Unit) Major change factors, including technology, globalization, and demographics, and their impact on organizations; how organizations are creating and responding to these changes through organizational design, learning systems, and human resource changes.

LOC 311-0 Tools for Organizational Analysis (1 Unit) Understanding cause-and-effect relationships pertaining to organizational behavior and performance.

LOC 313-0 Learning and Thinking in Organizations (1 Unit) Examines how human learning and thinking can facilitate organizational growth and change through methods such as instructional design, modeling, and evaluation of learning outcomes.

LOC 346-0 Psychology of Technology & Instructional Design (1 Unit) Introduction to theory and practice in the development of technologies for formal and informal learning in the classroom, workplace, and everyday world.

LOC 351-0 Topics in Learning and Organizational Change (1 Unit) Advanced work on special topics.

LOC 391-0 Organizational Planning & Analysis (1 Unit) Culminating experience involving application of knowledge and skills to analyze real-world problems and solutions in learning and organizational change.

SESP 114-0 Summer Internship (0 Unit)

SESP 115-0 Internship (0 Unit)

SESP 195-1 Community Engagement (0.5 Unit) Critical reflection on community engagement experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community. For Certificate in Civic Engagement students only.

SESP 195-2 Community Engagement (0.5 Unit) Critical reflection on community engagement experiences in relation to broader societal

issues. Conceptual frameworks for understanding the meaning and nature of community. For Certificate in Civic Engagement students only.

SESP 201-0 Human Development: Childhood and Adolescence (1 Unit) Personal, social, and cognitive development from birth through adolescence. Interplay of biological and experiential factors on linguistic and conceptual development, ego, and personality.

SESP 202-0 Introduction to Community Development (1 Unit) 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 (1 Unit) 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 (1 Unit) 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 291-1 Peer-Led Learning: Theory and Practice (0.25 Unit) SESP 291 is the training program for students working as first-time mentors in the Peer Leaders program. It is taken over two academic quarters, with each quarter offering .25 credit (a total of .5 credit). You will receive a "K" grade for fall quarter, which means you are continuing in the course. After winter quarter, you will receive a letter grade which will be retroactively applied to fall quarter.

SESP 291-2 Peer-Led Learning: Theory and Practice (0.25 Unit)

SESP 295-0 Theory and Practice of Community Consulting (1 Unit) Course on the importance of community capacity building and the community-consulting process; start of preliminary work for the Certificate in Civic Engagement capstone project.

SESP 298-0 Student Organized Seminar (1 Unit) Courses proposed by students and supervised by faculty sponsors on special topics approved by the SESP undergraduate education director. May be taken only once per quarter; pass/ no credit only. Consultation with the SESP student affairs assistant dean advised.

SESP 299-1 Civic Engagement Capstone Research (1 Unit) Independent study courses leading to completion of the Certificate in Civic Engagement capstone project.

SESP 299-2 Certificate in Civic Engagement- Capstone Project (1 Unit) Independent study courses leading to completion of the Certificate in Civic Engagement capstone project.

SESP 303-0 Designing for Social Change (1 Unit) Processes, challenges, and ethics of designing programs, at home and abroad, for realizing human rights and meaningful social change.

SESP 317-0 Gender and the Life Course (1 Unit) How gender influences major life stages. Focus on the psychosocial effects of gender on children; young, midlife, and old adults; societal institutions; and selected social policy issues.

SESP 320-0 Race and Education (1 Unit) Conceptual underpinnings of the construct of race and how conceptions of race have influenced the course of education in the United States.

SESP 351-0 Special Topics (1 Unit) Advanced work on special topics.

SESP 372-0 Methods of Observing Human Behavior (1 Unit) Guided practice in systematic and participant observation. Observer bias, field notes, unobtrusive measures.

SESP 382-0 Practicum in Human Development; Learning Sciences (4 Units) Real-world participant observation in professional activities and projects; development of analytical field studies of the practicum experience based on field notes, recorded observations, and class discussions; culminates in a final research paper. For LRN SCI students only. Prerequisites: SESP 372-0; consent of SESP practicum director 2 quarters before registration (3 quarters if a Summer Session practicum).

SESP 384-0 Practicum in Human Development - Washington, D.C. (4 Units) See description for SESP 382-0. Offered during Summer Session only. For participants in the Washington, DC, field studies program only. Prerequisites: SESP 372-0; consent of SESP practicum director 3 quarters before registration.

SESP 386-0 Practicum: Human Development & Psychological Svcs. (4 Units) See description and prerequisites for SESP 382-0. For HDPS students only.

SESP 387-0 Practicum: Learning & Organizational Change (4 Units) See description and prerequisites for SESP 382-0. For LOC students only.

SESP 388-0 Practicum: Social Policy (4 Units) See description and prerequisites for SESP 382-0. For SOC POL students only.

SESP 389-0 Practicum in Human Development - San Francisco (4 Units) See description and prerequisites for SESP 382-0. Offered during Summer Session only. For participants in the San Francisco field studies program only.

SESP 390-0 Research Apprenticeship (1 Unit) Opportunity to participate in faculty research projects. Prerequisites: consent of the faculty member and the SESP assistant dean for student affairs; submission of completed Request for Independent Study/Special Courses Form at registration.

SESP 391-0 Advanced Research Methods (1 Unit) Overview of research methods that may be used to design and implement the honors thesis. Prerequisites: SESP 210-0 and SESP 372-0 recommended.

SESP 398-0 Honors Thesis (1 Unit) Students develop, design, implement, and evaluate a research project under a faculty adviser's guidance. Prerequisites: senior status; cumulative GPA by the end of winter quarter of the junior year; recommendation for the honors program from SESP 391-0 instructor(s); consent of program director.

SESP 399-0 Independent Study (1 Unit) Faculty-supervised study of special topics of the student's own choosing and not covered in regular courses. Prerequisites: consent of the supervising faculty member(s) and the SESP assistant dean for student affairs; submission of completed Request for Independent Study/Special Courses Form at registration.

Learning and Organizational Change Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Concentration Program—16 units

Course	Title
Required Courses (7 units)	
LOC 211-0	Intro to Organization Theory & Practice
LOC 306-0	Studies in Organizational Change
LOC 216-0	Introduction to Organizational Learning
1 course for the Sociocultural cluster from:	
LOC 214-0	Culture and Cognition
LOC 308-0	Redesigning Everyday Organizations
1 course for the Cognitive Psychology cluster from:	
LRN_SCI 201-0	Cognition and Action
LOC 313-0	Learning and Thinking in Organizations
1 course for the Organizational Design cluster from:	
LOC 346-0	Psychology of Technology & Instructional Design
LRN_SCI 301-0	Design of Learning Environments
SESP 303-0	Designing for Social Change
LOC 308-0	Redesigning Everyday Organizations
1 course for the Organizational Analysis cluster from:	
LOC 310-0	Learning Organizations for Complex Environments
LOC 311-0	Tools for Organizational Analysis
LOC 391-0	Organizational Planning & Analysis
LOC 351-0	Topics in Learning and Organizational Change (Modern Organizations and Innovation or Team Dynamics)
SOC_POL 312-0	Social Policymaking and Implementation

Concentration Courses (9 units)

Must be selected from an approved list of courses in LOC, other SESP concentrations, and disciplines such as cognitive science, communication studies, computer science, economics, psychology, and sociology. Must include at least 4 courses at the 300 level. Up to 3 units of SESP 390-0 Research Apprenticeship or SESP 399-0 Independent Study and 3 units of SESP 398-0 Honors Thesis may be counted toward this requirement.

Students who are interested in the business field are encouraged to take 3 or more units in economics, business institutions, computer science, industrial engineering, or a foreign language for example, Economics (e.g., ECON 201-0 Introduction to Macroeconomics, ECON 202-0 Introduction to Microeconomics), business institutions (e.g., BUS_INST 301-0 Accounting).

SESP Core (8 units)

Course	Title
Basic courses—2 units	
SESP 201-0	Human Development: Childhood and Adolescence
or SESP 203-0	Human Development: Adulthood and Aging
1 inequality and diversity issues course, chosen from:	
LRN_SCI 202-0	Culture, Language, & Identity
LOC 214-0	Culture and Cognition
SESP 317-0	Gender and the Life Course
SESP 320-0	Race and Education
TEACH_ED 302-0	Social Contexts of Education
or an approved equivalent	
Research methods—2 units	
SESP 210-0	Introduction to Statistics and Research Methodology
SESP 372-0	Methods of Observing Human Behavior
Practicum—4 units ¹	
SESP 382-0	Practicum in Human Development; Learning Sciences
or SESP 384-0	Practicum in Human Development - Washington, D.C.
or SESP 386-0	Practicum: Human Development & Psychological Svcs.
or SESP 387-0	Practicum: Learning & Organizational Change

or SESP 388-0	Practicum: Social Policy
or SESP 389-0	Practicum in Human Development - San Francisco

¹ Practicum course must be in concentration field.

This 4-unit course may be taken either for 1 quarter during the junior year or for nine weeks during the Summer Session before or after the junior year; no fifth unit may be taken concurrently without special permission. At least 2 quarters before registering for the course, students must consult the SESP practicum director regarding procedures and site-placement application materials; for Summer Session practicums, consultation should be scheduled at least 3 quarters in advance.

Distribution Requirements (10 units)

- 2 natural sciences courses
- 2 formal studies courses (mathematics, logic, etc.)
- 2 historical studies courses
- 2 ethics and values courses (philosophy, religion, etc.)
- 2 literature and fine arts courses

Selected courses from Weinberg College and professional schools across the University may be used to fulfill distribution requirements with the consent of the student's adviser and the SESP assistant dean for student affairs.

Electives (8 units)

Courses from any school across the University may be used to fulfill elective requirements. 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 Sciences

sesp.northwestern.edu/ugrad/learning-sciences.html

The Learning Sciences concentration involves understanding and promoting learning in a wide range of social contexts. Students learn about the most up-to-date theories of learning and applied design, including new technologies, learning environments, curriculum, social arrangements, and space. Learning Sciences is an appropriate academic choice for students who are interested in education technology, instructional design, museum education, educational research, curriculum design, and workplace learning. Courses examine the role of social and cultural contexts in learning, cognition and the processes through which individual learning takes place, and design and evaluation of learning environments using a variety of tools, techniques, and theoretical perspectives. Students choose interdisciplinary courses from anthropology, linguistics, education, computer science, psychology, and cognitive science. Students must choose one specialization: learning in schools, out-of-school learning, or design of learning environments. Students are strongly encouraged to develop a senior-year capstone project based on one or more learning sciences courses.

Program of Study

- Learning Sciences Major (p. 105)

LRN_SCI 201-0 Cognition and Action (1 Unit) Perspectives on thinking and learning; how individuals reason and accomplish tasks, both on their own and in interaction with each other and with their immediate environments.

LRN_SCI 202-0 Culture, Language, & Identity (1 Unit) Social and cultural dimensions of learning, particularly how diverse linguistic and cultural tools mediate forms of identity, learning experiences, and participation in and transformation of social life.

LRN_SCI 214-0 Culture and Cognition (1 Unit) Explore the cultural ground of cognition. How do cultural environments structure and orient our conceptual knowledge, and how do these cognitive processes feedback into cultural systems? Key topics include conceptual development, knowledge organization, causal reasoning, moral psychology, and environmental psychology. Jointly, the topics are integrated through a focus on social and ecological thought. We will engage in cultural artifact analyses, field experiences, and research inquiries.

LRN_SCI 301-0 Design of Learning Environments (1 Unit) Conceiving, building, and testing products and services to help people learn. Topics include the human-centered design process, principles for designing learning environments, and agile project management and communication techniques.

LRN_SCI 302-0 Social Contexts of Education (1 Unit) 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, particularly in urban settings. How participation in these socializing settings molds the development of individuals' capacities and forms their goals. Combined with TEACH_ED 302-0; may not receive credit for both courses.

LRN_SCI 304-0 Intro to Schooling in Communities (1 Unit) Action research methods-including observation/field notes, interviewing, and artifact analysis-as means to understanding how schools work and how theory and practice relate. Includes 30 hours of field experience. Combined with TEACH_ED 304-0; may not receive credit for both courses.

LRN_SCI 306-0 Learning with New Media (1 Unit) Examines ways to study and learn from social media spaces and how digital platforms shape presentation of content and information sharing practices.

LRN_SCI 307-0 Designing Interactive Media and Technology for Learning (1 Unit) Building on theory in the learning sciences and a broad set of multimodal technological tools, students develop and test a collection of learning technologies and examine ways to assess the educational impact of their inventions. Prerequisite: EECS 110-0 or permission of instructor.

LRN_SCI 308-0 Cognition in Context (1 Unit) Concepts and methods for understanding and studying cognition and learning and putting these concepts and methods to use in a design/ change project. Combined with LOC 308-0; may not receive credit for both courses.

LRN_SCI 313-0 Tangible Interaction Design and Learning (1 Unit) Explores the use of tangible interaction to create innovative learning experiences, including distributed cognition, embodied interaction, cultural forms, and design frameworks. Combined with EECS 313-0; may not receive credit for both courses. Prerequisite: EECS 110-0.

LRN_SCI 338-0 Learning and Teaching with Technology (1 Unit) Theory and practice of designing school environments that integrate new technologies and media. Combined with TEACH_ED 338-0; may not receive credit for both courses.

LRN_SCI 351-0 Topics in Learning Sciences (1 Unit)

LRN_SCI 372-0 Designing and Constructing Models with Multi-agent Languages (1 Unit) Exploration and analysis of multi-agent models, which simulate "emergent" scientific phenomena in a wide variety of content domains. Combined with EECS 372-0; may not receive credit for both courses.

SESP 114-0 Summer Internship (0 Unit)

SESP 115-0 Internship (0 Unit)

SESP 195-1 Community Engagement (0.5 Unit) Critical reflection on community engagement experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community. For Certificate in Civic Engagement students only.

SESP 195-2 Community Engagement (0.5 Unit) Critical reflection on community engagement experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community. For Certificate in Civic Engagement students only.

SESP 201-0 Human Development: Childhood and Adolescence (1 Unit) Personal, social, and cognitive development from birth through adolescence. Interplay of biological and experiential factors on linguistic and conceptual development, ego, and personality.

SESP 202-0 Introduction to Community Development (1 Unit) 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 (1 Unit) 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 (1 Unit) 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 291-1 Peer-Led Learning: Theory and Practice (0.25 Unit) SESP 291 is the training program for students working as first-time mentors in the Peer Leaders program. It is taken over two academic quarters, with each quarter offering .25 credit (a total of .5 credit). You will receive a "K" grade for fall quarter, which means you are continuing in the course. After winter quarter, you will receive a letter grade which will be retroactively applied to fall quarter.

SESP 291-2 Peer-Led Learning: Theory and Practice (0.25 Unit)

SESP 295-0 Theory and Practice of Community Consulting (1 Unit) Course on the importance of community capacity building and the community-consulting process; start of preliminary work for the Certificate in Civic Engagement capstone project.

SESP 298-0 Student Organized Seminar (1 Unit) Courses proposed by students and supervised by faculty sponsors on special topics approved by the SESP undergraduate education director. May be taken only once per quarter; pass/ no credit only. Consultation with the SESP student affairs assistant dean advised.

SESP 299-1 Civic Engagement Capstone Research (1 Unit) Independent study courses leading to completion of the Certificate in Civic Engagement capstone project.

SESP 299-2 Certificate in Civic Engagement- Capstone Project (1 Unit)

Independent study courses leading to completion of the Certificate in Civic Engagement capstone project.

SESP 303-0 Designing for Social Change (1 Unit) Processes, challenges, and ethics of designing programs, at home and abroad, for realizing human rights and meaningful social change.

SESP 317-0 Gender and the Life Course (1 Unit) How gender influences major life stages. Focus on the psychosocial effects of gender on children; young, midlife, and old adults; societal institutions; and selected social policy issues.

SESP 320-0 Race and Education (1 Unit) Conceptual underpinnings of the construct of race and how conceptions of race have influenced the course of education in the United States.

SESP 351-0 Special Topics (1 Unit) Advanced work on special topics.

SESP 372-0 Methods of Observing Human Behavior (1 Unit) Guided practice in systematic and participant observation. Observer bias, field notes, unobtrusive measures.

SESP 382-0 Practicum in Human Development; Learning Sciences (4 Units) Real-world participant observation in professional activities and projects; development of analytical field studies of the practicum experience based on field notes, recorded observations, and class discussions; culminates in a final research paper. For LRN SCI students only. Prerequisites: SESP 372-0; consent of SESP practicum director 2 quarters before registration (3 quarters if a Summer Session practicum).

SESP 384-0 Practicum in Human Development - Washington, D.C. (4 Units) See description for SESP 382-0. Offered during Summer Session only. For participants in the Washington, DC, field studies program only. Prerequisites: SESP 372-0; consent of SESP practicum director 3 quarters before registration.

SESP 386-0 Practicum: Human Development & Psychological Svcs. (4 Units) See description and prerequisites for SESP 382-0. For HDPS students only.

SESP 387-0 Practicum: Learning & Organizational Change (4 Units) See description and prerequisites for SESP 382-0. For LOC students only.

SESP 388-0 Practicum: Social Policy (4 Units) See description and prerequisites for SESP 382-0. For SOC POL students only.

SESP 389-0 Practicum in Human Development - San Francisco (4 Units) See description and prerequisites for SESP 382-0. Offered during Summer Session only. For participants in the San Francisco field studies program only.

SESP 390-0 Research Apprenticeship (1 Unit) Opportunity to participate in faculty research projects. Prerequisites: consent of the faculty member and the SESP assistant dean for student affairs; submission of completed Request for Independent Study/Special Courses Form at registration.

SESP 391-0 Advanced Research Methods (1 Unit) Overview of research methods that may be used to design and implement the honors thesis. Prerequisites: SESP 210-0 and SESP 372-0 recommended.

SESP 398-0 Honors Thesis (1 Unit) Students develop, design, implement, and evaluate a research project under a faculty adviser's guidance. Prerequisites: senior status; cumulative GPA by the end of

winter quarter of the junior year; recommendation for the honors program from SESP 391-0 instructor(s); consent of program director.

SESP 399-0 Independent Study (1 Unit) Faculty-supervised study of special topics of the student's own choosing and not covered in regular courses. Prerequisites: consent of the supervising faculty member(s) and the SESP assistant dean for student affairs; submission of completed Request for Independent Study/Special Courses Form at registration.

Learning Sciences Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Concentration Program—16 units

Course	Title
Required Courses (9 units)	
LRN_SCI 201-0	Cognition and Action
LRN_SCI 202-0	Culture, Language, & Identity
LRN_SCI 301-0	Design of Learning Environments
1 course chosen from:	
COG_SCI 207-0	Introduction to Cognitive Modeling
COG_SCI 211-0	Learning, Representation & Reasoning
PSYCH 228-0	Cognitive Psychology
1 course chosen from:	
ANTHRO 215-0	The Study of Culture through Language
LING 220-0	Language and Society
LING 221-0	Language and Prejudice
LING 222-0	Language, Politics, and Identity
LING 223-0	Language and Gender
1 course chosen from:	
LRN_SCI 302-0	Social Contexts of Education
LRN_SCI 304-0	Intro to Schooling in Communities
LRN_SCI 338-0	Learning and Teaching with Technology
1 course chosen from:	
LRN_SCI 214-0	Culture and Cognition
LRN_SCI 306-0	Learning with New Media
LRN_SCI 308-0	Cognition in Context
1 course chosen from:	
SESP 303-0	Designing for Social Change
LRN_SCI 307-0	Designing Interactive Media and Technology for Learning
LRN_SCI 313-0	Tangible Interaction Design and Learning
LRN_SCI 372-0	Designing and Constructing Models with Multi-agent Languages
1 additional course in student's specialization	
Concentration Courses (7 units)	
Must be selected from an approved list of courses in learning sciences, other SESP concentrations, and disciplines such as anthropology, communication studies, computer science, design, linguistics, and psychology. Must include at least 3 courses at the 300 level. Up to 3 units of SESP 390-0 Research Apprenticeship or SESP 399-0 Independent Study and 3 units of SESP 398-0 Honors Thesis may be counted toward this requirement.	
SESP Core (8 units)	
Course	Title
Basic courses—2 units	
SESP 201-0	Human Development: Childhood and Adolescence
or SESP 203-0	Human Development: Adulthood and Aging

1 inequality and diversity issues course, chosen from:

LRN_SCI 202-0	Culture, Language, & Identity
LOC 214-0	Culture and Cognition
SESP 317-0	Gender and the Life Course
SESP 320-0	Race and Education
TEACH_ED 302-0	Social Contexts of Education
or an approved equivalent	

Research methods—2 units

SESP 210-0	Introduction to Statistics and Research Methodology
SESP 372-0	Methods of Observing Human Behavior

Practicum—4 units¹

SESP 382-0	Practicum in Human Development; Learning Sciences
or SESP 384-0	Practicum in Human Development - Washington, D.C.
or SESP 386-0	Practicum: Human Development & Psychological Svcs.
or SESP 387-0	Practicum: Learning & Organizational Change
or SESP 388-0	Practicum: Social Policy
or SESP 389-0	Practicum in Human Development - San Francisco

¹ Practicum course must be in concentration field.

This 4-unit course may be taken either for 1 quarter during the junior year or for nine weeks during the Summer Session before or after the junior year; no fifth unit may be taken concurrently without special permission. At least 2 quarters before registering for the course, students must consult the SESP practicum director regarding procedures and site-placement application materials; for Summer Session practicums, consultation should be scheduled at least 3 quarters in advance.

Distribution Requirements (10 units)

- 2 natural sciences courses
- 2 formal studies courses (mathematics, logic, etc.)
- 2 historical studies courses
- 2 ethics and values courses (philosophy, religion, etc.)
- 2 literature and fine arts courses

Selected courses from Weinberg College and professional schools across the University may be used to fulfill distribution requirements with the consent of the student's adviser and the SESP assistant dean for student affairs.

Electives (8 units)

Courses from any school across the University may be used to fulfill elective requirements. 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.northwestern.edu/ugrad/secondary-teaching

SESP's interdisciplinary secondary teaching concentration combines subject-area courses in a chosen field from Weinberg College—biological sciences, chemistry, economics, English, foreign languages (French, Latin, or Spanish), history, mathematics, physics, political science, or sociology—with courses in child and adolescent development, education theory and methods, and urban education. The program leads to an Illinois Professional Educator license as well as a bachelor of science and social policy degree. The degree is 42 units.

Similar to the other SESP concentrations, which have a four unit practicum in the junior year, secondary teaching students must complete a one-quarter student teaching internship in the *senior* year while enrolled in TEACH_ED 388-0 Student Teaching: Humanities or TEACH_ED 389-0 Student Teaching Seminar: Math/Science.

Weinberg College students who wish to pursue secondary teaching licensure must apply to the program by the fall of junior year and complete the requirements of the secondary teaching concentration. They also must complete the degree requirements of Weinberg College.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Total requirements—42 units

Distribution requirements—11 units

Professional core—12 units

Teaching subject-area requirements—varies

Electives—7 or fewer as needed to complete the 42-unit degree requirement

Distribution Requirements (11 units)

- 1 oral communication course
- 2 natural sciences courses
- 2 formal studies courses (mathematics, logic, etc.)
- 2 historical studies courses
- 2 ethics and values courses (TEACH_ED 302-0 Social Contexts of Education will count as 1 of these)
- 2 literature and fine arts courses

Selected courses from Weinberg College and professional schools across the University fulfill distribution requirements.

Professional Core (13 units)

Course	Title
SESP 201-0	Human Development: Childhood and Adolescence ¹
TEACH_ED 302-0	Social Contexts of Education
TEACH_ED 304-0	Seminar on Teaching: Introduction to Schooling in Communities
TEACH_ED 310-0	Foundations of Learning in a New Language
TEACH_ED 322-0	Content Area Reading and Writing
TEACH_ED 327-0	Educating Exceptional Children
1 methods and techniques course chosen from:	
TEACH_ED 355-0	Methods & Techniques: World Languages
TEACH_ED 356-0	Methods & Techniques: English
TEACH_ED 357-0	Methods and Techniques: Secondary Mathematics
TEACH_ED 358-0	Methods and Techniques: Science
TEACH_ED 359-0	Methods & Techniques: Social Science

1 middle grades methods course chosen from:

TEACH_ED 366-0	Middle Grades Methods & Techniques of Teaching: English
TEACH_ED 367-0	Middle Grades Methods & Techniques of Teaching: Mathematics
TEACH_ED 368-0	Middle Grades Methods & Techniques of Teaching: Science
TEACH_ED 369-0	Middle Grades Methods & Techniques of Teaching: Social Sciences

1 practicum/seminar:

TEACH_ED 378-0	Theory and Practice of Teaching: Secondary Humanities
or TEACH_ED 379-0	Theory and Practice of Teaching: Secondary Math/Science

1 student teaching seminar (4 units):

TEACH_ED 388-0	Student Teaching: Humanities
or TEACH_ED 389-0	Student Teaching Seminar: Math/Science

¹ PSYCH 218-0 Developmental Psychology for non-SESP students

Teaching Subject–Area Requirements (12–20.72 units)

Specific teaching subject–area courses prepare students to meet the requirements of the Illinois State Board of Education. Teaching subject–area requirements may differ from those of a departmental major, and departmental course offerings change frequently. Secondary teaching candidates must meet regularly with the secondary teaching adviser to ensure that requirements are met. In the event that courses listed here are no longer offered by the departments, suitable replacements will be found. Students are also responsible for any prerequisites.

Biological and Physical Sciences

Biological Sciences (20.72 units)

Course **Title**

7 core science courses plus labs:

ASTRON 101-0	Modern Cosmology
or ASTRON 120-0	Highlights of Astronomy
or ASTRON 220-0	Introduction to Astrophysics
BIOL_SCI 215-0	Genetics and Molecular Biology
CHEM 110-0	Quantitative Problem Solving in Chemistry
or CHEM 171-0 & CHEM 181-0	Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory
EARTH 201-0	Earth Systems Revealed
PHYSICS 130-1 & PHYSICS 130-2 & PHYSICS 130-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3	College Physics and College Physics and College Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory
or PHYSICS 135-1 & PHYSICS 135-2 & PHYSICS 135-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3	General Physics and General Physics and General Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory

4 additional chemistry courses and required labs.

CHEM 131-0 & CHEM 141-0	General Chemistry 1 and General Chemistry Laboratory 1
CHEM 132-0 & CHEM 142-0	General Chemistry 2 and General Chemistry Laboratory 2
CHEM 210-1	Organic Chemistry
CHEM 210-2	Organic Chemistry

10 additional biological sciences courses:

BIOL_SCI 217-0	Physiology
BIOL_SCI 219-0	Cell Biology
BIOL_SCI 220-0	Genetics and Molecular Processes Laboratory
BIOL_SCI 221-0	Cellular Processes Laboratory
BIOL_SCI 222-0	Investigative Laboratory

BIOL_SCI 308-0	Biochemistry
1 chosen from:	
BIOL_SCI 341-0	Population Genetics
BIOL_SCI 342-0	Evolutionary Processes
BIOL_SCI 391-0	Development and Evolution of Body Plans
1 chosen from:	
BIOL_SCI 330-0	Plant Biology
BIOL_SCI 334-0	Soils and the Environment: The Earth's Critical Zone
BIOL_SCI 336-0	Spring Flora
BIOL_SCI 339-0	Critical Topics in Ecology and Conservation
BIOL_SCI 347-0	Conservation Biology
BIOL_SCI 349-0	Plant Community Ecology
BIOL_SCI 350-0	Plant Evolution and Diversity Lab

2 additional 300-level biological sciences courses (SESP students) ¹

¹ For *Weinberg College students*: additional courses as needed to meet requirements for the major.

- Students must meet the math prerequisites for science courses, including but not limited to MATH 220-0 Differential Calculus of One-Variable Functions, MATH 224-0 Integral Calculus of One-Variable Functions, and statistics.

Chemistry (19.38 units)

Course **Title**

7 core science courses plus labs:

ASTRON 101-0	Modern Cosmology
or ASTRON 120-0	Highlights of Astronomy
or ASTRON 220-0	Introduction to Astrophysics
BIOL_SCI 164-0	Genetics and Evolution
or BIOL_SCI 215-0	Genetics and Molecular Biology
CHEM 110-0	Quantitative Problem Solving in Chemistry
or CHEM 171-0 & CHEM 181-0	Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory
EARTH 201-0	Earth Systems Revealed
PHYSICS 135-1 & PHYSICS 135-2 & PHYSICS 135-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3	General Physics and General Physics and General Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory

10 additional chemistry courses and required labs:

CHEM 131-0 & CHEM 141-0	General Chemistry 1 and General Chemistry Laboratory 1
or CHEM 172-0 & CHEM 182-0	Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory
CHEM 132-0 & CHEM 142-0	General Chemistry 2 and General Chemistry Laboratory 2
CHEM 210-1	Organic Chemistry
CHEM 210-2 & CHEM 230-2	Organic Chemistry and Organic Chemistry Lab I
CHEM 210-3 & CHEM 230-3	Organic Chemistry and Organic Chemistry Lab II
CHEM 220-0	Introductory Instrumental Analysis
CHEM 342-1	Thermodynamics

3 additional 300-level chemistry courses, including at least 1 from:

CHEM 333-0	Inorganic Chemistry
CHEM 342-2	Quantum Mechanics and Spectroscopy
CHEM 342-3	Kinetics and Statistical Thermodynamics

CHEM 350-1	Advanced Laboratory 1
CHEM 350-2	Advanced Laboratory 2
CHEM 350-3	Advanced Laboratory 3
CHEM 393-0	Green Chemistry

- Students must meet the math prerequisites for science courses.

Physics (15.02 units)

Course	Title
7 core science courses:	
ASTRON 101-0	Modern Cosmology
or ASTRON 120-0	Highlights of Astronomy
or ASTRON 220-0	Introduction to Astrophysics
BIOL_SCI 164-0	Genetics and Evolution
or BIOL_SCI 215-0	Genetics and Molecular Biology
CHEM 110-0	Quantitative Problem Solving in Chemistry
or CHEM 171-0	Advanced General Inorganic Chemistry
& CHEM 181-0	and Advanced General Inorganic Chemistry Laboratory
EARTH 201-0	Earth Systems Revealed
PHYSICS 135-1	General Physics
& PHYSICS 135-2	and General Physics
& PHYSICS 135-3	and General Physics
& PHYSICS 136-1	and General Physics Laboratory
& PHYSICS 136-2	and General Physics Laboratory
& PHYSICS 136-3	and General Physics Laboratory
4 additional physics courses:	
PHYSICS 239-0	Foundations of Modern Physics
PHYSICS 330-1	Classical Mech
PHYSICS 332-0	Statistical Mechanics
PHYSICS 333-1	Advanced Electricity & Magnetism
3 additional physics including at least 2 at the 300 level	
Students are responsible for all math prerequisites, including:	
MATH 220-0	Differential Calculus of One-Variable Functions
MATH 224-0	Integral Calculus of One-Variable Functions
MATH 230-0	Differential Calculus of Multivariable Functions
MATH 234-0	Multiple Integration and Vector Calculus
MATH 240-0	Linear Algebra
MATH 250-0	Elementary Differential Equations

English

English (13 units)

Course	Title
ENGLISH 210-1	British Literary Traditions
& ENGLISH 210-2	and British Literary Traditions
or ENGLISH 270-1	American Literary Traditions
& ENGLISH 270-2	and American Literary Traditions
ENGLISH 300-0	Seminar in Reading and Interpretation
TEACH_ED 324-0	Critical Issues in Literacy
8 literature courses, including at least 5 at the 300 level:	
2 American literature courses	
2 English literature courses	
4 additional literature courses, including 1 non-Western literature course or US racial minority literature course.	
1 course chosen from:	
LING 220-0	Language and Society
LING 221-0	Language and Prejudice
LING 250-0	Sound Patterns in Human Language
LING 260-0	Formal Analysis of Words & Sentences

LING 270-0	Meaning
LING 311-0	Child Language
LING 321-0	Bilingualism
LING 341-0	Language Typology
LING 342-0	Structure of Various Languages
ENGLISH 206-0	Reading & Writing Poetry
or a poetry course	

Foreign Languages

French (14 units)

Course	Title
At least 12 French language courses, including at least 5 at the 300 level: ¹	
FRENCH 202-0	Writing Workshop: Cultural Encounters in Contemporary France
FRENCH 203-0	Oral Workshop: Individual and Society in France Today
FRENCH 303-0	Advanced Conversation
Up to 3 courses may be chosen from:	
FRENCH 210-0	Reading Literatures in French
FRENCH 211-0	Reading Cultures in French
FRENCH 271-0	Introducing the Novel
FRENCH 272-0	Introducing Theatre
FRENCH 273-0	Introducing Poetry

At least 3 300-level French literature courses, of which at least one must be of non-European French literature.

At least 2 French culture courses.	
TEACH_ED 328-0	Dynamics of Middle School Curriculum
TEACH_ED 329-0	Early Adolescent Development and Intervention

Students must earn a score of upper-intermediate or higher score on the ACTFL OPI for licensure.

¹ Students whose AP score places them out of FRENCH 202-0 Writing Workshop: Cultural Encounters in Contemporary France and FRENCH 203-0 Oral Workshop: Individual and Society in France Today choose additional 200- or 300-level courses for a total of at least 12 French courses.

Latin (14 units)

Course	Title
CLASSICS 211-0	Ancient Athens: Democracy, Drama, Civilization
CLASSICS 212-0	Rome: Culture and Empire
CLASSICS 395-0	Research Seminar
9 additional courses with at least 4 at the 300 level including:	
3 courses in Latin literature (201-3 or higher)	
6 200- or 300-level Latin, Greek, or Classics courses	
TEACH_ED 328-0	Dynamics of Middle School Curriculum
TEACH_ED 329-0	Early Adolescent Development and Intervention

Spanish (14 units)

Course	Title
12 Spanish language, literature, and culture and civilization courses, including at least 5 at the 300 level:	
SPANISH 203-0	Individual and Society through Written Expression (or AP placement) ¹
or SPANISH 207-0	Spanish for Heritage Speakers
SPANISH 204-0	Reading and Writing the Art of Protest
SPANISH 208-0	Spanish and the Community
SPANISH 220-0	Introduction to Literary Analysis
3 literature courses chosen from:	

SPANISH 250-0	Literature in Spain before 1700
SPANISH 251-0	Literature in Spain since 1700
SPANISH 260-0	Literature in Latin America before 1888
SPANISH 261-0	Literature in Latin America since 1888
3 Latin American/Latin-x culture and civilization courses at the 300 level	
2 300-level literature courses taught in Spanish	
TEACH_ED 328-0	Dynamics of Middle School Curriculum
TEACH_ED 329-0	Early Adolescent Development and Intervention
Students must earn a score of upper-intermediate or higher on the ACTFL OPI for licensure.	

- ¹ 1 additional Spanish course if the SPANISH 203-0 Individual and Society through Written Expression or SPANISH 207-0 Spanish for Heritage Speakers prerequisite was met through AP placement

Mathematics

Mathematics (12 units)

Course	Title
12 courses total with 5 at the 300 level. No more than one AP credit may be counted toward the 12.	
6 calculus/analysis courses:	
MATH 220-0	Differential Calculus of One-Variable Functions
MATH 224-0	Integral Calculus of One-Variable Functions
MATH 230-0	Differential Calculus of Multivariable Functions
MATH 234-0	Multiple Integration and Vector Calculus
MATH 240-0	Linear Algebra
MATH 300-0	Foundations of Higher Mathematics
1 probability and statistics course chosen from:	
MATH 310-1	Probability and Stochastic Processes
SESP 210-0	Introduction to Statistics and Research Methodology
STAT 210-0	Introductory Statistics for the Social Sciences
TEACH_ED 373-0	Topics in High School Math (if the topic is statistics and probability.)

- No more than 1 AP credit may be counted toward any of the above requirements.
- Students enrolled in MENU (Mathematical Experience for Northwestern Undergraduates) courses should consult with their SESP advisers to determine course equivalencies.

Social Sciences

History (15 units)

Course	Title
HISTORY 250-1 & HISTORY 250-2	Global History: Early Modern to Modern Transition and Global History: The Modern World
or HISTORY 201-1 & HISTORY 201-2	European Civilization: High Medieval Thru Mid-18th C and European Civilization: Mid-18th C to Present
HISTORY 210-1 & HISTORY 210-2	History of the United States, Precolonial to the Civil War and History of the United States, Reconstruction to the Present

7 additional courses, including at least 5 at the 300 level:

2 non-Western civilization courses such as:	
HISTORY 255-1 & HISTORY 255-2 & HISTORY 255-3	Background to African Civilization and Culture: Origins to 17th C. and Background to African Civilization and Culture: 16th-19th C. and Background to African Civilization and Culture: 1875-1994
HISTORY 270-0	Middle Eastern/Islamic Civilization

HISTORY 281-0	Chinese Civilization
HISTORY 284-1 & HISTORY 284-2	Japanese History, Ancient & Medieval, 200-1600 and Japanese History: Tokugawa Period, 1600-1868
HISTORY 356-1 & HISTORY 356-2	History of South Africa, Early Times to 1879 and History of South Africa, 20th century
HISTORY 357-0	East Africa
HISTORY 358-0	Topics in West African History
HISTORY 366-0	Race and Nation in the Independence Era
HISTORY 367-0	History of Modern Brazil
HISTORY 368-1 & HISTORY 368-2	Revolution in 20th Century Latin America: Mexico and its Revolutions and Revolution in 20th Century Latin America: Marxist Revolutions
HISTORY 369-0	Development and Inequality in Modern Latin America
HISTORY 381-1 & HISTORY 381-2	History of Modern China: Late Imperial China, 1600-1911 and History of Modern China: 1911-present
HISTORY 382-0	The Modern Japanese City
HISTORY 384-1 & HISTORY 384-2	History of Modern Japan: The Modern State, 1860-1943 and History of Modern Japan: War and postwar Japan, 1943-present
HISTORY 385-1	History of Modern South Asia, 1500-1800
approved history courses on non-Western cultures	
2 additional US history courses	
3 additional history courses	

No more than 1 AP credit may be counted toward any of the above requirements

4 courses to meet related core requirements in social sciences; no more than 1 may be met by AP credit:

POLI_SCI 220-0	American Government and Politics
ECON 201-0	Introduction to Macroeconomics
Plus two from the following:	
ANTHRO 211-0	Culture & Society
ECON 202-0	Introduction to Microeconomics
GEOG 313-0	North America
POLI_SCI 240-0	Introduction to International Relations
POLI_SCI 250-0	Introduction to Comparative Politics
PSYCH 110-0	Introduction to Psychology
SOCIOL 110-0	Introduction to Sociology

Economics (17 units)

Course	Title
10 economics courses:	
ECON 201-0	Introduction to Macroeconomics
ECON 202-0	Introduction to Microeconomics
ECON 281-0	Introduction to Applied Econometrics
ECON 310-1 & ECON 310-2	Microeconomics and Microeconomics
ECON 311-0	Macroeconomics
4 additional economics courses	

- SESP students*: complete a minor in US history (7 units)
- Weinberg College students*: economics majors complete a minor in US history (7 units) or 7 history courses, including 4 in US history:

Course	Title
Recommended courses:	
HISTORY 210-1 & HISTORY 210-2	History of the United States, Precolonial to the Civil War and History of the United States, Reconstruction to the Present

HISTORY 250-1 & HISTORY 250-2	Global History: Early Modern to Modern Transition and Global History: The Modern World
or HISTORY 201-1 & HISTORY 201-2	European Civilization: High Medieval Thru Mid-18th C and European Civilization: Mid-18th C to Present

HISTORY 210-1 & HISTORY 210-2	History of the United States, Precolonial to the Civil War and History of the United States, Reconstruction to the Present (recommended)
----------------------------------	---

Political Science (17 units)

Course	Title
10 Political Science courses of which 5 must be at the 300 level:	
POLI_SCI 201-0	Introduction to Political Theory
POLI_SCI 220-0	American Government and Politics
POLI_SCI 240-0	Introduction to International Relations
POLI_SCI 250-0	Introduction to Comparative Politics
1 course in methodology chosen from:	
POLI_SCI 210-0	Introduction to Empirical Methods in Political Science
POLI_SCI 310-0	Methods of Political Inference
POLI_SCI 311-0	Logics of Political Inquiry
POLI_SCI 312-0	Statistical Research Methods
5 additional courses	

- *SESP students*: complete a minor in history (7 units)
- *Weinberg College students*: political science majors complete a minor in US history (7 units) or take 7 history courses, including 4 in US history:

Course	Title
<i>Recommended courses:</i>	
HISTORY 250-1 & HISTORY 250-2	Global History: Early Modern to Modern Transition and Global History: The Modern World
or HISTORY 201-1 & HISTORY 201-2	European Civilization: High Medieval Thru Mid-18th C and European Civilization: Mid-18th C to Present
HISTORY 210-1 & HISTORY 210-2	History of the United States, Precolonial to the Civil War and History of the United States, Reconstruction to the Present

Sociology (17 units)

Course	Title
10 courses:	
ANTHRO 105-0 or ANTHRO 211-0	Evolution and Social Behavior: The Basics Culture & Society
SOCIO 110-0	Introduction to Sociology
SOCIO 226-0	Sociological Analysis
SOCIO 303-0 or SOCIO 329-0	Analysis and Interpretation of Social Data Field Research and Methods of Data Collection
SOCIO 306-0	Sociological Theory
5 additional sociology courses, including at least 3 at the 300 level. Up to 2 anthropology courses may be substituted with permission.	

- *SESP students*: complete a minor in U S history (7 units)
- *Weinberg College students*: sociology majors complete a minor in history (7 units) or take 7 history courses, including 4 in US history:

Course	Title
Recommended courses include:	
HISTORY 250-1 & HISTORY 250-2	Global History: Early Modern to Modern Transition and Global History: The Modern World
or HISTORY 201-1 & HISTORY 201-2	European Civilization: High Medieval Thru Mid-18th C and European Civilization: Mid-18th C to Present

Electives (varies)

Additional units of elective coursework must be taken to complete the 42-unit degree requirement. Students are encouraged to discuss their elective plans with the teacher certification manager.

Teacher Preparation Program

Students who wish to be licensed as teachers must apply to the SESP Teacher Preparation Program. This program is approved by the Illinois State Teacher Certification Board. Completion of the courses alone does not result in licensure, nor is licensure required for completion of the SESP degree.

Application and Admission

Students apply to the Teacher Preparation Program when enrolled in TEACH_ED 304-0 Seminar on Teaching: Introduction to Schooling in Communities or by the fall of the junior year. To be admitted, they must have received a passing score on the Illinois Certification Testing System (ICTS) Test of Academic Proficiency and have a minimum overall GPA of 2.5 and a minimum GPA of 3.0 in a humanities teaching subject–area course or an annually calculated and determined GPA in math or science subject-areas. Students must be eligible for entrance to the program no later than the end of fall quarter of the junior year. Students are required to attend meetings about the process.

Clinical Experience

Students in the Teacher Preparation Program complete three clinical experiences: a 30-hour nonschool experience (as part of TEACH_ED 304-0 Seminar on Teaching: Introduction to Schooling in Communities); a 100-hour school practicum (typically during fall of the senior year); and student teaching (typically during winter of the senior year).

To be eligible for the 100-hour practicum, students must have met the GPA requirements for and been admitted to the Teacher Preparation Program and be on track to have completed a minimum of 9 courses in the teaching subject area by the end of the practicum term in order to be placed. Those meeting these requirements will be placed with a department or teacher mentor at a local school.

Clinical experiences gained at the site are central to the discussion of methods and theories in the practicum seminar (TEACH_ED 378-0 Theory and Practice of Teaching: Secondary Humanities or TEACH_ED 379-0 Theory and Practice of Teaching: Secondary Math/Science) and methodology courses (TEACH_ED 355-0 Methods & Techniques: World Languages–TEACH_ED 359-0 Methods & Techniques: Social Science).

To be eligible for student teaching, students must have successfully completed the applicable TEACH_ED 355-0 Methods & Techniques: World Languages–TEACH_ED 359-0 Methods & Techniques: Social Science course(s) as well as TEACH_ED 378-0 Theory and Practice of Teaching: Secondary Humanities or TEACH_ED 379-0 Theory and Practice of Teaching: Secondary Math/Science, earned a passing score on the applicable ICTS Content-Area Test, fulfilled minimum GPA requirements for student teaching, completed 9 teaching subject–area courses and have been recommended for continuation to student teaching. Most school districts also require a criminal background check.

Student teaching involves full-time placement in a local school for the entire quarter. Teacher candidates attend an evening seminar (TEACH_ED 388-0 Student Teaching: Humanities or TEACH_ED 389-0 Student Teaching Seminar: Math/Science). The internship and seminar together earn 4 units. No other courses are taken concurrently. Teacher candidates are evaluated by their school mentor, a Northwestern supervisor, and the seminar instructor.

Other Licensure Requirements

In addition to successful completion of student teaching, all teacher candidates must successfully complete the state-mandated performance assessment, edTPA.

Foreign language teacher candidates other than those in Latin are required to complete the Oral Proficiency Interview of the American Council on the Teaching of Foreign Languages with a rating of upper-intermediate-high or better.

Recommendation for Licensure

Students are recommended for licensure when they successfully complete degree requirements, earn a rating of recommendation for licensure for student teaching and pass all outside tests as noted above. Although legal requirements for licensure vary from state to state, the SESP Teacher Preparation Program is flexible enough to permit students who plan carefully to complete provisional requirements for most states. As it is easier to obtain a teaching license in another state through reciprocity than through independent certification, all students who complete the program are encouraged to apply for an Illinois license before leaving the state.

Students should apply for the license immediately upon graduation. Teacher Preparation Program graduates who are recommended but do not apply for certification upon graduation may not be eligible for certification at a later date due to changes in state requirements.

The Illinois School Code has provided that school districts may not knowingly employ individuals who have been convicted of certain offenses (principally those related to sex or drugs). All Illinois school districts require applicants to submit to a criminal background check.

TEACH_ED 302-0 Social Contexts of Education (1 Unit) 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, particularly in urban settings. How participation in these socializing settings molds the development of individuals' capacities and forms their goals. Taught with LRN_SCI 302-0; may not receive credit for both courses.

TEACH_ED 304-0 Seminar on Teaching: Introduction to Schooling in Communities (1 Unit) Action research methods- including observation/field notes, interviewing, and artifact analysis-as means to understanding how schools work and how theory and practice relate. Includes 30 hours of field experience.

TEACH_ED 309-0 Speech & Communication in the School Environment (1 Unit) Communication in the classroom and school environment for teacher and student. Basic public speaking, interpersonal communication, creating a positive climate for classroom discourse, facilitating group activities.

TEACH_ED 310-0 Foundations of Learning in a New Language (1 Unit) Historical, political, sociocultural, and educational practices that impact linguistically and culturally diverse learners in American schools.

TEACH_ED 313-0 Problems in the Philosophy of Education (1 Unit) 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 322-0 Content Area Reading and Writing (1 Unit) Theory and practical methods of reading methodology to enable teacher candidates to scaffold the literacy skills of English-language learners and students not reading at grade level.

TEACH_ED 324-0 Critical Issues in Literacy (1 Unit) Continues on the work in MS_ED 422-0 and TEACH_ED 322-0, delving deeply into critical literacy issues.

TEACH_ED 327-0 Educating Exceptional Children (1 Unit) 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 (1 Unit) Identifying and understanding the effects of middle school dynamics (principles, structures, and practices) on classroom learning and instruction. Focuses on the development and social problems of fifth through eighth graders.

TEACH_ED 329-0 Early Adolescent Development and Intervention (1 Unit) Interaction of physical, mental, and emotional health and the surrounding social environment of middle school students; developmental characteristics of early adolescence; the middle school teacher's role in assessment and referral.

TEACH_ED 338-0 Learning and Teaching with Technology (1 Unit) Theory and practice of designing school environments that integrate new technologies and media. Taught with LRN_SCI 338; may not receive credit for both courses.

TEACH_ED 351-0 Special Topics in Teacher Education (1 Unit) Advanced work on special topics.

TEACH_ED 355-0 Methods & Techniques: World Languages (1 Unit) Analysis of research, teaching methodologies, and literature related to the content area. Focuses on learning experiences, methods, and educational techniques appropriate for elementary, middle school, and high school students. Concurrent registration in TEACH_ED 378-0 or TEACH_ED 379-0 required.

TEACH_ED 356-0 Methods & Techniques: English (1 Unit) Analysis of research, teaching methodologies, and literature related to the content area. Learning experiences, methods, and educational techniques appropriate for high school students.

TEACH_ED 357-0 Methods and Techniques: Secondary Mathematics (1 Unit) See description for MS_ED 456-0.

TEACH_ED 358-0 Methods and Techniques: Science (1 Unit) See description for MS_ED 456-0.

TEACH_ED 359-0 Methods & Techniques: Social Science (1 Unit) See description for MS_ED 456-0.

TEACH_ED 366-0 Middle Grades Methods & Techniques of Teaching: English (1 Unit)

TEACH_ED 367-0 Middle Grades Methods & Techniques of Teaching: Mathematics (1 Unit)

TEACH_ED 368-0 Middle Grades Methods & Techniques of Teaching: Science (1 Unit)

TEACH_ED 369-0 Middle Grades Methods & Techniques of Teaching: Social Sciences (1 Unit)

TEACH_ED 373-0 Topics in High School Math (1 Unit) Content varies.

TEACH_ED 378-0 Theory and Practice of Teaching: Secondary Humanities (1 Unit) Exploration of education theory in the seminar, plus 10 hours a week of fieldwork. Concurrent registration in the applicable methods and techniques course (TEACH_ED 355-0 - TEACH_ED 359-0) required. Prerequisites: TEACH_ED 304-0 and passing score on the ILTS Test of Academic Proficiency.

TEACH_ED 379-0 Theory and Practice of Teaching: Secondary Math/Science (1 Unit) See description for MS_ED 478-0.

TEACH_ED 388-0 Student Teaching: Humanities (4 Units) Seminar and accompanying fulltime, 10-week internship involving intensive clinical experience and teaching under the supervision of a mentor. Prerequisites: TEACH_ED 304-0; TEACH_ED 378-0 or TEACH_ED 379-0; applicable course(s) from TEACH_ED 355-0 - TEACH_ED 359-0; successful completion of the practicum experience; passing score on the applicable ILTS Content Area Test.

TEACH_ED 389-0 Student Teaching Seminar: Math/Science (4 Units) See description for TEACH_ED 388-0.

Social Policy

sesp.northwestern.edu/ugrad/social-policy

The Social Policy concentration explores how policies function as the guiding principles on which social programs are based. Students interested in public service, public policy, public health, and law typically choose to follow the requirements of the social policy concentration.

Courses analyze how social policies and social institutions influence the course of human lives and how people can influence social policies. Students develop a strong interdisciplinary foundation in the social sciences and gain an understanding of current social policy issues, drawing on research in African American studies, anthropology, communication studies, economics, gender studies, history, philosophy, political science, public health, and sociology. Examples of interdisciplinary specializations include education policy and reform, urban issues and policy, health care issues and policy, legal issues, and environmental issues and policy.

Students are encouraged to use elective credits 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.

Program of Study

- Social Policy Major (p. 113)

SOC_POL 201-0 Introduction to Social Policy (1 Unit) Social policy formulation: the substance of major American social policies, the agenda-

setting process, and how the political system shapes social policy in this country.

SOC_POL 304-0 Social Policy & the Human Services (1 Unit)

Development of social policy for human services in the United States. Human service policies for education, mental health, physical health, prisons, income, and aging.

SOC_POL 305-0 Law and Social Policy (1 Unit) Use and influence of the legal system in and on social institutions and policy.

SOC_POL 306-0 Contemporary Issues in Education (1 Unit) Current policy issues and major debates in K-12 education. Characteristics and skills of the critical consumer of policy. Topics vary by year.

SOC_POL 307-0 Educational Policy (1 Unit) Conflict between societal imperatives to select and prepare young people for future careers and to offer youths opportunity; how society and schools address this conflict; various approaches to policy reform.

SOC_POL 310-0 Legal Aspects of Education (1 Unit) School governance structure and decision making; relevant state and federal legislation; role of the US Supreme Court in affecting public schooling.

SOC_POL 311-0 Social Policy and the United States Health Care System (1 Unit) Examines the health care delivery system in the United States through a review of US health policy issues.

SOC_POL 312-0 Social Policymaking and Implementation (1 Unit) Examines the process by which social policies are made, the process and realities of their implementation, and the attendant politics.

SOC_POL 330-0 Economics of Social Policy (1 Unit) Economic concepts and empirical tools to analyze the design and effects of social policies. Topics include the social safety net, health insurance, minimum wage, and taxation. Prerequisites: ECON 202-0 and SESP 210-0 or equivalent.

SOC_POL 331-0 Economics of Inequality and Discrimination (1 Unit) Economic concepts and empirical tools to analyze the causes and consequences of inequality and discrimination. Topics include housing policy, crime, earnings inequality, and the role of education. Prerequisites: ECON 202-0 and SESP 210-0 or equivalent.

SOC_POL 332-0 Economics of Education Policy (1 Unit) Economic concepts and empirical tools to analyze the design and effects of education policies, including school choice, accountability, education finance, class size policy, and teacher compensation and retention. Prerequisites: ECON 202-0 and SESP 210-0 or equivalent.

SOC_POL 351-0 Special Topics in Social Policy (1 Unit) Advanced work on special topics.

SESP 114-0 Summer Internship (0 Unit)

SESP 115-0 Internship (0 Unit)

SESP 195-1 Community Engagement (0.5 Unit) Critical reflection on community engagement experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community. For Certificate in Civic Engagement students only.

SESP 195-2 Community Engagement (0.5 Unit) Critical reflection on community engagement experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community. For Certificate in Civic Engagement students only.

SESP 201-0 Human Development: Childhood and Adolescence (1 Unit) Personal, social, and cognitive development from birth through adolescence. Interplay of biological and experiential factors on linguistic and conceptual development, ego, and personality.

SESP 202-0 Introduction to Community Development (1 Unit) 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 (1 Unit) 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 (1 Unit) 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 291-1 Peer-Led Learning: Theory and Practice (0.25 Unit) SESP 291 is the training program for students working as first-time mentors in the Peer Leaders program. It is taken over two academic quarters, with each quarter offering .25 credit (a total of .5 credit). You will receive a "K" grade for fall quarter, which means you are continuing in the course. After winter quarter, you will receive a letter grade which will be retroactively applied to fall quarter.

SESP 291-2 Peer-Led Learning: Theory and Practice (0.25 Unit)

SESP 295-0 Theory and Practice of Community Consulting (1 Unit) Course on the importance of community capacity building and the community-consulting process; start of preliminary work for the Certificate in Civic Engagement capstone project.

SESP 298-0 Student Organized Seminar (1 Unit) Courses proposed by students and supervised by faculty sponsors on special topics approved by the SESP undergraduate education director. May be taken only once per quarter; pass/ no credit only. Consultation with the SESP student affairs assistant dean advised.

SESP 299-1 Civic Engagement Capstone Research (1 Unit) Independent study courses leading to completion of the Certificate in Civic Engagement capstone project.

SESP 299-2 Certificate in Civic Engagement- Capstone Project (1 Unit) Independent study courses leading to completion of the Certificate in Civic Engagement capstone project.

SESP 303-0 Designing for Social Change (1 Unit) Processes, challenges, and ethics of designing programs, at home and abroad, for realizing human rights and meaningful social change.

SESP 317-0 Gender and the Life Course (1 Unit) How gender influences major life stages. Focus on the psychosocial effects of gender on children; young, midlife, and old adults; societal institutions; and selected social policy issues.

SESP 320-0 Race and Education (1 Unit) Conceptual underpinnings of the construct of race and how conceptions of race have influenced the course of education in the United States.

SESP 351-0 Special Topics (1 Unit) Advanced work on special topics.

SESP 372-0 Methods of Observing Human Behavior (1 Unit) Guided practice in systematic and participant observation. Observer bias, field notes, unobtrusive measures.

SESP 382-0 Practicum in Human Development; Learning Sciences (4 Units) Real-world participant observation in professional activities and projects; development of analytical field studies of the practicum experience based on field notes, recorded observations, and class discussions; culminates in a final research paper. For LRN SCI students only. Prerequisites: SESP 372-0; consent of SESP practicum director 2 quarters before registration (3 quarters if a Summer Session practicum).

SESP 384-0 Practicum in Human Development - Washington, D.C. (4 Units) See description for SESP 382-0. Offered during Summer Session only. For participants in the Washington, DC, field studies program only. Prerequisites: SESP 372-0; consent of SESP practicum director 3 quarters before registration.

SESP 386-0 Practicum: Human Development & Psychological Svcs. (4 Units) See description and prerequisites for SESP 382-0. For HDPs students only.

SESP 387-0 Practicum: Learning & Organizational Change (4 Units) See description and prerequisites for SESP 382-0. For LOC students only.

SESP 388-0 Practicum: Social Policy (4 Units) See description and prerequisites for SESP 382-0. For SOC POL students only.

SESP 389-0 Practicum in Human Development - San Francisco (4 Units) See description and prerequisites for SESP 382-0. Offered during Summer Session only. For participants in the San Francisco field studies program only.

SESP 390-0 Research Apprenticeship (1 Unit) Opportunity to participate in faculty research projects. Prerequisites: consent of the faculty member and the SESP assistant dean for student affairs; submission of completed Request for Independent Study/Special Courses Form at registration.

SESP 391-0 Advanced Research Methods (1 Unit) Overview of research methods that may be used to design and implement the honors thesis. Prerequisites: SESP 210-0 and SESP 372-0 recommended.

SESP 398-0 Honors Thesis (1 Unit) Students develop, design, implement, and evaluate a research project under a faculty adviser's guidance. Prerequisites: senior status; cumulative GPA by the end of winter quarter of the junior year; recommendation for the honors program from SESP 391-0 instructor(s); consent of program director.

SESP 399-0 Independent Study (1 Unit) Faculty-supervised study of special topics of the student's own choosing and not covered in regular courses. Prerequisites: consent of the supervising faculty member(s) and the SESP assistant dean for student affairs; submission of completed Request for Independent Study/Special Courses Form at registration.

Social Policy Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Concentration Program—16 units

Course	Title
Required Courses (7 units)	
SOC_POL 201-0	Introduction to Social Policy

SESP 202-0	Introduction to Community Development
SOC_POL 304-0	Social Policy & the Human Services
or SOC_POL 312-0	Social Policymaking and Implementation
ECON 202-0	Introduction to Microeconomics
POLI_SCI 220-0	American Government and Politics
1 course chosen from:	
SOC_POL 305-0	Law and Social Policy
SOC_POL 307-0	Educational Policy
SOC_POL 311-0	Social Policy and the United States Health Care System
SOC_POL 332-0	Economics of Education Policy ¹
1 course chosen from:	
SOC_POL 330-0	Economics of Social Policy
SOC_POL 331-0	Economics of Inequality and Discrimination
SOC_POL 332-0	Economics of Education Policy ¹

Concentration Courses (9 units)

Must be selected from an approved list of courses in SOC POL, other SESP concentrations, and disciplines such as African American studies, communication studies, economics, political science, and sociology. Must include at least 5 courses at the 300 level. Up to 3 units of SESP 390-0 Research Apprenticeship or SESP 399-0 Independent Study and 3 units of SESP 398-0 Honors Thesis may be counted toward this requirement.

¹ SOC_POL 332-0 Economics of Education Policy cannot be double counted.

SESP Core (8 units)

Course	Title
Basic courses—2 units	
SESP 201-0	Human Development: Childhood and Adolescence
or SESP 203-0	Human Development: Adulthood and Aging
1 inequality and diversity issues course, chosen from:	
LRN_SCI 202-0	Culture, Language, & Identity
LOC 214-0	Culture and Cognition
SESP 317-0	Gender and the Life Course
SESP 320-0	Race and Education
TEACH_ED 302-0	Social Contexts of Education
or an approved equivalent	
Research methods—2 units	
SESP 210-0	Introduction to Statistics and Research Methodology
SESP 372-0	Methods of Observing Human Behavior
Practicum—4 units ¹	
SESP 382-0	Practicum in Human Development; Learning Sciences
or SESP 384-0	Practicum in Human Development - Washington, D.C.
or SESP 386-0	Practicum: Human Development & Psychological Svcs.
or SESP 387-0	Practicum: Learning & Organizational Change
or SESP 388-0	Practicum: Social Policy
or SESP 389-0	Practicum in Human Development - San Francisco

¹ Practicum course must be in concentration field.

This 4-unit course may be taken either for 1 quarter during the junior year or for nine weeks during the Summer Session before or after the junior year; no fifth unit may be taken concurrently without special permission. At least 2 quarters before registering for the course, students must consult the SESP practicum director regarding procedures and site-placement application materials; for Summer Session practicums, consultation should be scheduled at least 3 quarters in advance.

Distribution Requirements (10 units)

- 2 natural sciences courses
- 2 formal studies courses (mathematics, logic, etc.)
- 2 historical studies courses
- 2 ethics and values courses (philosophy, religion, etc.)
- 2 literature and fine arts courses

Selected courses from Weinberg College and professional schools across the University may be used to fulfill distribution requirements with the consent of the student's adviser and the SESP assistant dean for student affairs.

Electives (8 units)

Courses from any school across the University may be used to fulfill elective requirements. 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.

Summer Field Studies Program

sesp.northwestern.edu/ugrad/practicum

The SESP Field Studies Program gives students the opportunity to make solid professional contributions to an organization while benefiting from experiential learning. The one-quarter program carries 4 units of credit. Students intern at their sites for 30 hours a week and attend a Friday morning Practicum Analysis Seminar.

In the workplace, students record and analyze events and processes, integrating concepts and theories from their social science courses. The field notes lead to a final paper analyzing some component of the practicum/field study experience.

During Summer Session any Northwestern undergraduate student is able to complete the program in Washington, DC (SESP 384-0 Practicum in Human Development - Washington, D.C.), or San Francisco (SESP 389-0 Practicum in Human Development - San Francisco) in addition to the Chicago area. Program sites expose students to the breadth and depth of issues and activities within a field. They experience new skills and responsibilities through the projects they carry out from start to finish. Their supervising mentors meet with them individually for at least one hour per week.

The prerequisite course—SESP 372-0 Methods of Observing Human Behavior—teaches students how to take and analyze notes for a field study. Students complete a qualitative field study of their practicum experiences.

Civic Engagement Certificate

sesp.northwestern.edu/ugrad/civic-engagement-program

Open to freshmen, sophomores, and juniors in any school at Northwestern, the Civic Engagement Certificate Program increases students' understanding of community needs and assets and fosters ongoing civic engagement by connecting community service experience with an academic component. Spanning five academic quarters, the two-year program requires a total of 5 units of coursework and 100 hours of community engagement.

Coursework includes:

Course	Title
SESP 202-0	Introduction to Community Development (taken in winter quarter of the first year of the program)
SESP 195-1 & SESP 195-2	Community Engagement and Community Engagement (taken in winter and spring of the first year)
SESP 295-0	Theory and Practice of Community Consulting (taken in fall of the second year)
2 independent study units:	
SESP 299-1 & SESP 299-2	Civic Engagement Capstone Research and Certificate in Civic Engagement- Capstone Project (taken in winter and spring of the second year and leading to a capstone project completed in collaboration with a sponsoring organization.)

During the two years of the program, students complete at least 100 hours of meaningful community engagement.

ROBERT R. MCCORMICK SCHOOL OF ENGINEERING AND APPLIED SCIENCE

mccormick.northwestern.edu

The McCormick School of Engineering and Applied Science is committed to providing leadership for the technological foundation of our society, economy, environment, and culture. The school's mission is twofold: the personal and professional development of its students and faculty and the development and application of new technology, which is increasingly interdisciplinary.

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 pursue

Undergraduate students in McCormick may follow a curriculum leading to a bachelor of science degree in any of the following fields:

- applied mathematics (p. 148)
- biomedical engineering (p. 121)
- chemical engineering (p. 124)
- civil engineering (p. 127)
- computer engineering (p. 137)
- computer science (p. 137)
- electrical engineering (p. 137)
- environmental engineering (p. 127)
- industrial engineering (p. 153)
- manufacturing and design engineering (p. 156)
- materials science and engineering (p. 158)
- mechanical engineering (p. 162)

The programs in biomedical engineering, chemical engineering, civil engineering, computer engineering, electrical engineering, environmental engineering, manufacturing and design engineering, materials science and engineering, and mechanical engineering are accredited by the Engineering Accreditation Commission of ABET (abet.org). For further information on ABET standards and course partitioning visit www.mccormick.northwestern.edu/academics/undergraduate/abet/

With the proper use and combination of requirements, options, and electives, students may prepare themselves for graduate work in engineering or for postbaccalaureate degrees in medicine, law, business, or other areas. Bachelor of science degrees are also awarded in approved ad hoc integrated engineering studies programs.

Graduate programs of study are available in all of the above fields as well as in analytics, applied physics, biotechnology, engineering design and innovation, engineering management, information technology, manufacturing management, product design and development, project management, robotics, technology and social behavior, and theoretical and applied mechanics. Programs leading to degrees at the master's and

doctoral levels are described in detail in publications of the Graduate School and engineering graduate programs.

Excellence in research is a distinguishing characteristic of the engineering faculty. Working at the frontiers of knowledge, faculty members are positioned 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 1,850 undergraduates and 2,140 graduate students. It is housed in the Technological Institute complex, which contains nearly 2 million square feet of floor area and provides excellent educational and research facilities.

Academic Requirements

Requirements for the Degree of Bachelor of Science

Students must successfully complete all 48 units of the curriculum or have equivalent academic experience. Students who interrupt their programs of study for an extended time during which degree requirements are changed will normally be held to the new requirements. Those who encounter curricular changes during their period of enrollment may choose to follow any curriculum during that period but must meet its requirements completely.

All curricula leading to a bachelor of science degree in engineering or applied science have the same basic components: mathematics, engineering analysis and computer proficiency, basic sciences, design and communications, basic engineering, social sciences/humanities, unrestricted electives, and the major program. Courses qualifying for these components are listed within each department's program page.

General requirements for the bachelor of science degree are as follows:

- Core Courses (32 units)**
- Mathematics (4 units)**
- Standard for all degree programs

Course	Title
MATH 220-0	Differential Calculus of One-Variable Functions
MATH 224-0	Integral Calculus of One-Variable Functions
MATH 230-0	Differential Calculus of Multivariable Functions ¹
MATH 234-0	Multiple Integration and Vector Calculus ^{1&2}

¹ ES_APPM 252-1 Honors Calculus for Engineers, ES_APPM 252-2 Honors Calculus for Engineers may substitute for MATH 230-0 Differential Calculus of Multivariable Functions and MATH 234-0 Multiple Integration and Vector Calculus.

² The computer science degree program requires EECS 212-0 Mathematical Foundations of Comp Science instead of MATH 234-0 Multiple Integration and Vector Calculus.

- Engineering Analysis and Computer Proficiency (4 units)**
- Standard for all degree programs

Course	Title
GEN_ENG 205-1 or GEN_ENG 206-1	Engineering Analysis I ¹ Honor Engineering Analysis
GEN_ENG 205-2	Engineering Analysis II
GEN_ENG 205-3	Engineering Analysis III
GEN_ENG 205-4 or GEN_ENG 206-4	Engineering Analysis IV ^{1&2} Honors Engineering Analysis IV

¹ The Engineering Analysis I and IV requirements may be satisfied by completing either the regular courses GEN_ENG 205-1 Engineering Analysis I and GEN_ENG 205-4 Engineering Analysis IV or the honors courses GEN_ENG 206-1 Honor Engineering Analysis and GEN_ENG 206-4 Honors Engineering Analysis IV. Engineering Analysis II and III only offer regular courses.

² The computer science degree program requires EECS 111-0 Fundamentals of Computer Programming instead of Engineering Analysis IV.

Basic Sciences (4 units)

- Eligible courses may vary by degree program; see program for details.
- Minimum of 4 units comprising courses from at least two of the following areas

Course	Title
Physics	
PHYSICS 135-2 & PHYSICS 136-2	General Physics and General Physics Laboratory
PHYSICS 135-3 & PHYSICS 136-3	General Physics and General Physics Laboratory
PHYSICS 239-0	Foundations of Modern Physics
Biological Sciences	
BIOL_SCI 215-0	Genetics and Molecular Biology
BIOL_SCI 217-0	Physiology
BIOL_SCI 219-0	Cell Biology
BIOL_SCI 220-0	Genetics and Molecular Processes Laboratory
BIOL_SCI 221-0	Cellular Processes Laboratory
BIOL_SCI 222-0	Investigative Laboratory
CHEM_ENG 275-0	Molecular & Cell Biology for Engineers
CIV_ENV 202-0	Biological and Ecological Principles
Chemistry	
CHEM 131-0 & CHEM 141-0	General Chemistry 1 and General Chemistry Laboratory 1
CHEM 132-0 & CHEM 142-0	General Chemistry 2 and General Chemistry Laboratory 2
CHEM 151-0 & CHEM 161-0	Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1
CHEM 152-0 & CHEM 162-0	Accelerated General Chemistry 2 and Accelerated General Chemistry Laboratory 2
CHEM 171-0 & CHEM 181-0	Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory
CHEM 172-0 & CHEM 182-0	Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory
CHEM 210-1	Organic Chemistry
CHEM 210-2	Organic Chemistry
Earth and Planetary Sciences/Astronomy	
ASTRON 220-0	Introduction to Astrophysics
CIV_ENV 203-0	Earth in the Anthropocene
EARTH 201-0	Earth Systems Revealed
EARTH 202-0	Earth's Interior
EARTH 203-0	Earth System History

- No more than 2 units may be from earth and planetary sciences/astronomy.
- No more than 3 units may be from any other area.
- Lab courses may count toward basic science requirements only in combination with their corresponding lecture courses.

Design and Communications (3 units)

- Standard for all degree programs

Course	Title
Writing and Design	
DSGN 106-1 & DSGN 106-2	Design Thinking and Communication and Design Thinking and Communication
ENGLISH 106-1 & ENGLISH 106-2	Writing in Special Contexts and Writing in Special Contexts
Speaking	
Select one of the following:	
COMM_ST 102-0	Public Speaking
PERF_ST 103-0	Analysis & Performance of Literature
PERF_ST 203-0	Performance Culture and Communication
BMD_ENG 390-2	Biomedical Engineering Design ¹

¹ The biomedical engineering degree program requires BMD_ENG 390-2 Biomedical Engineering Design to satisfy the speaking requirement.

Basic Engineering (5 units)

- Eligible courses may vary by degree program; see program for details.
- 5 courses from at least four of the areas below

Course	Title
Computer Architecture and Numerical Methods	
EECS 203-0	Introduction to Computer Engineering
EECS 205-0	Fundamentals of Computer System Software
EECS 328-0	Numerical Methods for Engineers
ES_APPM 346-0	Modeling and Computation in Science & Engineering
Computer Programming	
EECS 211-0	Fundamentals of Computer Programming II
EECS 230-0	Programming for Engineers
EECS 317-0	Data Management & Information Processing
Electrical Science	
EECS 202-0	Introduction to Electrical Engineering
EECS 221-0	Fundamentals of Circuits
EECS 222-0	Fundamentals of Signals & Systems
EECS 223-0	Fundamentals of Solid State Engineering
EECS 224-0	Fund of Electromagnetics & Photonics
EECS 270-0	Applications of Electronic Devices
MECH_ENG 233-0	Electronics Design
Fluids and Solids	
BMD_ENG 270-0	Fluid Mechanics
BMD_ENG 271-0	Introduction to Biomechanics
CHEM_ENG 321-0	Fluid Mechanics
CIV_ENV 216-0	Mechanics of Materials I
MECH_ENG 241-0	Fluid Mechanics I
Materials Science and Engineering	
MAT_SCI 201-0	Introduction to Materials
MAT_SCI 301-0	Materials Science Principles
Probability, Statistics, and Quality Control	
BMD_ENG 220-0	Introduction to Biomedical Statistics
CHEM_ENG 312-0	Probability and Statistics for Chemical Engineering
CIV_ENV 306-0	Uncertainty Analysis
EECS 302-0	Probabilistic Systems
IEMS 201-0	Introduction to Statistics
IEMS 303-0	Statistics
MECH_ENG 359-0	Reliability Engineering

Systems Engineering and Analysis

CHEM_ENG 210-0	Analysis of Chemical Process Systems
CIV_ENV 205-0	Economics and Finance for Engineers
CIV_ENV 304-0	Civil and Environmental Engineering Systems Analysis
IEMS 310-0	Operations Research
IEMS 313-0	Foundations of Optimization

Thermodynamics

BMD_ENG 250-0	Thermodynamics
CHEM_ENG 211-0	Thermodynamics
MAT_SCI 314-0	Thermodynamics of Materials
MAT_SCI 315-0	Phase Equilibria & Diffusion of Materials
MECH_ENG 222-0	Thermodynamics & Statistical Mechanics - I ¹
MECH_ENG 322-0	Thermodynamics & Statistical Mechanics - II

¹ MECH_ENG 222-0 Thermodynamics & Statistical Mechanics - I may not be taken with CHEM 342-1 Thermodynamics or CHEM_ENG 211-0 Thermodynamics

Social Sciences/Humanities (7 units)

- Standard for all degree programs
- Following is a partial list of requirements; a complete list is available via the McCormick Advising System.
 - 7 social sciences/humanities courses
 - Maximum of 5 credits from either category
 - At least 3 courses must be thematically related
 - No more than 3 100-level courses
 - AP, IB, and transfer credits are eligible to count toward this requirement

Unrestricted Electives (5 units)

Standard for all degree programs: students may take any credit course in the University to explore or extend technical or nontechnical interests.

Major Program (16 units)

Each degree program in the McCormick School finds its depth in the major program's 16 units. These 16 units are made up of departmental sequences that build competency in the field as well as technical electives that allow students to explore areas of interest within the discipline. Technical electives provide opportunity for individualization, but coherence in the selection of elective courses is still necessary.

Each department maintains its own set of major program requirements which can be found on the program specific pages of this catalog. Students must meet both the school's and the major program's curricular requirements.

Taking courses regarded as duplicates will increase the number of requirements needed to earn a McCormick degree. For a list of course duplicates visit: www.mccormick.northwestern.edu/students/undergraduate/advising-registration/course-duplicates.html

Grade Requirements

A grade point average (GPA) of not less than 2.0 is required for all units presented for the degree. Students must have received a grade of C or higher in any course taken elsewhere and used to fulfill a McCormick degree requirement. The GPA in 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. Grades for courses fulfilling a minor must be C– or higher, and none of them may be a P.

Every candidate for a degree must file an application for the degree a year in advance of the date of graduation. This application is submitted directly within the McCormick Advising System.

In addition to and independent of the requirements set by McCormick, all students must satisfy the Undergraduate Registration Requirement (p. 26).

Integrated Engineering Studies Program

The McCormick Integrated Engineering Studies (MIES) Program provides an alternative for students whose particular interests and goals cannot be satisfied by a regular program in engineering or applied science. To be eligible, students must have a cumulative GPA of 3.25 or above. They may apply as early as the end of their first year but no later than 3½ quarters before completing the degree. Applicants must prepare a compelling argument for qualifying for this customized degree program. Examples of these ad hoc degrees from recent years include public health, engineering physics, biomedical engineering and molecular biology, analytics, and mechanical design. Students who complete this program are awarded a bachelor of science in integrated engineering studies, and their transcripts specify the themes of their courses of study. For additional details, visit the MIES webpage: www.mccormick.northwestern.edu/academics/undergraduate/programs/integrated-engineering-studies.html

Academic Policies**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 the first and second years.

Core courses: Any 300-level course, but no more than 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 (<http://www.mccormick.northwestern.edu/students/undergraduate/advising-registration/pass-no-credit-option.html>) or the Undergraduate Engineering 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 (or other appropriate international examinations), special examinations in subject areas, or analysis of high school background. Any placement in approved sequential work (verified by a grade above C– in a subsequent course) 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 AP examinations and other such programs must still meet the Undergraduate Registration Requirement.

Academic Options

Students in the McCormick School have many opportunities to enhance their educational experience by pursuing additional programs and opportunities.

Undergraduate Honors Program

Students with good scholastic records may apply to the Undergraduate Honors Program any time during their junior or pre-senior years. (Students within three quarters of graduation are past this admission point.) At the time of admission to the honors program, they must have a cumulative GPA of 3.5 or better. Courses used to meet the honors requirements must also be used toward requirements for the bachelor's degree.

Honors students participating in the program must:

- Complete at least 3 units of approved advanced study (including courses normally accepted at the graduate level) with an average grade of B or better.
- Complete an extended independent study project (at least 2 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 his or her performance is not judged to meet the honors standards, the student will still receive course grades and credits as earned.

Undergraduate Research

Opportunities for Undergraduate Research (p. 38) are made available and encouraged. Each field of study offers independent study courses for research enrollment on an elective basis. Funding of undergraduate research is provided by faculty-directed programs and several McCormick School and University sources.

The McCormick Student Advisory Board holds an annual competition for the Harold B. Gotaas Award, which honors a graduating McCormick senior who has demonstrated excellence in undergraduate research.

Students normally perform undergraduate research projects under the direction of faculty doing research in their department and in laboratories throughout the University, including McCormick research centers. For more on McCormick's research activities, see mccormick.northwestern.edu/research.

Second Field of Specialization

Elective opportunities in McCormick curricula may be used in a departmental program in another school of the University as long as the secondary program also allows doubling counting of credits. 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. For a complete list of major, minor, and certificate programs offered at Northwestern visit: www.northwestern.edu/academics/undergraduate-a-to-z.html

Multiple BS Degrees in McCormick

Students with wide-ranging interests may work toward two or more bachelor of science degrees in McCormick by satisfying the full requirements for each degree. At least 6 additional units of credit, or the equivalent, must be presented for each additional degree, and the work

in multiple areas does not need to be completed at the same time. Each department or program must approve the course plan for its degree no later than two academic quarters before work for the second degree is completed but no earlier than junior year.

Accelerated Master's Program

Qualified McCormick undergraduate students may work simultaneously toward the bachelor of science and master of science degrees in engineering. Integrated planning of coursework makes it possible to take 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.

For additional information, including how to apply, visit: www.mccormick.northwestern.edu/academics/undergraduate/programs/honors-and-combined-degrees/combined-bachelors-masters-program/

Dual Bachelor's Degree Programs with other NU Undergraduate Schools

Qualified students may earn bachelor's degrees from two different undergraduate schools in Northwestern. Five years of full-time study are usually required. Students may pursue dual bachelor's degree programs between the McCormick School of Engineering and Applied Science and the Weinberg College of Arts and Sciences, the Bienen School of Music, or the School of Communication.

For additional details on these programs see Dual Bachelor's Degrees (p. 35). For information on applying to one of these programs see Application to Dual Bachelor's Degree Programs (p.).

Minors

McCormick students are able to pursue the following minors in addition to a bachelor's degree. See the program pages for descriptions and requirements.

- Biotechnology and biochemical engineering (p. 126)
- Computer science (p. 148)
- Environmental engineering (p. 136)
- Entrepreneurship (p. 150)
- Materials science (p. 293) (minor offered by the Weinberg College of Arts & Sciences)
- Transportation and logistics (p. 31) (minor offered by the Transportation and Logistics Program)

Additional minors are available from other Northwestern schools and may be pursued by engineering students; that information may be found under Minors (p. 32) in the Additional Baccalaureate Options section.

Certificates

McCormick students are able to pursue the following McCormick certificates in addition to a bachelor's degree. See the program pages for descriptions and requirements.

- Architectural Engineering and Design Certificate (p. 136): This program prepares engineering students for collaborative careers in

the building industry—as architects, structural designers, builders, project managers, or developers.

- **Business Enterprise Certificate** (<http://www.mccormick.northwestern.edu/academics/undergraduate/programs/certificates-and-minors/business-enterprise-certificate.html>): Students who aim to have business careers and want to improve their ability to make a contribution soon after graduation may wish to consider this certificate program. It involves a combination of required business courses and work experience. Those completing the Walter P. Murphy Cooperative Engineering Education Program must take 2 units of credit in addition to those needed for their bachelor's degrees; other students must take 4 extra units. An acceptable report on the work experience and successful completion of a McCormick BS degree are required. Full program details can be found by visiting the Business Enterprise Certificate website: www.mccormick.northwestern.edu/academics/undergraduate/programs/certificates-and-minors/business-enterprise-certificate.html
- **Segal Design Certificate** (p. 158): This certificate program, administered by the Segal Design Institute, develops a set of design skills valuable across the entire spectrum of careers available to McCormick graduates.

Cooperative Engineering Education Program

The Walter P. Murphy Cooperative Engineering Education Program alternates periods of paid industrial experience with academic studies for full-time students in all departments of engineering and applied science. Students apply theory while gaining practical experience and develop an understanding of the responsibilities of their future professional careers.

There are two options for completing the Co-op Program:

- **Single Employer Option:** Students complete a minimum of 9 months (three quarters) with the same employer. The schedule must contain at least one six month (two quarter) work term.
- **Two Employer Option:** Students complete two six month (two quarter) work terms with two different employers. This is a minimum of 12 months (4 quarters) of work experience overall.

Students are registered for their work quarters, thus remaining enrolled at Northwestern. No tuition or fees are charged during co-op periods. At the end of each work period, employers are asked to evaluate student performance and progress.

In addition to the academic degree, students who successfully complete the schedule of school and work receive recognition as co-op students upon graduation from McCormick.

Learn more about the co-op program at:
www.mccormick.northwestern.edu/career-development/programs/co-op/

Honors Program in Medical Education

The Honors Program in Medical Education (HPME) is designed for unusually gifted high school students who seek careers 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 biomedical engineering after five years and the doctor of medicine degree after seven years. See Honors Program in Medical Education (p. 34) for more information on HPME and Admission (p. 11) for information on applying to the program.

Student Resources

McCormick strives to create an enriching academic environment where students are able to engage with a variety of resources and organizations.

Tutorial Program

Northwestern offers academic support resources in the form of small-group mentoring, coaching, workshops, peer-guided study groups, and tutoring. For detailed information on available programs, including locations and hours, visit Academic Support and Learning Advancement: www.northwestern.edu/academic-support-learning/

Faculty Advisers

Entering McCormick students are assigned a first-year adviser. By the beginning of the sophomore year most students will have selected a program 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.

First-year students can find helpful information and first-year advisers' contact details by visiting www.mccormick.northwestern.edu/students/undergraduate/first-year/. Sophomores, juniors, and seniors can find their advisers listed in the McCormick Advising System. Advice on other subjects may be obtained by emailing McCAcadServices@northwestern.edu.

McCormick Advising System

All students have access to the McCormick Advising System (MAS), the online service through which they can track their degree progress, document consultations with their faculty advisers, and manage other transactions related to being a McCormick student. MAS can be accessed by visiting mas.mccormick.northwestern.edu. Questions about getting an audit updated, degree requirements, or general issues with MAS should be directed to mccormick-school@northwestern.edu.

Organizations for Engineering Students

The McCormick Student Advisory Board is composed of representatives from each class in engineering and from approved McCormick organizations. It is the recognized representative body of undergraduate engineering students and as such serves as a link between the students and the faculty and administration. It encourages and coordinates the activities of engineering students and student groups.

Student groups at McCormick provide an important opportunity for undergraduates to develop leadership skills and create opportunities to network with faculty, staff, and professionals in the field. For information on McCormick student groups and honor societies visit: www.mccormick.northwestern.edu/academics/undergraduate/student-groups.html

Applied Mathematics

See Engineering Sciences and Applied Mathematics (p. 148).

Biomedical Engineering

mccormick.northwestern.edu/biomedical

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.

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—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 have provided 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 further understanding of many physiological processes, which in turn leads to improvements in clinical practice, diagnosis, and patient care.

Northwestern was among the first schools to recognize the value of a biomedical engineering background. Today the Department of Biomedical Engineering offers one of the largest and broadest programs in the country at both the undergraduate and graduate levels. Most students interested in the field follow its program, but other engineering departments also offer biomedical options.

The biomedical engineering program provides biomedical training that is quantitative, emphasizes problem solving, and treats phenomena from the molecular to the systems levels. The curriculum prepares students for careers in dentistry, medicine, or research or with healthcare corporations. Required courses in mathematics, engineering, and science establish a strong foundation on which the student builds a self-selected area of specialization.

A minimum of 18 course units in engineering design and engineering science, as well as substantial training in design, are required for a biomedical engineering degree.

Those seeking admission to dental or medical school should be familiar with the entrance requirements of schools to which they intend to apply. Many professional schools require courses in physics, organic, and/or physical chemistry and laboratory biology, in addition to courses required by the biomedical engineering program. These requirements may be satisfied by judicious use of electives.

Biomedical Engineering Electives

Students seeking depth in one particular area of biomedical engineering may choose to focus their electives in one of the following three areas:

- Biomechanics and rehabilitation
- Biomaterials and regenerative medicine
- Imaging and biophotonics

Alternately, students may choose a broader approach to the curriculum, selecting electives from two or all three of these areas.

Programs of Study

- Biomedical Engineering Degree (p. 123)

BMD_ENG 101-0 Introduction to Biomedical Engineering (0 Unit)

Information to 1) help students determine if BME is the right major for them and 2) learn how to make the most of their undergraduate experience. The field of biomedical engineering, career and research opportunities, ethics.

BMD_ENG 220-0 Introduction to Biomedical Statistics (1 Unit) Basic statistical concepts presented with emphasis on their relevance to biological and medical investigations.

BMD_ENG 250-0 Thermodynamics (1 Unit) Physical and chemical principles as applied to biological systems and medical devices. Topics include material balances, thermodynamics, solution chemistry, electrochemistry, surface chemistry, transport, and kinetics. Prerequisites: MATH 230-0; CHEM 132-0, CHEM 152-0, or CHEM 172-0.

BMD_ENG 270-0 Fluid Mechanics (1 Unit) Fundamentals of fluid mechanics and their applications to biological systems. Prerequisites: GEN_ENG 205-4; MATH 234-0.

BMD_ENG 271-0 Introduction to Biomechanics (1 Unit) Analysis of stresses and deformations in solids. Problems in biomechanics, with emphasis on assumptions appropriate to modeling biological materials including bone, skin, muscle, and cell membranes. Prerequisite: GEN_ENG 205-2.

BMD_ENG 301-0 Quantitative Systems Physiology (1 Unit) Functional/structural aspects of mammalian nervous system. Neural biophysics. Laboratory exercises. Prerequisite: PHYSICS 135-2; junior standing recommended

BMD_ENG 302-0 Quantitative Systems Physiology (1 Unit) Rigorous overview of cardiovascular and respiratory anatomy, physiology, and pathophysiology. Case studies and a design team project. Prerequisite: MATH 230-0; junior standing recommended.

BMD_ENG 303-0 Quantitative Systems Physiology (1 Unit) Cellular mechanisms of and quantitative systems' approach to human renal, digestive, endocrine, and metabolic physiology. Prerequisite: junior standing recommended.

BMD_ENG 305-0 Introduction to Biomedical Signals and Electrical Circuits (1 Unit) Time and frequency domain analysis: convolution representation, Fourier series, Fourier transforms, frequency response, filtering, sampling. Prerequisite: PHYSICS 135-2 or consent of instructor.

BMD_ENG 306-0 Biomedical Systems Analysis (1 Unit) 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: BMD_ENG 305-0; BMD_ENG 220-0, IEMS 303-0, or MECH_ENG 359-0; GEN_ENG 205-4.

BMD_ENG 307-0 Quantitative Experimentation and Design (1 Unit)

Laboratory and associated lecture concerning quantitative physiology, physiological measurement techniques, instrument design, and statistical design of experiments. Prerequisites: BMD_ENG 305-0; BMD_ENG 306-0; BMD_ENG 220-0, IEMS 303-0 or MECH_ENG 359-0.

BMD_ENG 314-0 Models in Biochemistry & Molecular Biology (1 Unit)

Mathematical modeling of biochemical and molecular biological problems, such as allosteric enzymes, bacterial transduction, X-ray diffraction, study of DNA. Prerequisites: BIOL_SCI 215-0; BIOL_SCI 219-0; junior standing recommended.

BMD_ENG 315-0 Application of Genetic Engineering to Immunochemistry (1 Unit)

Recent developments in genetic engineering as applied to the rapidly developing field of immunochemistry for antibodies and related proteins. Prerequisite: junior standing recommended.

BMD_ENG 316-0 Engineering Design of Therapeutic Antibodies (1 Unit)

In-depth study of the development of therapeutic antibodies through protein engineering-the process of selectively modifying the activities of existing proteins and enzymes to improve their function. Prerequisites: BIOL_SCI 215-0; BIOL_SCI 219-0

BMD_ENG 317-0 Biochemical Sensors (1 Unit) Theory, design, and applications of chemical sensors used in medical diagnosis and patient monitoring. Electrochemical and optical sensors. Prerequisites: BIOL_SCI 215-0; BIOL_SCI 219-0; CHEM 210-1; PHYSICS 135-2; PHYSICS 135-3.

BMD_ENG 323-0 Visual Engineering Science (1 Unit) Mammalian visual system. Physiological optics. Visual image representation and interpretation. Visual adaptation. Motion. Color vision. Prerequisite: PHYSICS 135-2

BMD_ENG 325-0 Introduction to Medical Imaging (1 Unit) Diagnostic X-rays; X-ray film and radiographic image; computed tomography; ultrasound. Prerequisite: PHYSICS 135-3 or equivalent.

BMD_ENG 327-0 Magnetic Resonance Imaging (1 Unit) Nuclear magnetic resonance; two-dimensional Fourier transform, spinecho and gradientecho imaging; gradient and RF hardware. Prerequisite: PHYSICS 135-3.

BMD_ENG 333-0 Modern Optical Microscopy & Imaging (1 Unit)

Rigorous introduction to principles, current trends, emerging technologies, and biomedical applications of modern optical microscopy. Prerequisites: PHYSICS 135-2; MATH 220-0; MATH 230-0; GEN_ENG 205-4.

BMD_ENG 343-0 Biomaterials and Medical Devices (1 Unit) Structure-property relationships for biomaterials. Metal, ceramic, and polymeric implant materials and their implant applications. Interactions of materials with the body. Taught with MAT_SCI 370-0; may not receive credit for both courses. Prerequisites: BIOL_SCI 215-0; BIOL_SCI 219-0; MAT_SCI 201-0 or MAT_SCI 301-0; senior standing.

BMD_ENG 344-0 Biological Performance of Materials (1 Unit) 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. Prerequisites: BIOL_SCI 215-0; BIOL_SCI 219-0; MAT_SCI 201-0.

BMD_ENG 346-0 Tissue Engineering (1 Unit) In vivo molecular, cellular, and organ engineering, with emphasis on the foundations,

techniques, experiments, and clinical applications of tissue engineering. Prerequisites: BIOL_SCI 215-0; BIOL_SCI 219-0.

BMD_ENG 349-1 Regenerative Engineering Principles and Technologies (1 Unit) Foundations, principles, and technologies of molecular, cellular, and tissue regenerative engineering. Prerequisites: BIOL_SCI 215-0; BIOL_SCI 219-0.

BMD_ENG 349-2 Regenerative Engineering Applications (1 Unit)

Fundamentals of human disorders; engineering aspects of regenerative medicine; application of regenerative engineering to human disease. Prerequisite: BMD_ENG 349-1.

BMD_ENG 365-0 Control of Human Limbs and Their Artificial Replacements (1 Unit)

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.

BMD_ENG 366-0 Biomechanics of Movement (1 Unit) Engineering mechanics applied to analyze human movement, including models of muscle and tendon, kinematics of joints, and dynamics of multi-joint movement. Applications in sports, rehabilitation, and orthopedics. Prerequisite: BMD_ENG 271-0.

BMD_ENG 371-0 Mechanics of Biological Tissue (1 Unit) Stress and strain for small and large deformations. Nonlinear elastic, viscoelastic, pseudo-elastic, and biphasic models. Prerequisites: BMD_ENG 271-0; GEN_ENG 205-3; GEN_ENG 205-4.

BMD_ENG 377-0 Intermediate Fluid Mechanics (1 Unit) Fundamental concepts of fluid dynamics. Kinematics, mass and momentum balances, constitutive relations. Navier-Stokes equations and methods of solution. Sealing techniques. Prerequisite: BMD_ENG 270-0 or consent of instructor.

BMD_ENG 378-0 Transport Fundamentals (1 Unit) Fundamental and biomedical applications of diffusive and convective heat and mass transfer. Prerequisites: BMD_ENG 270-0; MATH 230-0; BMD_ENG 377-0 recommended.

BMD_ENG 380-0 Medical Devices, Disease & Global Health (1 Unit)

Health systems and technologies to address health problems of the world's underserved populations, with special emphasis on developing countries.

BMD_ENG 388-SA Healthcare Technology in Resource Poor Environments (1 Unit) Consent of instructor.

BMD_ENG 389-SA Healthcare Assessment and Planning (1 Unit) Consent of instructor.

BMD_ENG 390-1 Biomedical Engineering Design (1 Unit) 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: BMD_ENG 307-0.

BMD_ENG 390-2 Biomedical Engineering Design (1 Unit) Development of a design project initiated during the previous quarter. Prerequisite: BMD_ENG 390-1.

BMD_ENG 390-3 Biomedical Engineering Design (1 Unit) Continuation of a design project; independent study. May not be repeated for credit. Prerequisites: BMD_ENG 390-1 or BMD_ENG 390-2; consent of instructor.

BMD_ENG 391-SA HealthCare Technology Innovation and Design (1 Unit)

BMD_ENG 395-0 Topics in Biomedical Engineering (1 Unit) Must be taken P/N.

BMD_ENG 396-0 Special Topics (0.5 Unit) Special Topics in Biomedical Engineering, Laboratory emphasis.

BMD_ENG 397-0 Special Topics in Biomedical Engineering (0.5-1 Unit) Special Topics in Biomedical Engineering, Laboratory emphasis.

BMD_ENG 398-0 Special Topics in Biomedical Engineering (0.34 Unit) Special Topics in Biomedical Engineering, Laboratory emphasis.

BMD_ENG 399-0 Projects (1 Unit) SEE DEPT FOR SECTION AND PERMISSION NUMBERS.

Biomedical Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Requirements (48 units)	
<i>Core Courses (32 units)</i> ¹	
4 mathematics courses (p. 116)	
4 engineering analysis and computer proficiency courses (p. 116)	
4 units of basic science:	
PHYSICS 135-2 & PHYSICS 135-3	General Physics and General Physics
CHEM 131-0 & CHEM 132-0	General Chemistry 1 and General Chemistry 2
or CHEM 151-0 & CHEM 152-0	Accelerated General Chemistry 1 and Accelerated General Chemistry 2
or CHEM 171-0 & CHEM 172-0	Advanced General Inorganic Chemistry and Advanced General Physical Chemistry
3 design and communications courses (p. 116)	
5 basic engineering courses:	
BMD_ENG 270-0	Fluid Mechanics
BMD_ENG 271-0	Introduction to Biomechanics
MAT_SCI 201-0 or MAT_SCI 301-0	Introduction to Materials Materials Science Principles
BMD_ENG 220-0 or IEMS 303-0 or MECH_ENG 359-0	Introduction to Biomedical Statistics Statistics Reliability Engineering
BMD_ENG 250-0 or MECH_ENG 222-0	Thermodynamics Thermodynamics & Statistical Mechanics - I
7 social sciences/humanities courses (p. 116)	
5 unrestricted electives (p. 116)	
<i>Major Program (16 units)</i>	
BMD_ENG 101-0	Introduction to Biomedical Engineering (noncredit)
10 Core Courses:	
BIOL_SCI 215-0	Genetics and Molecular Biology
CHEM 210-1	Organic Chemistry
BMD_ENG 301-0	Quantitative Systems Physiology
BMD_ENG 302-0	Quantitative Systems Physiology
BMD_ENG 303-0	Quantitative Systems Physiology
BMD_ENG 305-0	Introduction to Biomedical Signals and Electrical Circuits
BMD_ENG 306-0	Biomedical Systems Analysis
BMD_ENG 307-0	Quantitative Experimentation and Design

BMD_ENG 378-0	Transport Fundamentals
BMD_ENG 390-1	Biomedical Engineering Design
4 biomedical engineering electives:	
2 category A courses (p. 123)	
2 category B courses (p. 123)	
2 technical electives, preferably with an emphasis on engineering design, may include:	
BIOL_SCI 219-0	Cell Biology
CHEM 210-2	Organic Chemistry
CHEM 210-3	Organic Chemistry
DSGN 240-0	Introduction to Solid Modeling: Solidworks
DSGN 245-0	Introduction to Computer Aided Design I: NX
DSGN 246-0	Introduction to Computer Aided Design II: NX
EECS 211-0	Fundamentals of Computer Programming II
EECS 230-0	Programming for Engineers
MECH_ENG 240-0	Intro to Mechanical Design & Manufactrng

Any engineering, science, or mathematics courses at the 300 level or higher, provided they are graded.

Three, 0.34 unit basic science and biology labs may also be combined and counted as a technical elective. Six total labs can be used.

¹ See general requirements (p. 116) for details.

Biomedical Engineering Electives

Category A Courses

Course	Title
BMD_ENG 317-0	Biochemical Sensors
BMD_ENG 325-0	Introduction to Medical Imaging
BMD_ENG 327-0	Magnetic Resonance Imaging
BMD_ENG 333-0	Modern Optical Microscopy & Imaging
BMD_ENG 343-0	Biomaterials and Medical Devices (BMD_ENG 343-0 and MAT_SCI 370-0 are duplicate courses and only 1 may be taken)
or MAT_SCI 370-0	Biomaterials
BMD_ENG 344-0	Biological Performance of Materials
BMD_ENG 346-0	Tissue Engineering
BMD_ENG 349-1	Regenerative Engineering Principles and Technologies
BMD_ENG 366-0	Biomechanics of Movement
BMD_ENG 371-0	Mechanics of Biological Tissue
BMD_ENG 377-0	Intermediate Fluid Mechanics

Category B Courses

Course	Title
BIOL_SCI 219-0	Cell Biology *
BIOL_SCI 301-0	Principles of Biochemistry *
BMD_ENG 314-0	Models in Biochemistry & Molecular Biology
BMD_ENG 315-0	Application of Genetic Engineering to Immunochemistry
BMD_ENG 316-0	Engineering Design of Therapeutic Antibodies
BMD_ENG 317-0	Biochemical Sensors
BMD_ENG 323-0	Visual Engineering Science
BMD_ENG 325-0	Introduction to Medical Imaging
BMD_ENG 327-0	Magnetic Resonance Imaging
BMD_ENG 333-0	Modern Optical Microscopy & Imaging
BMD_ENG 343-0	Biomaterials and Medical Devices (BMD_ENG 343-0 and MAT_SCI 370-0 are duplicate courses and only 1 may be taken)

or MAT_SCI 370-0	Biomaterials
BMD_ENG 344-0	Biological Performance of Materials
BMD_ENG 346-0	Tissue Engineering
BMD_ENG 349-1	Regenerative Engineering Principles and Technologies
BMD_ENG 349-2	Regenerative Engineering Applications
BMD_ENG 365-0	Control of Human Limbs and Their Artificial Replacements
BMD_ENG 366-0	Biomechanics of Movement
BMD_ENG 371-0	Mechanics of Biological Tissue
BMD_ENG 377-0	Intermediate Fluid Mechanics
BMD_ENG 380-0	Medical Devices, Disease & Global Health *
BMD_ENG 395-0	Topics in Biomedical Engineering (Bioelectronics and Organic Nanomaterials)
CIV_ENV 327-0	Finite Element Methods in Mechanics
CHEM_ENG 361-0	Introduction to Polymers
CHEM_ENG 379-0	Computational Biology: Principles & Applications
DSGN 360-0	Design Competition
EECS 211-0	Fundamentals of Computer Programming II (EECS 211-0 and EECS 230-0 cover the same material and cannot both be used)
or EECS 230-0	Programming for Engineers
EECS 302-0	Probabilistic Systems
EECS 328-0	Numerical Methods for Engineers
EECS 332-0	Introduction to Computer Vision
EECS 360-0	Introduction to Feedback Systems
EECS 379-0	Lasers and Coherent Optics
EECS 382-0	Photonic Information Processing
EECS 395-0	Special Topics in Electrical Engineering and Computer Science (Sections 23 and 27)
ES_APPM 346-0	Modeling and Computation in Science & Engineering
ES_APPM 370-1	Introduction to Computational Neuroscience
IEMS 385-0	Introduction to Health Systems Management
MECH_ENG 314-0	Machine Dynamics
MECH_ENG 315-0	Theory of Machines - Design of Elements
MECH_ENG 333-0	Introduction to Mechatronics
MECH_ENG 341-0	Computational Methods for Engineering Design
MECH_ENG 362-0	Stress Analysis
MECH_ENG 385-0	Nanotechnology
MECH_ENG 389-0	Molecular Machines in Biology
MECH_ENG 390-0	Intro to Dynamic Systems
MAT_SCI 318-0	Materials Selection
MAT_SCI 360-0	Introduction to Electron Microscopy
MAT_SCI 376-0	Nanomaterials
PHYSICS 357-0	Optics Laboratory *

* Only one course that is less than 1 engineering unit can be counted toward the BME electives.

Chemical Engineering

mccormick.northwestern.edu/chemical-biological

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 gives chemical

engineering its characteristic concern with the management and development of innovation. Chemical engineers have always played a pivotal role in the field of energy and more recently have become key players in sustainability and biotechnology.

While clearly rooted in chemistry, chemical engineering is a distinct discipline that makes significant contributions to society. Concerns about efficient utilization of raw materials, cost-effective and safe processing strategies, and environmental impact have shaped the evolution of the field. Chemical engineers are uniquely skilled in understanding molecular transformations; working over a wide range of scales, from molecular to global; analyzing quantitatively; and viewing, synthesizing, and analyzing large, complex systems.

Preparation for careers in the field requires a comprehension of physical, chemical, biological, and engineering principles. The chemical engineering curriculum provides broad fundamental training and prepares graduates for the chemical and process industries or for advanced study. The program aims at developing graduates who can plan, design, and operate new processes, who can contribute to the development of new chemical products, and who have potential for managerial responsibility in highly technical industrial enterprises.

Areas of Specialization

The curriculum permits students to select one of these six areas of specialization or plan an alternate program with an adviser:

- Bioengineering
- Chemical process engineering
- Design
- Environmental engineering and sustainability
- Nanotechnology and molecular engineering
- Polymer science and engineering

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. A computing laboratory is used in a variety of courses.

Programs of Study

- Chemical Engineering Degree (p. 126)
- Biotechnology and Biochemical Engineering Minor (p. 126)

CHEM_ENG 190-0 Engineering of Chemical and Biological Processes (1 Unit) 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 (1 Unit) Introduction to process systems. Material balances and stoichiometry. Analysis of process system flow sheets. Introduction to departmental computing facilities. Basic numerical analysis. Prerequisites: CHEM 132-0, CHEM 152-0, or CHEM 172-0; GEN_ENG 205-3 (may be taken concurrently).

CHEM_ENG 211-0 Thermodynamics (1 Unit) 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: CHEM_ENG 210-0.

CHEM_ENG 212-0 Phase Equilibrium and Staged Separations (1 Unit) Thermodynamic models of mixtures and phase equilibrium. Analysis and design of staged separation processes such as distillation, absorption, stripping, and extraction. Prerequisites: CHEM_ENG 210-0, CHEM_ENG 211-0.

CHEM_ENG 275-0 Molecular & Cell Biology for Engineers (1 Unit) Introduction to cell and molecular biology concepts that provide the foundation for modern biotechnology and bioengineering. Prerequisite: CHEM 132-0, CHEM 152-0, or CHEM 172-0.

CHEM_ENG 307-0 Kinetics and Reactor Engineering (1 Unit) Chemical reaction kinetics with application to the design of chemical reactors. Prerequisites: CHEM_ENG 210-0, CHEM_ENG 211-0, CHEM_ENG 321-0, CHEM_ENG 322-0.

CHEM_ENG 312-0 Probability and Statistics for Chemical Engineering (1 Unit) 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. Prerequisite: MATH 220-0, MATH 224-0, MATH 230-0, & MATH 234-0, or ES_APPM 252-1 & ES_APPM 252-2.

CHEM_ENG 321-0 Fluid Mechanics (1 Unit) Derivation and applications of continuity and Navier-Stokes equations. Macroscopic mass, momentum, and energy balance. Dimensional analysis: friction factors in pipes and packed beds; drag coefficients. Prerequisites: completion of mathematics requirements with no grades of D; GEN_ENG 205-4 (C- or better).

CHEM_ENG 322-0 Heat Transfer (1 Unit) The differential equations of energy transport. Solutions for various applications. Prerequisites: completion of mathematics requirements with no grades of D; GEN_ENG 205-4 (C- or better); CHEM_ENG 321-0 recommended.

CHEM_ENG 323-0 Mass Transfer (1 Unit) Diffusion and rate concepts; application to distillation, extraction, absorption, humidification, drying. Prerequisites: CHEM_ENG 321-0, CHEM_ENG 322-0.

CHEM_ENG 330-0 Molecular Engineering and Statistical Mechanics (1 Unit) Basic statistical mechanics. Applications to thermodynamics, kinetics, and transport of various engineering systems, including frontier areas of chemical and biological engineering. Not open to students who have taken CHEM_ENG 406-0, CHEM 342-3, or PHYSICS 332-0. Prerequisite: CHEM_ENG 211-0 or another thermodynamics course; courses in probability and statistics, heat transfer, or other transport recommended.

CHEM_ENG 341-0 Dynamics and Control of Chemical and Biological Processes (1 Unit) Dynamic behavior of chemical process components. Feedback control principles. Prerequisites: CHEM_ENG 307-0; senior standing.

CHEM_ENG 342-0 Chemical Engineering Laboratory (1 Unit) Operation and control of process equipment for the determination of operating data. Analysis and written presentation of results. Prerequisites: CHEM_ENG 212-0, CHEM_ENG 307-0, CHEM_ENG 321-0, CHEM_ENG 322-0, CHEM_ENG 323-0.

CHEM_ENG 345-0 Process Optimization for Energy and Sustainability (1 Unit) Modern techniques and application to the design and operation

of chemical process systems. Steady-state and dynamic methods. Experimental search for the optimum. Prerequisite: junior standing.

CHEM_ENG 351-0 Process Economics, Design, & Evaluation (1 Unit) Preliminary design of industrial processes for the production of chemical and allied products by the application of the engineering sciences and economics. Prerequisites: CHEM_ENG 212-0, CHEM_ENG 307-0, CHEM_ENG 321-0, CHEM_ENG 322-0, CHEM_ENG 323-0.

CHEM_ENG 352-0 Chemical Engineering Design Projects (1 Unit) 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: CHEM_ENG 351-0.

CHEM_ENG 355-0 Chemical Engineering Product Design (1 Unit) Properties and selection of chemicals for products from single-molecule pharmaceuticals to devices to manufactured products such as food and consumer goods. Prerequisite: junior standing.

CHEM_ENG 361-0 Introduction to Polymers (1 Unit) Polymerization mechanisms and their relation to molecular structure, polymerization processes, and the mechanical properties of polymers, especially flow behavior. Prerequisites: CHEM_ENG 211-0 or other thermodynamics course; CHEM 210-1.

CHEM_ENG 364-0 Chemical Processing and the Environment (1 Unit) 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: CHEM_ENG 212-0, CHEM_ENG 307-0.

CHEM_ENG 365-0 Sustainability, Technology, and Society (1 Unit) Technical discussion of sustainability, sustainable development, global warming, natural and renewable resources and utilization, industrial ecology, eco-efficiency, technology related to sustainability, and risk assessment. Prerequisite: junior standing in science or engineering.

CHEM_ENG 367-0 Quantitative Methods in Life Cycle Analysis (1 Unit) Lifecycle analysis (LCA) framework for environmental assessment of technology systems, focusing on modeling methods for systems mass and energy flows, process and input-output-based systems inventories, environmental impact analysis, and methods for robust engineering decisions. MECH_ENG 367-0 is taught with CHEM_ENG 367-0; may not receive credit for both courses.

CHEM_ENG 371-0 Transport Phenomena in Living Systems (1 Unit) Application of transport theory, principally diffusion, to movement of molecules in biological systems, including blood, cornea, microcirculation, and lung. Prerequisites: CHEM_ENG 275-0 or BIOL_SCI 215-0 or BIOL_SCI 219-0; CHEM_ENG 321-0, CHEM_ENG 323-0, BMD_ENG 270-0, or equivalent; or consent of instructor.

CHEM_ENG 372-0 Bionanotechnology (1 Unit) Physical biology of the cell and its implications for nanotechnology, with a focus on the quantitative description of sizes, shapes, times, and energies at the nanoscale. Prerequisite: MATH 230-0.

CHEM_ENG 373-0 Biotechnology and Global Health (1 Unit) Recent advances in synthetic biology and genetic, metabolic, and tissue engineering. Design, development, and commercialization of healthcare technologies for countries in the developing world and the challenges of deploying preventative, diagnostic, and therapeutic products in these settings.

CHEM_ENG 375-0 Biochemical Engineering (1 Unit) Modern biochemical engineering. Life sciences: microbiology, biochemistry, and molecular genetics. Metabolic stoichiometry, energetics, growth kinetics, transport phenomena in bioreactors, and product recovery. Prerequisite: CHEM_ENG 307-0, CHEM_ENG 323-0, or consent of instructor.

CHEM_ENG 376-0 Principles of Synthetic Biology (1 Unit) Overview of synthetic biology's foundations in the natural sciences and engineering and its applications in medicine, biotechnology, and green chemistry. How engineering driven approaches may be used to accelerate design-build-test loops required for reprogramming existing biological systems and constructing new ones. Prerequisites: CHEM_ENG 275-0 or BIOL_SCI 215-0 or BIOL_SCI 219-0

CHEM_ENG 377-0 Bioseparations (1 Unit) Downstream process in biotechnology. Separation and lysis of cells. Recovery of organelles and proteins. Protein separation and purification. Prerequisites: CHEM_ENG 323-0 (may be taken concurrently); CHEM_ENG 275-0 or BIOL_SCI 215-0 or BIOL_SCI 219-0.

CHEM_ENG 379-0 Computational Biology: Principles & Applications (1 Unit) 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 381-0 Practical Biological Imaging (1 Unit) Theory and practice of biological microscopy in a lab setting; image acquisition, analysis, and the ethics of image manipulation.

CHEM_ENG 382-0 Regulatory Sciences in Biotechnology (1 Unit) Course on topics at the intersection of science, engineering, and biotech regulatory compliance. Federal regulations for drug product development; regulatory compliance processes and organizational structure; interface between biotechnology processes and regulatory sciences; global harmonization of regulations; regulatory documentation.

CHEM_ENG 390-0 Personal & Organizational Effectiveness (1 Unit) 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 (1 Unit) Topics suggested by students or faculty and approved by the department.

CHEM_ENG 399-0 Projects (1 Unit) Supervised investigation of a chemical engineering problem with submission of a final report.

Chemical Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Requirements (48 units)	
<i>Core Courses (32 units)</i> ¹	
4 mathematics courses (p. 116)	
4 engineering analysis and computer proficiency courses (p. 116)	
4 units of basic science:	
PHYSICS 135-2 & PHYSICS 135-3	General Physics and General Physics
CHEM 131-0 & CHEM 132-0	General Chemistry 1 and General Chemistry 2
or CHEM 151-0 & CHEM 152-0	Accelerated General Chemistry 1 and Accelerated General Chemistry 2

or CHEM 171-0 & CHEM 172-0	Advanced General Inorganic Chemistry and Advanced General Physical Chemistry
3 design and communications courses (p. 116)	
5 basic engineering courses:	
CHEM_ENG 210-0	Analysis of Chemical Process Systems
CHEM_ENG 211-0	Thermodynamics
CHEM_ENG 321-0	Fluid Mechanics
MAT_SCI 301-0	Materials Science Principles
CHEM_ENG 312-0 or IEMS 303-0	Probability and Statistics for Chemical Engineering Statistics
7 social sciences/humanities courses (p. 116)	
5 unrestricted electives (p. 116)	
<i>Major Program (16 units)</i>	
11 Required Courses:	
CHEM 210-1 & CHEM 210-2	Organic Chemistry and Organic Chemistry
CHEM_ENG 212-0	Phase Equilibrium and Staged Separations
CHEM_ENG 275-0	Molecular & Cell Biology for Engineers ²
CHEM_ENG 307-0	Kinetics and Reactor Engineering
CHEM_ENG 322-0	Heat Transfer
CHEM_ENG 323-0	Mass Transfer
CHEM_ENG 341-0	Dynamics and Control of Chemical and Biological Processes
CHEM_ENG 342-0	Chemical Engineering Laboratory
CHEM_ENG 351-0	Process Economics, Design, & Evaluation
CHEM_ENG 352-0	Chemical Engineering Design Projects
5 technical electives:	
2 advanced chemical engineering courses from an approved list available from the department	
1 engineering course from an approved list available from the department or 1 unit of independent study	
1 advanced science or mathematics course from an approved list available from the department	
1 engineering, advanced science, or mathematics course from an approved list available from the department	

¹ See general requirements (p. 116) for details.
² BIOL_SCI 215-0 Genetics and Molecular Biology or BIOL_SCI 219-0 Cell Biology may substitute for CHEM_ENG 275-0 Molecular & Cell Biology for Engineers

Biotechnology and Biochemical Engineering Minor

This minor provides specific training for McCormick students interested in industries that create and manufacture bio-based fuels and industrial chemicals, pharmaceuticals, biomaterials, and agents for gene and cell therapies or for those desiring in-depth preparation for future graduate study in biotech research.

Course	Title
Requirements (10 units)	
6 courses in biological science and biochemical engineering:	
BIOL_SCI 215-0	Genetics and Molecular Biology ¹
BIOL_SCI 219-0	Cell Biology ¹
BIOL_SCI 217-0 or BMD_ENG 303-0	Physiology Quantitative Systems Physiology
BIOL_SCI 308-0	Biochemistry ²

or BIOL_SCI 301-0	Principles of Biochemistry
CHEM_ENG 375-0	Biochemical Engineering
CHEM_ENG 377-0	Bioseparations

Laboratory experience:

399 independent study in an approved laboratory,
or the complete series of 0.34-unit laboratories

BIOL_SCI 220-0 & BIOL_SCI 221-0 & BIOL_SCI 222-0	Genetics and Molecular Processes Laboratory and Cellular Processes Laboratory and Investigative Laboratory
--	--

3 electives providing opportunity for greater depth in both fundamental biology and engineering applications

1 course from Core Electives (p. 127)

2 courses from Extended Electives (p. 127)

¹ CHEM_ENG 275-0 Molecular & Cell Biology for Engineers may substitute for either one

² BIOL_SCI 308-0 Biochemistry (recommended, especially for non-engineers) or BIOL_SCI 301-0 Principles of Biochemistry

- A minimum GPA of 2.0 is required in courses in the minor.
- A BA or BS degree from Northwestern must be completed.
- No more than 5 courses may be double-counted to fulfill requirements in the major program.
- A maximum of 2 courses not offered by the department may be taken P/N for the minor. Students must also comply with departmental and McCormick P/N regulations for courses that are double-counted toward requirements in the minor and major programs.
- Students not majoring in chemical engineering should take BIOL_SCI 215-0 Genetics and Molecular Biology, BIOL_SCI 217-0 Physiology, BIOL_SCI 219-0 Cell Biology, and BIOL_SCI 308-0 Biochemistry before CHEM_ENG 375-0 Biochemical Engineering and CHEM_ENG 377-0 Bioseparations. They should also take CHEM 342-1 Thermodynamics and the recommended BIOL_SCI 315-0 Advanced Cell Biology to prepare for CHEM_ENG 375-0 Biochemical Engineering and CHEM_ENG 377-0 Bioseparations.
- Students must submit a completed petition form for the minor to the Office of Undergraduate Engineering before the beginning of their final quarter as undergraduates.

Minor Electives

Core Electives

Course	Title
CHEM_ENG 371-0	Transport Phenomena in Living Systems
CHEM_ENG 372-0	Bionanotechnology
CHEM_ENG 373-0	Biotechnology and Global Health
CHEM_ENG 376-0	Principles of Synthetic Biology
CHEM_ENG 379-0	Computational Biology: Principles & Applications
CHEM_ENG 382-0	Regulatory Sciences in Biotechnology
CHEM_ENG 475-0	Cell-Material Interactions
CHEM_ENG 478-0	Advances in Biotechnology
CHEM_ENG 479-0	Cell Culture and Ex Vivo Tissue Engineering
CHEM_ENG 395-0	Special Topics in Chemical Engineering (must be approved by petition)

Extended Electives

Course	Title
CHEM_ENG 371-0	Transport Phenomena in Living Systems
CHEM_ENG 372-0	Bionanotechnology

CHEM_ENG 373-0	Biotechnology and Global Health
CHEM_ENG 376-0	Principles of Synthetic Biology
CHEM_ENG 379-0	Computational Biology: Principles & Applications
CHEM_ENG 382-0	Regulatory Sciences in Biotechnology
CHEM_ENG 475-0	Cell-Material Interactions
CHEM_ENG 478-0	Advances in Biotechnology
CHEM_ENG 479-0	Cell Culture and Ex Vivo Tissue Engineering
CHEM_ENG 395-0	Special Topics in Chemical Engineering (must be approved by petition)
BIOL_SCI 315-0	Advanced Cell Biology
BIOL_SCI 323-0	Bioinformatics: Sequence and Structure Analysis
BIOL_SCI 328-0	Microbiology
BIOL_SCI 330-0	Plant Biology
BIOL_SCI 332-0	Conservation Genetics
BIOL_SCI 341-0	Population Genetics
BIOL_SCI 353-0	Molecular Biology Laboratory
BIOL_SCI 355-0	Immunobiology
BIOL_SCI 361-0	Protein Structure and Function
BIOL_SCI 363-0	Biophysics
BIOL_SCI 378-0	Functional Genomics
BIOL_SCI 380-0	Biology of Cancer
BIOL_SCI 390-0	Advanced Molecular Biology
BIOL_SCI 395-0	Molecular Genetics
BMD_ENG 317-0	Biochemical Sensors
BMD_ENG 343-0	Biomaterials and Medical Devices
BMD_ENG 344-0	Biological Performance of Materials
BMD_ENG 346-0	Tissue Engineering
BMD_ENG 349-1	Regenerative Engineering Principles and Technologies
CHEM 210-3	Organic Chemistry
CIV_ENV 361-1	Environmental Microbiology
CIV_ENV 441-0	Chemical Microbial Interactions
CIV_ENV 442-0	Processes in Environmental Biotechnology
Independent Study 399 in approved laboratory	

Civil and Environmental Engineering

mccormick.northwestern.edu/civil-environmental

The Department of Civil and Environmental Engineering offers two degree programs for undergraduate students, one in civil engineering and another in environmental engineering, as well as a minor in environmental engineering and an architectural engineering and design certificate.

Civil and environmental engineers play central roles in defining sustainable development approaches to the interactions of humans with earth systems. The curricula of these programs place strong emphasis on design, communication, teamwork, and the development of a systems perspective on the complex problems of today and tomorrow.

Civil Engineering

Civil Engineering is an international profession that provides solutions for pressing societal challenges for both the natural and built environment.

Civilian infrastructure systems provide safe and efficient transportation systems for people, food, and manufactured goods; safe and energy efficient residential and commercial buildings; support the ecological and human health by protecting the quality of water, air, and land; and support the energy sector with power plants and their support structures.

Civil Engineering bridges science and society, and thus plays a leading role in planning, designing, building, and ensuring a sustainable future. The American Society of Civil Engineers (ASCE) defines **sustainability** as *a set of economic, environmental and social conditions in which all of society has the capacity and opportunity to maintain and improve its quality of life indefinitely, without degrading the quantity, quality or the availability of natural resources and ecosystems*. The civil engineering profession recognizes the reality of limited natural resources, the desire for sustainable practice (including life-cycle analysis and sustainable design techniques), and the need for social equity in the consumption of resources.

Civil Engineers are the stewardess of our natural resources and the built environment that support commerce, recreation, health, and other necessities of modern social economies. They design, construct, and manage these systems as well as the taller, longer, lighter, and more elegant structures at the end nodes, such as airports, sky scrapers, bridges, etc. everywhere on the planet and even in space. Each system has unique characteristics that challenge civil engineers to combine engineering knowledge with initiative and creativity to meet project objectives, protect the well-being of society and our finite natural resources, and meet budget constraints.

In addition to the applications of mathematics, physical, natural, and engineering sciences, Civil Engineers must incorporate excellent communication and people-skills, social, economic, managerial sciences, and collaborate with architects, public officials, owners, contractors, material suppliers and the public during various phases of a project. Their work may extend to materials science to develop new building materials; using advanced sensors and communication devices to monitor performance of bridges, tunnels, buildings in real time, over long distances, and under extreme conditions. Civil engineers have designed infrastructures that stretched the limit of materials, performance, and human desire while preserving our natural resources.

The most unique aspects of civil engineering are: the close interaction with the citizens of a community, influence of political policy, and the ability to execute sustainable designs and constructions that have tremendous impact to the social, economic, and welfare of every member in the world.

At Northwestern, the Civil Engineering curriculum is designed to satisfy students' diverse interest and professional goals. Students develop study plans suited to their unique interest, including extensive options for courses such as Architectural Engineering and Design Certificate, Environmental Engineering Minor within our Department and Kellogg School of Management Certificate program for undergraduates to address the social, physical, and financial challenges of constructing and managing the nation's infrastructure.

While Civil engineering graduates typically work in engineering consulting firms, city and county public works, state departments of transportation, construction companies, various branches of federal government, and engineering material product industries, some of our graduates work in the aerospace industry, Wall Street, medicine, laws, politics, and policy development. A majority of Northwestern graduates receive at least one advanced degree. About half of these received advanced degrees are in other professional fields such as aerospace, business administration, medicine, and law. Others may work in research and development, and teaching.

Our recent graduates hold jobs in a wide spectrum of areas such as infrastructure engineering consulting (buildings, bridges, railroads,

power plants, environmental treatment plants, etc.), construction, project management, architecture, energy, and finance. Their positions include project engineers, project managers, field engineers, and designers. Some graduates join the business sector as business analysts, technical consultants, and derivative traders. Sample of their employers include Amazon, Boeing, Accenture, ARCADIS, Mass Electric Construction, General Dynamics' Electric Boat Division, National Forest Service, SOM, WSP, Thornton Tomsasetti, Jacobs, and MWRD. Others went directly to graduate school. Most mid-career civil engineers hold supervisory or administrative positions such as project engineers.

Environmental Engineering

Is the water safe to drink? Is the air dangerous to breathe? Should we eat the fish we catch or the crops we grow? Do our living and work spaces pose special threats to our health? Environmental Engineers are the technical professionals who identify and design solutions for environmental problems. They provide answers to the above and other questions about the potentially harmful interrelationships between human civilization and the environment. Environmental engineers apply scientific and technological knowledge to eliminate or reduce environmental problems. They seek to shield the environment from the harmful effects of human activity, protect human populations from adverse environmental events such as floods and disease, and restore environmental quality for ecological and human well-being. Traditionally, environmental engineering includes:

1. The identification and measurement of potentially harmful physical, chemical, and biological agents in the environment,
2. The transport and fate of these agents,
3. The effects of these agents on people and the environment, and
4. The design and operation of engineered systems for the maintenance and improvement of the quality of our environment.

Historically, it was the sanitary and civil engineers who made cities livable for large populations. However, the role of environmental engineering has been expanding in the past few decades. Increasingly, environmental engineers are being called upon to expand the focus of their efforts to address the challenges associated with alternative energy, sustainability, climate change, ecological restoration and emerging public health threats.

Northwestern has developed an interdisciplinary approach to the education of environmental engineers. The four-year curriculum provides the students with a sound fundamental knowledge of environmental engineering principals and an opportunity to integrate other aspects such as basic science, social science, humanities, and public policy to their knowledge. Environmental Engineers stand at the threshold between natural environmental systems and human societies!

Graduates in environmental engineering will have many career opportunities in a spectrum of business sectors and government agencies. These include engineering consulting firms that offer challenging employment in environmental planning, design, and management. The manufacturing and chemical industries, utilities, the pollution control industry, and others need engineers for the development and management of research and environmental control programs. Engineers in governmental agencies are responsible for planning and assessment of control strategies and measures to assure a clean and healthful environment. Universities and research organizations afford additional avenues of career development.

Our recent graduates hold positions as engineering designers, business analytics, and staff engineers of regulatory agency. Sample of their employers include MWH, Ch2M, Jacobs, EPA, Black & Veatch, McMaster Carr, 3M, and many energy start-ups. Many of our graduates continued their education in schools of engineering, law, medicine, public health, and management.

Programs of Study

- Civil Engineering Degree (p. 134)
- Environmental Engineering Degree (p. 135)
- Environmental Engineering Minor (p. 136)
- Architectural Engineering and Design Certificate (p. 136)

CIV_ENV 190-0 Civil and Environmental Engineering Seminar (0 Unit)

Introductory-level special topic seminar intended for first and second-year students.

CIV_ENV 195-0 Introductory Course in Civil and Environmental Engineering (1 Unit)

Introductory-level special topics courses in civil and environmental engineering. 195 is similar to CIV_ENV 395-0 but intended for first and second-year students.

CIV_ENV 201-0 Engineering Possibilities: Decision Science in the Age of Smart Technologies (1 Unit)

Define challenges facing cities, and learn how to critically evaluate different solutions, ranging from traditional to innovative. Foster critical thinking about problem definitions along with the definition of metrics that represent desirable (and undesirable) outcomes in urban systems.

CIV_ENV 202-0 Biological and Ecological Principles (1 Unit)

Fundamentals of biology - including cell biology, genetics, and biochemistry - and ecology - including biological interactions, microbial ecology - and biogeochemical cycling as they apply to natural and engineered systems. Bioinformatics tools necessary for analyzing biological and ecological data. Prerequisites: MATH 224-0; CHEM 131-0, CHEM 151-0, or CHEM 171-0

CIV_ENV 203-0 Earth in the Anthropocene (1 Unit) Fundamentals of Earth system science and their connections to the need for humans to develop food, water, energy and infrastructure systems that has led to transformation of the Earth's surface and of its atmosphere. Prerequisite: MATH 224-0; CHEM 131-0, CHEM 151-0, or CHEM 171-0 *Natural Sciences Distro Area*

CIV_ENV 205-0 Economics and Finance for Engineers (1 Unit) Principles of corporate finance; financial decisions of firms; value; risk and return; investment and capital budgeting decisions under certainty and uncertainty; performance evaluation. May not be taken for credit with or after KELLG_FE 310-0. Prerequisite: MATH 220-0; basic understanding of probability and economics recommended.

CIV_ENV 216-0 Mechanics of Materials I (1 Unit) 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: GEN_ENG 205-2 or GEN_ENG 206-2

CIV_ENV 220-0 Structural Art (1 Unit) Learn how to interpret and understand the built environment through an examination of the history of structural engineering as a creative art, with particular emphasis on technical, visual, and social analysis and critique of bridges, buildings, and designers.

CIV_ENV 221-0 Theory of Structures I (1 Unit) 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: CIV_ENV 216-0.

CIV_ENV 250-0 Earth Surface Engineering (1 Unit) 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: MECH_ENG 241-0.

CIV_ENV 260-0 Environmental Systems and Processes (1 Unit) Basic engineering principles required for the design, operation, analysis, and modeling of both natural and engineered systems and their application to major issues facing human and environmental health of ecosystems. Prerequisites: CHEM 131-0, CHEM 151-0, or CHEM 171-0; Corequisites: MATH 224-0

CIV_ENV 295-0 Introductory topics in Civil and Environmental Engineering (1 Unit) Intermediate-level study of topics suggested by students or faculty members and approved by the department.

CIV_ENV 301-1 Professional Development Seminar I (0.34 Unit) Case study in engineering ethics, with discussion of topics in professional development and lifelong learning. Prerequisite: junior engineering standing.

CIV_ENV 301-2 Professional Development Seminar II (0 Unit) Preparation for the Fundamentals of Engineering (FE) exam. Prerequisite: senior engineering standing.

CIV_ENV 302-0 Engineering Law (1 Unit) 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 engineering standing.

CIV_ENV 303-0 Environmental Law and Policy (1 Unit) An introduction to important aspects of environmental law and policy. Covers a wide range of environmental topics, with a focus on major federal environmental statutes. Prerequisite: junior or senior standing.

CIV_ENV 304-0 Civil and Environmental Engineering Systems Analysis (1 Unit) Quantitative techniques to develop descriptive and prescriptive models that support efficient planning and management of civil and environmental engineering systems. Prerequisite: MATH 224-0 or equivalent.

CIV_ENV 306-0 Uncertainty Analysis (1 Unit) Probability, statistics, and decision theory. Discrete and continuous random variables, marginal and conditional distributions, moments, statistical model selection and significance tests, hypothesis testing, and elementary Bayesian decision theory. Application to problems in soil mechanics, water resources, transportation, and structures.

CIV_ENV 314-0 Organic Geochemistry (1 Unit) The sources and fates of organic matter in the natural environment; global cycling of organic carbon; applications to the study of modern and ancient environments. Taught with EARTH 314-0; may not receive credit for both courses. Prerequisites: 1 course in earth and planetary sciences or environmental sciences; 1 course in chemistry.

CIV_ENV 317-0 Biogeochemistry (1 Unit) Cycling of biogenic elements (C, N, S, Fe, Mn) in surficial environments. Emphasis on microbial

processes and isotopic signatures. Prerequisites: 1 quarter of chemistry; 1 quarter of geoscience, environmental sciences, or biological sciences.

CIV_ENV 318-0 Mechanics of Fracture (1 Unit) 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, and dynamic effects.

CIV_ENV 319-0 Theory of Structures 2 (1 Unit) 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: CIV_ENV 221-0.

CIV_ENV 320-0 Structural Analysis--Dynamics (1 Unit) 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: CIV_ENV 221-0.

CIV_ENV 321-0 Concrete Properties (1 Unit) Concrete as a composite material; relationship between constitutive laws and microstructure; failure theories; fracture; fatigue; strain rate effects; destructive and nondestructive testing; creep and shrinkage; chemistry of cement hydration; admixtures; aggregates; proportioning; new materials.

CIV_ENV 322-0 Structural Design (1 Unit) 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: CIV_ENV 325-0 or equivalent.

CIV_ENV 323-0 Structural Steel Design (1 Unit) Rational basis of structural design. Design approach for structural-steel components of a building system. Prerequisites: CIV_ENV 216-0; CIV_ENV 221-0 or equivalent.

CIV_ENV 325-0 Reinforced Concrete (1 Unit) 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: CIV_ENV 221-0.

CIV_ENV 326-0 Engineering Forensics (1 Unit) Introduction to failure analysis and forensic engineering to describe how these investigative procedures contribute to regulations, engineering design, safety principles, and the economic aspects of structure engineering. Prerequisite: CIV_ENV 221-0

CIV_ENV 327-0 Finite Element Methods in Mechanics (1 Unit) 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. Taught with MECH_ENG 327-0; may not receive credit for both courses.

CIV_ENV 330-0 Engineering Project Management (1 Unit) 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: instructor consent

CIV_ENV 332-0 Building Construction Estimating (1 Unit) Estimation of cost at different stages of design; conceptual estimating and quantity takeoff of various elements, such as materials, labor, and equipment. Prerequisites: CIV_ENV 330-0; consent of instructor.

CIV_ENV 336-0 Project Scheduling (1 Unit) 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: CIV_ENV 330-0 or consent of instructor.

CIV_ENV 340-0 Hydraulics and Hydrology (1 Unit) Civil and environmental engineering applications of fluid mechanics. Turbulent flow in pipes and rivers, pipe and river networks, and open channels. Prerequisite: MECH_ENG 241-0

CIV_ENV 346-0 Ecohydrology (1 Unit) Interactions between water and ecosystems in freshwater, terrestrial, and urban environments. Feedbacks between ecological and hydrological processes. Engineering of ecosystems such as constructed wetlands, green roofs, and other green infrastructure for resilient and sustainable water management.

CIV_ENV 349-0 Environmental Management (1 Unit) The roles and responsibilities of project managers who deal with environmental issues. How managers deal with previously created environmental problems, respond to current requirements, and anticipate future needs. Prerequisites: a technical background and senior standing.

CIV_ENV 352-0 Foundation Engineering (1 Unit) 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: CIV_ENV 250-0.

CIV_ENV 355-0 Hydrogeology and Subsurface Contamination (1 Unit) The integration of principles of geology, physics, chemistry, and mathematics required for understanding groundwater flow and how to perform aquifer tests, the fate and remediation of contaminants in the subsurface, and to develop numerical models for simulating these processes. Prerequisites: fluid mechanics

CIV_ENV 356-0 Transport Processes in Porous Media (1 Unit) 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.

CIV_ENV 358-0 Airphoto Interpretation (1 Unit) Principles and practice of using aerial photographs to obtain information about natural features of the earth's surface, with emphasis on earth materials. Landforms, geological processes, rocks, and soils. Stereoscopic photographs, elements of photogrammetry. Prerequisite: junior standing or consent of instructor.

CIV_ENV 361-1 Environmental Microbiology (1 Unit) Basic principles and practical applications of microbiology to environmental issues, such as microbial contamination, degradation of organic contaminants, production of alternative fuels, and global climate change.

CIV_ENV 361-2 Public & Environmental Health (1 Unit) Current problems in public and environmental health, such as the worldwide burden of major infectious diseases, emergence of new pathogens, and environmental reservoirs of infectious organisms. Prerequisite: CIV_ENV 361-1 or consent of instructor.

CIV_ENV 363-0 Environmental Engineering Applications 1: Air and Land (1 Unit) 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: CIV_ENV 260-0.

CIV_ENV 364-0 Sustainable Water Systems (1 Unit) An overview of the engineered water cycle focusing the fundamental principles as well as the design and assessment methods for physical, chemical and biological treatment unit processes for drinking water treatment, used water treatment and reuse, and emerging issues such as the energy-food-water nexus. Prerequisites: CIV_ENV 260-0, MECH_ENG 241-0; CIV_ENV 340-0 recommended

CIV_ENV 365-0 Environmental Laboratory (1 Unit) Chemical and microbiological aspects of environmental engineering and science are explored through an integrated laboratory course. Prerequisite: CIV_ENV 367-0.

CIV_ENV 367-0 Chemical Processes in Aquatic Systems (1 Unit) Chemical principles for understanding and predicting the chemical composition and evolution of natural waters using an equilibrium approach. Applications to environmental issues such as metal speciation and toxicity, ocean acidification, carbon storage. Prerequisites: BMD_ENG 250-0 or CHEM_ENG 211-0.

CIV_ENV 368-0 Sustainability: The City (1 Unit) Exploration of the issues that motivate the design and engineering of sustainable resource use and development.

CIV_ENV 370-0 Emerging Organic Contaminants (1 Unit) Fundamental molecular processes that govern the fate and transformation of emerging organic contaminants in natural and engineered environmental systems. Prerequisites: CHEM 210-1 or consent of instructor

CIV_ENV 371-0 Introduction to Transportation Planning and Analysis (1 Unit) Analysis and design of solutions to transportation problems; introduction to selected operations research and statistical analysis techniques; use of case studies in urban transportation, intercity passenger transport, and freight movements. Prerequisite: junior standing or consent of instructor.

CIV_ENV 376-0 Transportation System Operations (1 Unit) Traffic-flow theory; vehicle and human factors, capacity analysis, intersection performance and control; management and control of arterial streets and networks; neighborhood traffic restraint, urban transit operations. Operations concepts and theories applied to actual problems through laboratory practice. Prerequisite: basic understanding of calculus and statistics; knowledge of MATLAB desirable but not required.

CIV_ENV 382-1 Capstone Design I (0.5 Unit) Culminating team-based design experience in civil and environmental engineering, with an overview of the function, design, and operations of modern infrastructure systems. Part 1 of 2-course sequence. Prerequisite: senior standing in civil or environmental engineering or consent of instructor

CIV_ENV 382-2 Capstone Design II (0.5 Unit) Culminating team-based design experience in civil and environmental engineering, with an overview of the function, design, and operations of modern infrastructure systems. Part 2 of 2-course sequence. Prerequisite: CIV_ENV 382-1

CIV_ENV 385-1 Architectural Engineering and Design 1: Fundamentals (1 Unit) Architectural engineering and design studios: architectural history, case studies in design, construction and management of buildings, and drawing and model building. Fundamental studio: basic architectural and structural design of a simple building project. Prerequisite: junior standing in engineering or consent of instructor.

CIV_ENV 385-2 Architectural Engineering & Design 2: Intermediate (1 Unit) Architectural engineering and design studios: architectural history,

case studies in design, construction and management of buildings, and drawing and model building. Intermediate studio: architectural and structural design of a building project with multiple requirements. Prerequisites: CIV_ENV 385-1 and junior standing in engineering; or consent of instructor.

CIV_ENV 385-3 Architectural Engineering & Design 3: Advanced Studio (1 Unit) Architectural engineering and design studios: architectural history, case studies in design, construction and management of buildings, and drawing and model building. Advanced studio: architectural and structural design of a large, complex building project. Prerequisites: CIV_ENV 385-2 and junior standing in engineering; or consent of instructor.

CIV_ENV 386-0 High Performance Architectural Design (1 Unit) Elements of high performance building design and to explore the various matrices used to analyze the relationship between the structure and function of various design alternatives.

CIV_ENV 387-0 Design of Sustainable Urban Developments (1 Unit) Design high performing neighborhoods, districts and communities that incorporate principles of density, diversity and flexibility around the "operating system of nature". Prerequisite: CIV_ENV 386-0, senior standing, consent of instructor; recommend CIV_ENV 385-1, CIV_ENV 385-2, and CIV_ENV 385-3.

CIV_ENV 395-0 Special Topics in Civil and Environmental Engrg (1 Unit) Topics suggested by students or faculty and approved by the department.

CIV_ENV 398-1 Community-based Design 1 (1 Unit) Yearlong participation in two-or three-person team projects involving research, analysis, and/or design in the solution of environmental problems affecting primarily lower-income communities. Grade assigned only on completion of both units. Prerequisite: consent of instructor.

CIV_ENV 398-2 Community-based Design 2 (1 Unit) Yearlong participation in two-or three-person team projects involving research, analysis, and/or design in the solution of environmental problems affecting primarily lower-income communities. Grade assigned only on completion of both units. Prerequisite: consent of instructor.

CIV_ENV 399-0 Projects (1 Unit) Special studies under faculty direction. Credit to be arranged.

CIV_ENV 410-0 Theory of Plates and Shells (1 Unit) Derivation of governing equations for plates, cylindrical shells and spherical shells, analytical and numerical methods for the solutions of elastic and inelastic problems, and civil engineering applications.

CIV_ENV 411-0 Micromechanics 1 (1 Unit) Mechanics of microstructures of materials, such as continuum theory of dislocations, inclusions, inhomogeneities, cracks, and composite materials. Unified eigenstrain method employed.

CIV_ENV 413-0 Experimental Solid Mechanics (1 Unit) Brief review of applied elasticity and fracture mechanics. Review of experimental methods for measuring mechanical behavior of solids, including deformation and fracture, fracture toughness and dynamic response at high strain rates. Methods discussed include strain gages, photoelasticity, birefringent coatings, moiré, digital image correlation, and fiberoptic methods. MECH_ENG 413-0 and CIV_ENV 413-0 are combined.

CIV_ENV 414-1 Mechanics of Composite Materials 1 (1 Unit) Introduction to basic concepts: fabrication of composite materials, micromechanics, macromechanics of unidirectional lamina, failure

theories, mechanics of multidirectional laminate, lamination theory, hydrothermal effects, interlaminar stresses, stress concentrations, structural design and optimization, and nondestructive evaluation. CIV_ENV 414-1 and MECH_ENG 414-1 are combined.

CIV_ENV 414-2 Mechanics of Composite Materials II (1 Unit)

Introduction to basic concepts: fabrication of composite materials, micromechanics, macromechanics of unidirectional lamina, failure theories, mechanics of multidirectional laminate, lamination theory, hydrothermal effects, interlaminar stresses, stress concentrations, structural design and optimization, and nondestructive evaluation. MECH_ENG 414-2 and CIV_ENV 414-2 are combined.

CIV_ENV 415-0 Theory of Elasticity (1 Unit) Notions of stress and strain. Basic equations of the linear theory of elastic media. Stress function and displacement potentials. Applications to specific classes of problems such as plane strain, contact stresses, and axisymmetric problems. Stress concentration. Singular states of stress. Dislocations and residual stresses.

CIV_ENV 417-1 Mechanics of Continua 1 (1 Unit) Introduction to mechanics of continuous media. Cartesian tensors; kinematics of deformable media; stress; balance laws; constitutive relations for selected solids and fluids.

CIV_ENV 417-2 Mechanics Continua 2 (1 Unit) Kinematics of deformable media, thermodynamics and balance laws of continua, general theory of constitutive equations. Emphasis on large deformation theories; objective stress and deformation measures with applications in finite strain elasticity. Introduction to nonlinear and inelastic material behavior including applications in plasticity and viscoelasticity. Prerequisites: CIV_ENV 417-1 or equivalent.

CIV_ENV 420-0 Advanced Structural Analysis (1 Unit) Solution of nonlinear equations for structures, shear center and center of twist of open and multicell cross sections, shear stresses in multicell closed cross sections, restrained warping torsion stresses.

CIV_ENV 421-0 Prestressed Concrete Design (1 Unit) Principles of prestressed concrete. Prestressing systems, end anchorage, and loss of prestress. Analysis and design of sections for flexure, shear, bond, bearing, and deflection. Continuous beams, slab, tension, and compression members. Circular prestressing.

CIV_ENV 422-0 Inelastic Analysis of Structures (1 Unit) Inelastic analysis of frames, plates, and shells. Plastic behavior and limit analysis theorems. Static and kinematic methods for calculating collapse loads. Yield surfaces for plates and shells, plastic potential flow law, and load capacity. Viscoelastic behavior and rheologic models. Creep of concrete and its effects in structures.

CIV_ENV 423-0 Matrix Analysis of Structures (1 Unit) Use of matrix methods for analysis of articulated structural systems, geometric matrices, stability, analysis of geometrically nonlinear systems, introduction to the finite element method.

CIV_ENV 424-0 Stability of Structures (1 Unit) Buckling of perfect and imperfect columns, mathematical treatment of various types of stability problems and stability criteria, dynamic and static instability, and energy methods. Buckling of frames, trusses, and beams. Snap-through, elastic-plastic columns, creep buckling, and basic approach to buckling of two- and three-dimensional bodies.

CIV_ENV 425-0 Behavior of Reinforced Concrete (1 Unit) Nonlinear behavior of reinforced concrete structural members. assumptions underlying serviceability criteria, ductility for earthquake design, etc.

CIV_ENV 426-1 Advanced Finite Element Methods 1 (1 Unit) Methods for treating material and geometric nonlinearities by finite elements; transient analysis: explicit and implicit time integration, partitioned methods, and stability; hybrid and mixed elements; finite elements for plates and shells; convergence, efficiency, and computer implementation.

CIV_ENV 426-2 Advanced Finite Element Methods 2 (1 Unit)

CIV_ENV 430-0 Cohesive Fracture and Scaling (1 Unit) Fracture mechanics fundamentals. Concrete, composites, ice, rocks, soils, ceramics. Cohesive crack model. Crack band model. Damage. Localization. Nonlocality. Size effect laws. Statistical aspects. Discrete micro-modeling. Fracture stability. Environmental effects, loading rate and fatigue.

CIV_ENV 434-0 Total Quality Management (1 Unit) How to achieve quality through continuous improvement of processes, customer satisfaction, and creating a team environment; includes data collection and analysis for process improvement.

CIV_ENV 435-0 Cost Engineering and Control (1 Unit) Application of cost engineering for construction companies and projects; time and cost integration; estimating process and bid preparation; labor estimates; accounting for equipment; cost-control concepts; changes and extras; claims. Prerequisites: IEMS 425-0 or permission of instructor.

CIV_ENV 436-0 Construction Contracts & Dispute Resolution (1 Unit) Contracts as part of the project delivery system. Components of a construction contract. Intended and unintended contract changes. Payment process. Trade union influences. Negotiations. Alternative dispute resolution. Mechanics liens. Risk management through insurance. Prerequisites: CIV_ENG 330-0 or permission of instructor.

CIV_ENV 440-0 Environmental Transport Processes (1 Unit) Processes controlling transport and fate of dissolved and suspended substances in natural and engineered environmental systems. Mass balances, hydrodynamic transport, phase and mass transfers; the fate of reactive species in complex environmental systems..

CIV_ENV 441-0 Chemical Microbial Interactions (1 Unit) Applications of classical microbiology and molecular biology methods to study complex microbial communities. Includes a laboratory component. Prerequisites: CIV_ENV 361-1.

CIV_ENV 442-0 Processes in Environmental Biotechnology (1 Unit) Theory and practice of microbiological processes used in pollution control: kinetics of suspended-growth and fixed-film processes, activated sludge, biofilm processes, nitrogen and phosphorus removal, methanogenesis. Prerequisites: CIV_ENV 440-0, CIV_ENV 441-0, and CIV_ENV 467-0.

CIV_ENV 443-0 Microbial Ecology (1 Unit) This course provides students with an overview of microbial ecology-that is, the study of interactions between microorganisms and the environment-and how complex microbial communities are linked function and stability of both engineered and natural systems.

CIV_ENV 444-0 Physical/Chemical Processes in Environmental Control (1 Unit) Theory and practice of separations and conversions in water quality and residuals management, coagulation, adsorption, ion

exchange, oxidation, sedimentation, flocculation, filtration. Prerequisites: CIV_ENV 367-0, CIV_ENV-0 440 or equivalent.

CIV_ENV 445-0 Environmental Systems Laboratory (1 Unit) Use of a variety of experimental methods to probe processes occurring in water treatment operations and complex natural systems. Emphasis on bringing multiple tools to bear in order to evaluate overall system behavior.

CIV_ENV 446-0 Environmental Analytical Chemistry (1 Unit) Theory and the applications of analytical chemistry as applied to complex, multiphase environmental systems. Prerequisites: CIV_ENV 367-0.

CIV_ENV 448-0 Biophysicochemical Processes in Environmental Systems (1 Unit) A team-taught course encompassing the synthesis and applications of knowledge gained in previous courses to environmental and biotechnological processes. Discussions of case studies and publications.

CIV_ENV 450-1 Soil Mechanics 1 (1 Unit) First Quarter: Shear strength of soils. Theory of consolidation. Problems of rate-independent and rate-dependent settlement. Second Quarter: Foundation engineering. Bearing capacity of shallow and deep foundations. Deformation of foundations. Effects of construction on performance. Case studies. Third Quarter: Earth and earth-supported structures. Earth pressures on walls. Design of retaining structures and supported excavations. Effects of construction on performance. Stability of slopes. Design of earth dams and embankments. Case studies.

CIV_ENV 450-2 Soil Mechanics 2 (1 Unit) First Quarter: Shear strength of soils. Theory of consolidation. Problems of rate-independent and rate-dependent settlement. Second Quarter: Foundation engineering. Bearing capacity of shallow and deep foundations. Deformation of foundations. Effects of construction on performance. Case studies. Third Quarter: Earth and earth-supported structures. Earth pressures on walls. Design of retaining structures and supported excavations. Effects of construction on performance. Stability of slopes. Design of earth dams and embankments. Case studies.

CIV_ENV 450-3 Soil Mechanics 3 (1 Unit) First Quarter: Shear strength of soils. Theory of consolidation. Problems of rate-independent and rate-dependent settlement. Second Quarter: Foundation engineering. Bearing capacity of shallow and deep foundations. Deformation of foundations. Effects of construction on performance. Case studies. Third Quarter: Earth and earth-supported structures. Earth pressures on walls. Design of retaining structures and supported excavations. Effects of construction on performance. Stability of slopes. Design of earth dams and embankments. Case studies.

CIV_ENV 451-0 Engineering Properties of Soils (1 Unit) Determination and interpretation of engineering properties of soils. Laboratory testing procedures and methods of evaluation and control. Report writing.

CIV_ENV 452-0 Unsaturated Soil Mechanics (1 Unit) Principles of the hydraulics and mechanics of natural and engineered soils characterized by unsaturated conditions.

CIV_ENV 453-0 Rock Mechanics (1 Unit) Engineering properties and behavior of rock masses. Shear strength of rock, in situ and laboratory tests of strength, rock fracture, three-dimensional geometry of joint systems, stability of rock masses, in situ stress determination, and deformability of rock masses.

CIV_ENV 454-0 Constitutive Models for Soils (1 Unit) Numerical models of effective and total stress-strain response of soils; non-linear pseudo-elastic, elasto-plastic and bounding surface models; parameter identification and applications. Prerequisites: CIV_ENV 450-1 or permission of instructor.

CIV_ENV 455-0 Computational Inelasticity (1 Unit)

CIV_ENV 456-0 Computational Poromechanics (1 Unit)

CIV_ENV 457-0 Environmental Geotechnics (1 Unit) Site characterization, geotechnical aspects of waste containment, and remediation. Geological setting and the heterogeneous nature of soils. Design, testing, and quality control for geosynthetics.

CIV_ENV 458-0 Soil Dynamics (1 Unit) Dynamics of soils and soil-foundation systems; nuclear weapon effects, earthquake response, vibrations of machine foundations, reactions due to impact equipment, industrial noise and blast effects, fatigue concepts, wave propagation and attenuation, blast-resistant construction, and linear and nonlinear systems.

CIV_ENV 461-0 Soil Science for Environmental Engineering (1 Unit) Fundamental properties and behavior of soil systems, with emphasis on soil physics, soil chemistry, and soil microbiological and biochemical reactions applied to contaminant transport and fate. Includes laboratory experience with soil.

CIV_ENV 467-0 Advanced Environmental Chemistry (1 Unit) Principles and applications needed to develop advanced problem-solving techniques in environmental chemistry. Major topics include applied thermodynamics, environmental organic chemistry, and problem solving for acid/base, complexation, precipitation/dissolution, and redox.

CIV_ENV 468-0 Metals in the Environment (1 Unit) A course on concepts, fundamentals, and tools used for studying the fate of metals in the environment. The emphasis is placed on the processes that control and regulate the chemical speciation of metals in aquatic environments and inform about their interactions with biological species.

CIV_ENV 471-1 Transportation Systems Analysis 1 (1 Unit) Applications of optimization methods to analysis, design, and operation of transportation and logistics networks. Network equilibrium; flow prediction in congested multicommodity networks; vehicle routing and fleet management; dynamic and stochastic transportation network modeling. Prerequisites: IEMS 310-0 or equivalent background.

CIV_ENV 471-2 Transportation Systems Analysis 2 (1 Unit) Applications of optimization methods to analysis, design, and operation of transportation and logistics networks. Network equilibrium; flow prediction in congested multicommodity networks; vehicle routing and fleet management; dynamic and stochastic transportation network modeling. Prerequisites: IEMS 310-0 or equivalent background.

CIV_ENV 472-1 Transportation System Operations and Control 1: Urban Networks (1 Unit) Concepts and advanced methodologies for the design of control strategies for transportation systems operations, focusing on urban traffic networks.

CIV_ENV 472-2 Transportation System Operations and Control 2: Scheduled Modes and Real-Time (1 Unit) Concepts and advanced methodologies for the design of service networks, operating plans and control strategies for scheduled transportation modes and real-time services.

CIV_ENV 473-0 Survey methods, data and analysis (1 Unit) Theories and techniques of sampling for surveys; methods and modes of survey implementation; types of information collected through different questionnaires; and design of stated preference experiments for discrete choice modeling.

CIV_ENV 479-0 Transp Systems Planning & Management (1 Unit) Functional and structural description of transportation systems; characteristics of major US transportation modes; transportation analysis, planning, problem-solving, and decision-making methods illustrated through urban, freight, and intercity case studies.

CIV_ENV 480-1 Travel Demand Analysis & Forecasting 1 (1 Unit) Introduction and application of statistical, econometric, and marketing research techniques to study and forecast travel behavior. First Quarter: Introduction to theory, analysis, and model development. Second Quarter: Advanced theory, disaggregate choice models, and prediction methods.

CIV_ENV 480-2 Advances in Travel Demand Analysis and Forecasting (1 Unit) This course addresses developments in the econometric and behavioral aspects of demand analysis and forecasting, supply-demand interaction in transport systems, and dynamics models.

CIV_ENV 482-0 Evaluation and Decision Making for Infrastructure Systems (1 Unit) Theories and methods of evaluation and choice from alternatives for transportation and other infrastructure projects and systems. Economic, quantitative, and judgmental methods for both a priori and before-and-after evaluation. Measurement, modeling, analysis, and presentation problems. Prerequisites: CIV_ENV 306-0.

CIV_ENV 483-0 Infrastructure Systems Analysis (1 Unit) Quantitative techniques for developing prescriptive models that can be used to support efficient planning and management of civil infrastructure systems.

CIV_ENV 484-0 Advanced Theories of Traffic Flow (1 Unit) This course is concerned with the behavior of vehicular and multimodal traffic as a complex system. It seeks to convey a conceptual understanding of traffic processes through the development of mathematical models of these processes.

CIV_ENV 495-0 Selected Topics in Civil Engineering (1 Unit) Special topics under faculty direction.

CIV_ENV 497-0 Special Topics in Civil Engineering (0.5 Unit) Topics selected from work of current interest in civil or environmental engineering.

CIV_ENV 499-0 Projects (1-3 Units) Special projects under faculty direction. Permission of instructor and department required.

CIV_ENV 503-0 Materials & Methods in Construction (0 Unit)

CIV_ENV 504-0 SEIM Capstone Pre-design Seminar (0 Unit)

CIV_ENV 508-0 M.S. Research Paper for non-thesis option (0 Unit) Report on topics approved by faculty for M.S. students with non-thesis option.

CIV_ENV 512-1 Structural Engineering & Mechanics Sem (0 Unit) Selected topics in structural engineering and materials and mechanics of materials and solids.

CIV_ENV 512-2 Structural Engineering & Mechanics Sem (0 Unit) Selected topics in structural engineering and materials and mechanics of materials and solids.

CIV_ENV 512-3 Structural Engineering & Mechanics Sem (0 Unit) Selected topics in structural engineering and materials and mechanics of materials and solids.

CIV_ENV 515-1 Geotechnics Seminar (0 Unit) Discussion of classical and current literature in the field.

CIV_ENV 515-2 Geotechnics Seminar (0 Unit) Discussion of classical and current literature in the field.

CIV_ENV 516-1 Seminar in Environmental Engineering & Science (0 Unit) Topics vary. Examples: environmental microbiology; innovation technologies for recycling, recovery, treatment of chemical residuals; environmental policy; public health; water and waste treatment processes; contaminant fate and impact in nature.

CIV_ENV 516-2 Seminar in Environmental Engineering and Science (0 Unit) Topics vary. Examples: environmental microbiology; innovation technologies for recycling, recovery, treatment of chemical residuals; environmental policy; public health; water and waste treatment processes; contaminant fate and impact in nature.

CIV_ENV 516-3 Seminar in Environmental Engineering and Science (0 Unit) Topics vary. Examples: environmental microbiology; innovation technologies for recycling, recovery, treatment of chemical residuals; environmental policy; public health; water and waste treatment processes; contaminant fate and impact in nature.

CIV_ENV 517-1 Seminar in Transportation Engineering (0 Unit) Selected topics in transportation engineering.

CIV_ENV 517-2 Seminar in Transportation Engineering (0 Unit)

CIV_ENV 517-3 Seminar in Transportation Engineering (0 Unit) Selected topics in transportation engineering.

CIV_ENV 519-0 Responsible Conduct of Research Training (0 Unit)

CIV_ENV 533-1 Project Management Seminar (0 Unit) Selected topics in project management and engineering.

CIV_ENV 533-2 Project Management Seminar (0 Unit) Selected topics in project management and engineering.

CIV_ENV 533-3 Project Management Seminar (0 Unit) Selected topics in project management and engineering.

CIV_ENV 590-0 Research (1-4 Units) Independent investigation of selected problems pertaining to thesis or dissertation. May be repeated for credit.

Civil Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Requirements (48 units)

Core courses (32 units)¹

Course	Title
4 mathematics courses (p. 116)	
4 engineering analysis and computer proficiency courses (p. 116)	
4 units of basic science:	
PHYSICS 135-2	General Physics
CHEM 131-0	General Chemistry 1
or CHEM 151-0	Accelerated General Chemistry 1
or CHEM 171-0	Advanced General Inorganic Chemistry
1 unit in biological sciences, or	
CIV_ENV 203-0	Earth in the Anthropocene
or EARTH 201-0	Earth Systems Revealed
or EARTH 202-0	Earth's Interior
1 additional unit in biological sciences, chemistry, or physics, or	
EARTH 201-0	Earth Systems Revealed
or EARTH 202-0	Earth's Interior
or CIV_ENV 203-0	Earth in the Anthropocene
3 design and communications courses (p. 116)	
5 basic engineering courses:	
CIV_ENV 216-0	Mechanics of Materials I
MECH_ENG 241-0	Fluid Mechanics I
MECH_ENG 222-0	Thermodynamics & Statistical Mechanics - I
or BMD_ENG 250-0	Thermodynamics
or CHEM_ENG 211-0	Thermodynamics
CIV_ENV 306-0	Uncertainty Analysis
CIV_ENV 304-0	Civil and Environmental Engineering Systems Analysis
7 social sciences/humanities courses (p. 116)	
5 unrestricted electives (p. 116)	
1 unit of unrestricted electives is from Chemistry lab, PHYSICS 136-2, and CIV_ENV 301-1	

¹ See general requirements (p. 116) for details.

Major Program (16 units)¹

Course	Title
2 Basic Courses: choose 2 from below	
CIV_ENV 220-0	Structural Art
CIV_ENV 201-0	Engineering Possibilities: Decision Science in the Age of Smart Technologies
CIV_ENV 202-0	Biological and Ecological Principles
4 Civil Engineering Breadth	
CIV_ENV 221-0	Theory of Structures I
CIV_ENV 250-0	Earth Surface Engineering
CIV_ENV 260-0	Environmental Systems and Processes
CIV_ENV 371-0	Introduction to Transportation Planning and Analysis
or CIV_ENV 376-0	Transportation System Operations
4 Focus Areas ^{2,3}	
Architectural Engineering & Design	
Environmental	
Geotechnics	
Management	
Structures	
Transportation	

1 Capstone Design⁴

CIV_ENV 382-1	Capstone Design I
CIV_ENV 382-2	Capstone Design II
5 Technical Electives ⁵	
Professional Development ⁶	
CIV_ENV 301-1	Professional Development Seminar I

- ¹ At least 12 out of the 16 units in the major program must be CIV_ENV courses with 100% engineering topic; **only** GEN_ENG 220-1 Analy/Comp Graph and GEN_ENG 220-2 Analy/Comp Graph II may be taken P/N.
- ² Must select from an approved list available in Undergraduate CIV_ENV Handbook; must choose from at least 2 focus areas; 1 of the 4 units must be design³.
- ³ Design is defined as courses taught by licensed Professional Engineer or equivalent as defined by ABET and use appropriate codes and/or standards.
- ⁴ Design component must be different from one of the design areas taken in the focus area.
- ⁵ 300 level or higher in mathematics, science, engineering, or another area supporting the area of specialization; GEN_ENG 220-1 Analy/Comp Graph and GEN_ENG 220-2 Analy/Comp Graph II may count toward this requirement; only 1 unit of CIV_ENV 399-0 Projects may be counted; no 399 from another department is accepted. Choose from an approved list available in Undergraduate CIV_ENV Handbook.
- ⁶ 0.34 units may count towards unrestricted electives.

Environmental Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (32 units)¹

Course	Title
4 mathematics courses (p. 116)	
4 engineering analysis and computer proficiency courses (p. 116)	
4 units of basic science:	
PHYSICS 135-2 & PHYSICS 136-2	General Physics and General Physics Laboratory
CHEM 131-0 & CHEM 132-0 & CHEM 141-0 & CHEM 142-0	General Chemistry 1 and General Chemistry Laboratory 1 and General Chemistry Laboratory 2
or CHEM 151-0 & CHEM 152-0 & CHEM 161-0 & CHEM 162-0	Accelerated General Chemistry 1 and Accelerated General Chemistry 2 and Accelerated General Chemistry Laboratory 1 and Accelerated General Chemistry Laboratory 2
or CHEM 171-0 & CHEM 172-0 & CHEM 181-0 & CHEM 182-0	Advanced General Inorganic Chemistry and Advanced General Physical Chemistry and Advanced General Inorganic Chemistry Laboratory and Advanced General Physical Chemistry Laboratory
3 design and communications courses (p. 116)	
5 basic engineering courses:	
CIV_ENV 304-0	Civil and Environmental Engineering Systems Analysis
BMD_ENG 250-0	Thermodynamics
or CHEM_ENG 211-0	Thermodynamics
MECH_ENG 241-0	Fluid Mechanics I

CIV_ENV 306-0	Uncertainty Analysis
MAT_SCI 201-0	Introduction to Materials
7 social sciences/humanities courses (p. 116)	
5 unrestricted electives (p. 116)	

¹ See general requirements (p. 116) for details.

Major Program (16 units)

Course	Title
3 Gateway Courses	
CIV_ENV 201-0	Engineering Possibilities: Decision Science in the Age of Smart Technologies
CIV_ENV 202-0	Biological and Ecological Principles
CIV_ENV 203-0	Earth in the Anthropocene
9 Environmental Engineering Core Courses	
CHEM 210-1	Organic Chemistry
CIV_ENV 260-0	Environmental Systems and Processes
CIV_ENV 340-0	Hydraulics and Hydrology
CIV_ENV 355-0	Hydrogeology and Subsurface Contamination
CIV_ENV 361-1	Environmental Microbiology
CIV_ENV 364-0	Sustainable Water Systems
CIV_ENV 365-0	Environmental Laboratory
CIV_ENV 367-0	Chemical Processes in Aquatic Systems
CIV_ENV 382-1	Capstone Design I
CIV_ENV 382-2	Capstone Design II
4 Technical Electives ¹	
Professional Development ²	
CIV_ENV 301-1	Professional Development Seminar I

¹ From an approved list (available in Undergraduate CIV_ENV Handbook) in engineering, mathematics, or science; at least 3 units must be 100% engineering topic; may include only 1 unit of CIV_ENV 399-0 Projects; no 399 course from another department is accepted; no course may be taken P/N.

² 0.34 units may count toward unrestricted electives.

Environmental Engineering Minor

The minor in environmental engineering provides students with a sampling of foundational courses in addition to two electives focusing on environmental chemistry, microbiology, or transport processes.

Course	Title
Requirements (8 units)	
<i>Core Courses (6 units)</i>	
CIV_ENV 201-0	Engineering Possibilities: Decision Science in the Age of Smart Technologies
CIV_ENV 202-0	Biological and Ecological Principles
CIV_ENV 203-0	Earth in the Anthropocene
CIV_ENV 260-0	Environmental Systems and Processes
CIV_ENV 355-0	Hydrogeology and Subsurface Contamination
CIV_ENV 364-0	Sustainable Water Systems
<i>Electives (2 units): choose 2 courses from below</i>	
CIV_ENV 340-0	Hydraulics and Hydrology
CIV_ENV 361-1	Environmental Microbiology
CIV_ENV 361-2	Public & Environmental Health
CIV_ENV 346-0	Ecohydrology
CIV_ENV 367-0	Chemical Processes in Aquatic Systems
CIV_ENV 368-0	Sustainability: The City

CIV_ENV 370-0	Emerging Organic Contaminants
CIV_ENV 398-1	Community-based Design 1
CIV_ENV 398-2	Community-based Design 2
CIV_ENV 399-0	Projects ¹
400-level course by permission	

¹ Only 1 CIV_ENV 399-0 Projects unit may be counted toward the minor.

Additional Conditions for this minor

- No more than 4 minor courses may be used to fulfill requirements in the student's major program.
- A grade of at least C– is required in each course for the minor.
- Students should discuss with the minor coordinator how best to satisfy prerequisites for required courses.
- A completed petition form for the minor (<http://www.mccormick.northwestern.edu/civil-environmental/documents/current-students/forms-documents/environmental-engineering-minor-declaration-form.pdf>) must be submitted to the McCormick Office of Undergraduate Engineering before the beginning of the final undergraduate quarter.

Architectural Engineering and Design Certificate

The Architectural Engineering and Design Certificate Program requires a mixture of design imagination, knowledge of materials and systems, and a variety of analytic and management tools. Architects, who traditionally have led the design effort, are best known for the aesthetic element of their products. It is the integration of architecture and engineering perspectives that leads to buildings that are pathbreaking in functionality, aesthetics, economy, and sustainability. This certificate prepares students for further pursuit of architecture-related careers.

Course	Title
Certificate Requirements (8 units)	
CIV_ENV 221-0	Theory of Structures I
CIV_ENV 325-0	Reinforced Concrete
CIV_ENV 323-0 or CIV_ENV 352-0	Structural Steel Design Foundation Engineering
CIV_ENV 385-1	Architectural Engineering and Design 1: Fundamentals
CIV_ENV 385-2	Architectural Engineering & Design 2: Intermediate
CIV_ENV 385-3	Architectural Engineering & Design 3: Advanced Studio
GEN_ENG 220-1 & GEN_ENG 220-2	Analy/Comp Graph and Analy/Comp Graph II
ART_HIST 232-0	Introduction to the History of Architecture and Design

Additional Conditions for Awarding Certificate in AED

- Completion of all requirements for McCormick B.S. degree.
- Course with grades lower than a "C" or taken P/N will not be acceptable for this certificate.
- At least 4 courses used to meet the AED Certificate requirements must not be counted towards the 16 units of major program requirements.

- Submit a completed ***Declaration of Petition*** to Receive the Certificate in AED to McCormick Office of Undergraduate Engineering **at least 3 quarters before** the beginning of the final undergraduate quarter.

Computer Engineering

See Electrical Engineering and Computer Science (p. 137).

Computer Science

See Electrical Engineering and Computer Science (p. 137).

Design Engineering

See Segal Design Institute (p. 156)(including the Bachelor of Science in Manufacturing and Design Engineering as well as the Segal Design Certificate).

Electrical Engineering and Computer Science

mccormick.northwestern.edu/eecs

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 combines these advantages with an uncommon commitment to students.

The department offers several interdisciplinary options, including premedical/biomedical studies and cognitive science. It collaborates with Weinberg College to offer that school's major in computer science (p. 228).

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 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. 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 and Machine Learning

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 high-speed 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, 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 concepts and skills necessary to implement and understand computer software. Students are taught how to design and analyze 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 field-programmable gate array (FPGA), and computer-aided design (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 in 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. They 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, 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 widely used in desktop computing.

Programs of Study

- Computer Engineering Degree (p. 144)
- Computer Science Degree (p. 145)
- Electrical Engineering Degree (p. 146)
- Computer Science Minor (McCormick School of Engineering) (p. 148)

EECS 100-0 Electrons, Photons, and Bits: Adventures in Electrical and Computer Engineering (1 Unit) Introduction to contemporary topics in electrical and computer engineering via lectures, demonstrations, lab tours, and invited speakers from industry and government. Weekly reading and writing assignments.

EECS 101-0 Computer Science: Concepts, Philosophy, and Connections (1 Unit) General introduction to historical and current intellectual questions in computer science. Theory, systems, artificial intelligence, interfaces, software development, and interactions with business, politics, law, medicine, engineering, and other sciences. *Social Behavioral Sciences Distro Area*

EECS 110-0 Introduction to Computer Programming (1 Unit) 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 111-0. *Formal Studies Distro Area*

EECS 111-0 Fundamentals of Computer Programming (1 Unit) Fundamental concepts of computer programming with heavy emphasis

on design of recursive algorithms and test-driven development. Functional, imperative, and object-oriented programming paradigms. Procedural abstraction, data abstraction, and modularity. Required for the computer science degree. *Formal Studies Distro Area*

EECS 120-0 Intro to Computers & Info Technology (1 Unit)

EECS 130-0 Tools and Technology of the World-Wide Web (1 Unit)

Introduction to the theory and practice of developing sites on and technology for the web. Basics of HTML, JavaScript, ASP, and CGI programming.

EECS 195-0 Electronics, Photons, and Bits: Adventures in Electrical and Computer Engineering (1 Unit) Topics suggested by students or faculty and approved by the department.

EECS 202-0 Introduction to Electrical Engineering (1 Unit) 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.

EECS 203-0 Introduction to Computer Engineering (1 Unit) Overview of computer engineering design. Number systems and Boolean algebra. CMOS and logic gates. Design of combinational circuits and simplification. Decoders, multiplexers, adders. Sequential logic and flip flops. Introduction to assembly language.

EECS 205-0 Fundamentals of Computer System Software (1 Unit) Basics of assembly language programming. Macros. System stack and procedure calls. Techniques for writing assembly language programs. Features of Intel x86 architecture. Interfaces between C and assembly codes. Prerequisite: EECS 111-0 or GEN_ENG 205-1; EECS 203-0 recommended.

EECS 211-0 Fundamentals of Computer Programming II (1 Unit) Continuation of EECS 111-0. Programming in statically-typed imperative languages. The von Neuman machine model: pointers, address manipulation, and manual memory management. Object-oriented programming and design. The C/C++ language family. Required for the computer science degree. Not to be taken for credit with EECS 230-0. Prerequisite: EECS 111-0.

EECS 212-0 Mathematical Foundations of Comp Science (1 Unit) 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. Prerequisite: MATH 230-0.

EECS 213-0 Introduction to Computer Systems (1 Unit) 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: EECS 211-0.

EECS 214-0 Data Structures & Algorithms (1 Unit) Design, implementation, and performance analysis of abstract data types; data structures and their algorithms. Topics include fundamental collection classes, tree and graph representations and walks, search trees, sorting, priority queues and heaps, least-cost paths computations, and disjoint-set structures. Required for the computer science degree. Prerequisite: EECS 211-0.

EECS 221-0 Fundamentals of Circuits (1 Unit) 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-part networks; Fourier analysis; response of circuits to periodic non-sinusoidal sources. Prerequisite: EECS 202-0.

EECS 222-0 Fundamentals of Signals & Systems (1 Unit)

Comprehensive introduction to analysis of continuous and discrete-time signals and systems. Linear time-invariant systems, convolution. Fourier series representations of periodic signals. Continuous and discrete-time Fourier transforms. Laplace transform; z-transform. Prerequisite: EECS 202-0.

EECS 223-0 Fundamentals of Solid State Engineering (1 Unit)

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; pn junction. Prerequisites: EECS 202-0; PHYSICS 135-3; MATH 234-0.

EECS 224-0 Fund of Electromagnetics & Photonics (1 Unit) Concepts of flux, potential, gradient, divergence, curl, and field intensity. Boundary conditions and solutions to Laplace and Poisson equations. Capacitance and inductance calculations. Conductors, insulators, and magnetic materials. Prerequisites: EECS 202-0, EECS 221-0; PHYSICS 135-2; MATH 234-0; or consent of instructor.

EECS 225-0 Fundamentals of Electronics (1 Unit) 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: EECS 221-0, EECS 223-0.

EECS 230-0 Programming for Engineers (1 Unit) 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 EECS 211-0. Prerequisites: GEN_ENG 205-1, GEN_ENG 205-2.

EECS 250-0 Physical Electronics and Devices (1 Unit) 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 explored. Prerequisites: EECS 221-0; PHYSICS 135-2.

EECS 270-0 Applications of Electronic Devices (1 Unit) DC and AC networks, rectifiers, transistor amplifiers, feedback and operational amplifiers, digital electronics, and microprocessors. Not open to electrical engineering degree candidates. Prerequisites: MATH 224-0; PHYSICS 135-2; or equivalent.

EECS 295-0 Intermediate Topics in Electrical Engineering and Computer Science (1 Unit) Topics suggested by students or faculty and approved by the department.

EECS 301-0 Introduction to Robotics Laboratory (1 Unit) Lab-based introduction to robotics, focusing on hardware (sensors/ actuators) and software (sensor processing/behavior development); motion control and planning; artificial intelligence; machine learning. Not open to graduate students except by consent of instructor. Prerequisite: EECS 110-0, EECS 111-0, or consent of instructor.

EECS 302-0 Probabilistic Systems (1 Unit) Introduction to probability theory and its applications. Axioms of probability, distributions, discrete and continuous random variables, conditional and joint distributions, correlation, limit laws, connection to statistics, and applications in engineering systems. Co-requisite: MATH 234-0 or equivalent. May not receive credit for both EECS 302-0 and any of the following: IEMS 202-0; MATH 310-1; STAT 320-1; EECS 314-0, EECS 383-0, EECS 385-0.

EECS 303-0 Advanced Digital Design (1 Unit) 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: EECS 203-0.

EECS 307-0 Communications Systems (1 Unit) 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: EECS 222-0, EECS 302-0 or equivalent.

EECS 308-0 Advanced Electromagnetics and Photonics (1 Unit) 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: EECS 224-0.

EECS 313-0 Tangible Interaction Design and Learning (1 Unit) The use of tangible interaction to create innovative learning experiences, including distributed cognition, embodied interaction, cultural forms, and design frameworks. Prerequisite: EECS 110-0.

EECS 314-0 Technology and Human Interaction (1 Unit) Understanding human interactions that occur both with and through technology; design, creation, and evaluation of technologies to support such interactions.

EECS 315-0 Design, Technology, and Research (1 Unit) Hands-on experience in the research learning environment. Students lead research projects in social and crowd computing, cyber-learning, human-computer interaction, and artificial intelligence. Prerequisite: consent of instructor (by application only).

EECS 317-0 Data Management & Information Processing (1 Unit) 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 computer science degree candidates. Prerequisite: EECS 110-0, EECS 111-0, or programming experience.

EECS 321-0 Programming Languages (1 Unit) Introduction to key parts of programming languages: syntax, semantics, and pragmatics. Implementation of a series of interpreters that show how various aspects of programming languages behave. Prerequisites: EECS 111-0, EECS 214-0.

EECS 322-0 Compiler Construction (1 Unit) 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: EECS 214-0.

EECS 323-0 Code Analysis and Transformation (1 Unit) Code analysis and transformation used in modern compilers. Fast, highly sophisticated code analysis and code transformation tools are essential for modern

software development. Understanding what modern code analysis and transformation techniques can and can't do is a prerequisite for research on both software engineering and computer architecture since hardware relies on software to realize its potential.

EECS 325-1 Artificial Intelligence Programming (1 Unit) Introduction to LISP and programming knowledge-based systems and interfaces. Strong emphasis on writing maintainable, extensible systems. Topics include semantic net-works, frames, pattern matching, deductive inference rules, case-based reasoning, and discrimination trees. Project-driven. Substantial programming assignments. Prerequisite: EECS 110-0, EECS 111-0, or programming experience.

EECS 326-0 Electronic System Design I (1 Unit) This fast-paced course teach a student how to go from a project idea to a fully functional prototype implementation. This involves a printed circuit board design using PCB CAD software, surface mount soldering, MCU programming, CAD design for 3D printing, and web design. Prerequisites: EECS 221-0 and EECS 225-0 and EECS 211-0, or graduate standing, or instructor consent.

EECS 327-0 Electronic System Design II: Project (1 Unit) This course puts to practice the knowledge gained in Electronic System Design I, and have students create a fully functional prototype implementation. This involves the same principles as in Electronic System Design I, but more independently, and with some design optimization. The course will also focus on team management and presentation skills, culminating in a project fair to the public. For a student with senior standing, this course can count towards the Design Degree Requirement in EE. Prerequisite: EECS 326-0 or instructor consent.

EECS 328-0 Numerical Methods for Engineers (1 Unit) Introduction to numerical methods; numerical differentiation, numerical integration, solution of ordinary and partial differential equations. Writing programs in FORTRAN, C, or Pascal using methods presented in class. Prerequisites: GEN_ENG 205-1, GEN_ENG 205-2, GEN_ENG 205-3; MATH 220-0; EECS 224-0, EECS 230-0.

EECS 329-0 The Art of Multicore Concurrent Programming (1 Unit) Concurrency disciplines and practical programming techniques for multicore processors; synchronization primitives, mutual exclusion, foundation of shared memory, lockings, non-blocking synchronizations, and transactional memory.

EECS 330-0 Human Computer Interaction (1 Unit) Introduction to human-computer interaction and design of systems that work for people and their organizations. Understanding the manner in which humans interact with and use computers for productive work. Prerequisite: programming experience.

EECS 331-0 Introduction to Computational Photography (1 Unit) Fundamentals of digital imaging and modern camera architectures. Hands-on experience acquiring, characterizing, and manipulating data captured using a modern camera platform.

EECS 332-0 Introduction to Computer Vision (1 Unit) Computer and biological vision systems, image formation, edge detection, image segmentation, texture, representation and analysis of two-dimensional geometric structures and of three-dimensional structures. Prerequisites: EECS 214-0, EECS 222-0, and EECS 302-0 or its equivalent.

EECS 333-0 Introduction to Communication Networks (1 Unit) 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: EECS 302-0 or equivalent

EECS 335-0 Introduction to the Theory of Computation (1 Unit)

Mathematical foundations of computation, including computability, relationships of time and space, and the P vs. NP problem. Prerequisite: EECS 212-0 or consent of instructor.

EECS 336-0 Design & Analysis of Algorithms (1 Unit) 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: EECS 111-0, EECS 212-0, or consent of instructor.

EECS 337-0 Natural Language Processing (1 Unit) 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, counter-planning, and thematic structures. Prerequisite: EECS 348-0 or consent of instructor.

EECS 338-0 Practicum in Intelligent Information Systems (2 Units)

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 (1 Unit) 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: EECS 214-0.

EECS 340-0 Introduction to Networking (1 Unit) 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: EECS 214-0.

EECS 341-0 Mechanism Design (1 Unit) Applying algorithms and microeconomics to derive a theory of the design of mechanisms that produce desired outcomes despite counteractive inputs by outside agents. Key application areas: auctions, markets, networking protocols.

EECS 343-0 Operating Systems (1 Unit) Fundamental overview of operating systems, including: concurrency (processes, synchronization, semaphores, monitors, deadlock); memory management (segmentation, paging virtual memory policies); software system architectures (level structures, microkernels); file systems (directory structures, file organization, RAID); protection (access control, capabilities, encryption, signatures, authentication). Requires substantial programming projects. Prerequisites: Both EECS 214-0 and EECS 213-0, or EECS 214-0 and EECS 205-0.

EECS 344-0 Design of Computer Problem Solvers (1 Unit) Principles and practice of organizing and building artificial intelligence reasoning systems. Pattern-directed rule systems, truth-maintenance systems, and constraint languages. Prerequisites: EECS 348-0 and EECS 325-1 or equivalent LISP experience.

EECS 345-0 Distributed Systems (1 Unit) 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: EECS 213-0 and EECS 214-0.

EECS 346-0 Microprocessor System Design (1 Unit) 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. Standard bus structures. Interrupt programming. Hardware/software design tradeoffs. Prerequisites: EECS 203-0, EECS 205-0.

EECS 347-1 Microprocessor System Projects (1 Unit) Programmable logic devices such as PAL and FPGA. Design, prototype, and test individual projects involving microprocessors and programmable logic devices. Prerequisite: EECS 346-0.

EECS 347-2 Microprocessor System Projects II (1 Unit) Designing, prototyping, and testing individual projects involving microprocessors and related devices, such as PAL/FPGA and special-purpose ICs. Embedded system tools such as special-purpose compilers and ICE (in-circuit emulation). Manufacturing issues such as PCB layout. Survey of microprocessor platforms. Prerequisite: EECS 347-1.

EECS 348-0 Introduction to Artificial Intelligence (1 Unit) Core techniques and applications of AI. Representing, retrieving, and applying knowledge for problem solving. Hypothesis exploration. Theorem proving. Vision and neural networks.

EECS 349-0 Machine Learning (1 Unit) Study of algorithms that improve through experience. Topics typically include Bayesian learning, decision trees, genetic algorithms, neural networks, Markov models, and reinforcement learning. Assignments include programming projects and written work. Prerequisite: EECS 348-0.

EECS 350-0 Introduction to Computer Security (1 Unit) Basic principles and practices of computer and information security. Software, operating system, and network security techniques, with detailed analysis of real-world examples. Topics include cryptography, authentication, software and operating system security (e.g., buffer overflow), Internet vulnerability (DoS attacks, viruses/worms, etc.), intrusion detection systems, firewalls, VPN, and web and wireless security. Prerequisite: EECS 213-0 or equivalent or consent of instructor; EECS 340-0 highly recommended.

EECS 351-1 Introduction to Computer Graphics (1 Unit) Mathematical software and hardware requirements for computer graphics systems. Data structures and programming languages. Random displays. Graphic applications. Prerequisite: EECS 214-0.

EECS 351-2 Intermediate Computer Graphics (1 Unit) Methods and theory of computer graphics. Project-oriented approach. Describing shapes, movement, and lighting effects; interactive elements. Prerequisites: EECS 214-0 and EECS 351-1.

EECS 352-0 Machine Perception of Music & Audio (1 Unit) Machine extraction of musical structure in audio and MIDI and score files, covering areas such as source separation and perceptual mapping of audio to machine-quantifiable measures. Prerequisite: EECS 211-0, GEN_ENG 205-2, or prior programming experience in MATLAB.

EECS 353-0 Digital Microelectronics (1 Unit) Logic families, comparators, A/D and D/A converters, combinational systems, sequential

systems, solid-state memory, largescale integrated circuits, and design of electronic systems. Prerequisites: EECS 203-0, EECS 225-0.

EECS 354-0 Network Penetration & Security (1 Unit) Practical tools for vulnerability assessment and defense of computer and communication systems. Prerequisites: EECS 213-0 or EECS 205-0; EECS 333-0 or EECS 340-0.

EECS 355-0 ASIC and FPGA Design (1 Unit) 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: EECS 303-0.

EECS 356-0 Introduction to Formal Specification & Verification (1 Unit) 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 Design Automation in VLSI (1 Unit) VLSI physical design, including logic design, architectural design, and packaging. Development of CAD tools for VLSI physical design. Prerequisites: EECS 214-0, EECS 303-0.

EECS 358-0 Introduction to Parallel Computing (1 Unit) Introduction to parallel computing for scientists and engineers. Shared-memory parallel architectures and programming, distributed memory, message-passing data-parallel architectures, and programming. Prerequisites: EECS 361-0; EECS 211-0 or EECS 230-0.

EECS 359-0 Digital Signal Processing (1 Unit) Discrete-time signals and systems. Discrete-time Fourier transform, z-transform, discrete Fourier transform, digital filters. Prerequisite: EECS 222-0.

EECS 360-0 Introduction to Feedback Systems (1 Unit) 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. Prerequisite: EECS 222-0.

EECS 361-0 Computer Architecture I (1 Unit) Design and understanding of the computer system as a whole unit. Performance evaluation and its role in computer system design; instruction set architecture design, data-path 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: (EECS 205-0 or EECS 213-0) AND (EECS 303-0 or EECS 355-0).

EECS 362-0 Computer Architecture Projects (1 Unit) Quarter-long team project designing a processor for a complete instruction set. Involves ISA design, design of components, data-path, and control for a pipelined processor to implement the ISA. Use of industrial-strength design tools and VHDL as the design specification language. Designs are evaluated using benchmark programs for correctness and performance. Prerequisite: EECS 361-0.

EECS 363-0 Digital Filtering (1 Unit) 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: EECS 359-0.

EECS 366-0 Embedded Systems (1 Unit) Introduction to the design and evaluation of embedded systems, with emphasis on the system-level aspects of embedded systems. Topics include modeling (models of computation and models of communication), survey of embedded system hardware, software and operating system issues specific to embedded system design, mapping specifications to hardware, and testing and evaluation of embedded systems.

EECS 367-0 Wireless and Mobile Health: Passive Sensing Data Analytics (1 Unit) A hands-on introduction and experience to the growing field of mobile Health. Students work together on a project with clinicians and faculty in medicine, building a unique mHealth system while testing their system on a small population. Theory-driven project hypothesis, technology selection and development, passive sensing data analytic chain understanding and implementation, and project management.

EECS 368-0 Programming Massively Parallel Processors with CUDA (1 Unit) GPU architecture, CUDA programming model, parallel programming optimizations for 1000+ cores, performance analysis, OpenCL. Requires two-week mini-project on optimized histogramming on GPUs. May not receive credit for both EECS 368-0 and EECS 468-0. Prerequisites: EECS 213-0; EECS 211-0 or intermediate C programming experience; or consent of instructor.

EECS 369-0 Introduction to Sensor Networks (1 Unit) Basic hardware and software platforms for sensor networks. Various algorithmic techniques for data routing, query processing, and tracking. Prerequisite: EECS 343-0 or EECS 340-0.

EECS 370-0 Computer Game Design (1 Unit) Plot, narrative, and character simulation for creating game worlds; artificial intelligence for synthetic characters; tuning gameplay. Substantial programming and project work. Prerequisites: EECS 214-0; 1 unit of EECS 322-0, EECS 343-0, EECS 348-0, or EECS 351-1, EECS 351-2.

EECS 371-0 Knowledge Representation and Reasoning (1 Unit) Principles and practices of knowledge representation, including logics, ontologies, commonsense knowledge, and semantic web technologies. Prerequisite: EECS 348-0, EECS 325-1, or equivalent experience with artificial intelligence.

EECS 372-0 Designing & Constructing Models with Multi-Agent Language (1 Unit) Exploration and analysis of multi-agent models, which simulate "emergent" scientific phenomena in a wide variety of content domains.

EECS 374-0 Introduction to Digital Control (1 Unit) Discrete dynamics systems; discrete models of continuous systems feedback and digital controllers; analog-digital conversion; digital control design including PID, lead/lag, deadbeat, and mode-matching controllers. Prerequisite: EECS 360-0.

EECS 375-0 Machine Learning: Foundations, Applications, and Algorithms (1 Unit) The course covers the fundamentals of machine learning and numerical optimization, with many application examples.

EECS 376-0 Computer Game Design and Development (1 Unit) Introduction to design of simulation-based media, with an emphasis on 2D game design. Mathematical preliminaries: linear, affine, and projective spaces, linear transforms, inner and exterior products, unit quaternions; Architecture: update/render loop, component systems, serialization and deserialization, event handling and asynchronous processing, multitasking; Rendering: scene graphs, meshes, shaders,

sprites; Networking; Audio; Physics: particles, rigid bodies, collision detection; Gameplay design.

EECS 377-0 Game Design Studio (1 Unit) In this course, students will design and develop games using the Unity game engine, with focus on team-based projects and agile development practices. Lectures will cover game design theory, game architecture and implementation, and the business of game development. Students will participate in class discussion and evaluation of projects in progress, to develop their skills in iterative design and implementation.

EECS 378-0 Digital Communications (1 Unit) 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: EECS 302-0 or equivalent.

EECS 379-0 Lasers and Coherent Optics (1 Unit) Optical resonators; fundamental operation of lasers; mode-locking and Q-switching; optical propagation and diffraction; Gaussian beams; thin-lens imaging; optical signal processing. Prerequisites: EECS 222-0, EECS 224-0.

EECS 380-0 Wireless Communications (1 Unit) 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: EECS 378-0.

EECS 381-0 Electronic Materials: Properties and Applications (1 Unit) 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: EECS 223-0 and EECS 224-0 or consent of instructor.

EECS 382-0 Photonic Information Processing (1 Unit) Introduction to photonic information processing; coherent and incoherent light; electro-optic and acousto-optic modulation; optical signal processing; holography; optical storage. Prerequisites: EECS 222-0 and EECS 224-0 or consent of instructor.

EECS 383-0 Fiber-Optic Communications (1 Unit) Semiconductor diode lasers, internal modulation, electro-optic modulation, coherent and incoherent detection, optical fibers and their properties, optical amplifiers, communication systems, optical networks. Prerequisites: EECS 223-0, EECS 224-0.

EECS 384-0 Solid State Electronic Devices (1 Unit) Energy-band model for semiconductors; carrier statistics and transport; diodes, bipolar and field-effect transistors; integrated circuits, optoelectronic and heterojunction devices. Prerequisite: EECS 381-0 or consent of instructor.

EECS 385-0 Optoelectronics (1 Unit) Introduction to solid-state optoelectronic devices; display devices, laser diodes, photodetectors, and light modulators; optical waveguides and fibers; system application of optoelectronic devices. Prerequisite: EECS 381-0 or consent of instructor.

EECS 386-0 Computational Electromagnetics and Photonics (1 Unit) 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: EECS 308-0.

EECS 387-0 Technology Infrastructure: Concepts, Requirements, Design and Operation (1 Unit) Requirements of largescale computer systems and networks; space, power, environmental control, operational software and security; planning, data centers, network operations centers, national and international regulations and practices.

EECS 388-0 Nanotechnology (1 Unit) Physics and fabrication of photonic and electronic devices. Physics of semiconductors: crystal structures, reciprocal lattice, elements of quantum mechanics, heterojunctions, quantum wells, and super-lattices. Bulk crystal, thin-film, and epitaxial growth technologies. Device processing technologies: diffusion oxidation, ion implantation, annealing, etching, and photolithography. Prerequisite: EECS 223-0 or consent of instructor.

EECS 389-0 Superconductivity and Its Applications (1 Unit) Properties of materials in the superconducting state; charge flow dynamics of type II superconductors; high-T_c superconductors; applications for computers and high-frequency devices. Prerequisite: EECS 381-0 or consent of instructor.

EECS 390-0 Introduction to Robotics (1 Unit) 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: EECS 230-0.

EECS 391-0 CMOS VLSI Circuit Design (1 Unit) Design of modern CMOS very large-scale integrated (VLSI) circuits.

EECS 392-0 VLSI Systems Design Projects (1 Unit) 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: EECS 391-0 or EECS 355-0.

EECS 393-0 Advanced Low Power VLSI and Mixed-signal IC Design (1 Unit) This course provides an in-depth review of the advanced technology in integrated circuit design. Special focuses will be given to ultra-low power circuit design, error resilient circuit design, machine learning accelerators, power management circuits and basic design of analog mixed-signal circuit. Following a seminar format, detailed case study on circuit design techniques used by Intel, IBM, etc. will be discussed.

EECS 394-0 Agile Software Development (1 Unit) Developing mobile and web applications, using modern sustainable agile practices, such as backlogs, user stories, velocity charts, and test driven development, to deliver value as quickly as possible to end users, clients, developers, and the development organization.

EECS 395-0 Special Topics in Electrical Engineering and Computer Science (1 Unit) Topics suggested by students or faculty and approved by the department.

EECS 396-0 Special Topics in Computer Science (1 Unit) Projects suggested by faculty and approved by the department. Equivalent to 397 but intended to apply toward courses for the computer science major and its project requirement.

EECS 397-0 Special Projects in Computer Science (1 Unit) Topics suggested by faculty and approved by the department. Equivalent to 396 but intended to apply toward courses for the computer science major.

EECS 398-0 Electrical Engineering Design (1 Unit) 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 (1 Unit) Seminar and projects for advanced undergraduates on subjects of current interest in electrical and computer engineering.

Computer Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Requirements (48 units)	
<i>Core Courses (32 units)</i> ¹	
4 mathematics courses (p. 116)	
4 engineering analysis and computer proficiency courses (p. 116)	
4 units of basic science:	
PHYSICS 135-2 & PHYSICS 135-3	General Physics and General Physics
PHYSICS 136-2 & PHYSICS 136-3	General Physics Laboratory and General Physics Laboratory
1.33 units chosen from McCormick-approved basic science courses (p. 116) ²	
3 design and communication courses (p. 116)	
5 basic engineering courses:	
EECS 203-0	Introduction to Computer Engineering (grade of C– or better required for graduation)
EECS 211-0	Fundamentals of Computer Programming II
EECS 202-0	Introduction to Electrical Engineering (grade of C– or better required for graduation)
EECS 302-0	Probabilistic Systems
1 course from one of the following basic engineering categories: fluids and solids, materials science and engineering, systems engineering and analysis, thermodynamics (p. 116)	
7 social sciences/humanities courses (p. 116)	
5 unrestricted electives (p. 116)	
<i>Major Program (16 units)</i>	
5 required courses:	
EECS 111-0	Fundamentals of Computer Programming
EECS 205-0	Fundamentals of Computer System Software
EECS 221-0	Fundamentals of Circuits
EECS 303-0	Advanced Digital Design
EECS 361-0	Computer Architecture I
10 technical electives:	
2 courses from:	
EECS 213-0	Introduction to Computer Systems
EECS 222-0	Fundamentals of Signals & Systems
EECS 223-0	Fundamentals of Solid State Engineering
EECS 224-0	Fund of Electromagnetics & Photonics
EECS 225-0	Fundamentals of Electronics
5 courses from the following five areas:	
Architecture and high performance computing (p. 144)	
VLSI and CAD (p. 144)	

Embedded systems (p. 144)

Software systems (p. 145)

Networks and security (p. 145)

3 electives from:

BIOL_SCI 215-0 Genetics and Molecular Biology

BIOL_SCI 217-0 Physiology

BIOL_SCI 219-0 Cell Biology

CHEM 210-1
& CHEM 210-2
& CHEM 210-3 Organic Chemistry
and Organic Chemistry
and Organic Chemistry

300-level technical courses in science, mathematics, computer science, or engineering³

1 required design course from:

EECS 347-1 Microprocessor System Projects

EECS 362-0 Computer Architecture Projects

EECS 392-0 VLSI Systems Design Projects

¹ See general requirements (p. 116) for details.

² Maximum of 3 basic science units may come from any one area.

³ No more than 2 units of EECS 399-0 Projects will be counted as technical electives. Additional units of EECS 399-0 Projects may be taken but will be counted as unrestricted electives.

Area Electives

Architecture and High-Performance Computing

Course	Title
EECS 329-0	The Art of Multicore Concurrent Programming
EECS 358-0	Introduction to Parallel Computing
EECS 362-0	Computer Architecture Projects
EECS 368-0	Programming Massively Parallel Processors with CUDA
EECS 452-0	Adv Computer Architecture
EECS 453-0	Parallel Architectures
EECS 468-0	Programming Massively Parallel Processors with CUDA

VLSI and CAD

Course	Title
EECS 353-0	Digital Microelectronics
EECS 355-0	ASIC and FPGA Design
EECS 357-0	Design Automation in VLSI
EECS 391-0	CMOS VLSI Circuit Design
EECS 392-0	VLSI Systems Design Projects
EECS 459-0	VLSI Algorithmics

Embedded Systems

Course	Title
EECS 301-0	Introduction to Robotics Laboratory
EECS 332-0	Introduction to Computer Vision
EECS 346-0	Microprocessor System Design
EECS 347-1	Microprocessor System Projects
EECS 360-0	Introduction to Feedback Systems
EECS 366-0	Embedded Systems
EECS 369-0	Introduction to Sensor Networks
EECS 390-0	Introduction to Robotics
EECS 432-0	Advanced Computer Vision
EECS 466-0	Embedded Systems

Software Systems

Course	Title
EECS 212-0	Mathematical Foundations of Comp Science
EECS 214-0	Data Structures & Algorithms
EECS 321-0	Programming Languages
EECS 322-0	Compiler Construction
EECS 336-0	Design & Analysis of Algorithms
EECS 339-0	Introduction to Database Systems
EECS 343-0	Operating Systems
EECS 394-0	Agile Software Development

Networks and Security

Course	Title
EECS 333-0	Introduction to Communication Networks
EECS 340-0	Introduction to Networking
EECS 350-0	Introduction to Computer Security
EECS 354-0	Network Penetration & Security

Computer Science Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Requirements (48 units)	
<i>Core Courses (32 units)</i> ¹	
4 mathematics courses:	
EECS 212-0	Mathematical Foundations of Comp Science
MATH 220-0	Differential Calculus of One-Variable Functions
MATH 224-0	Integral Calculus of One-Variable Functions
MATH 230-0	Differential Calculus of Multivariable Functions
4 engineering analysis and computer proficiency courses:	
GEN_ENG 205-1 & GEN_ENG 205-2 & GEN_ENG 205-3 or GEN_ENG 206-1 & GEN_ENG 206-2 & GEN_ENG 206-3	Engineering Analysis I and Engineering Analysis II and Engineering Analysis III Honor Engineering Analysis and Honors Engineering Analysis and Honors Engineering Analysis
EECS 111-0	Fundamentals of Computer Programming
4 units of basic science chosen according to McCormick basic science guidelines	
3 design and communications courses (p. 116)	
5 basic engineering courses:	
EECS 211-0	Fundamentals of Computer Programming II
EECS 302-0 or IEMS 201-0 or EECS 303-0	Probabilistic Systems Introduction to Statistics Advanced Digital Design
3 courses from at least two of the remaining basic engineering areas: computer architecture and numerical methods, electrical science, fluids and solids, materials science and engineering, systems engineering and analysis, and thermodynamics	
7 social sciences/humanities courses (p. 116)	
5 unrestricted electives (p. 116)	
<i>Major Program (16 units)</i>	
3 required courses:	
EECS 101-0	Computer Science: Concepts, Philosophy, and Connections
EECS 213-0	Introduction to Computer Systems
EECS 214-0	Data Structures & Algorithms

5 breadth courses, 1 from each of the following areas (see department website for changes to this list):

- Theory (p. 145)
- Systems (p. 145)
- Artificial intelligence (p. 145)
- Interfaces (p. 146)
- Software development (p. 146)

6 technical electives:

- Technical electives (p. 146)

2 project courses:

- Project courses (p. 146)

¹ See general requirements (p. 116) for details.

- Sections of EECS 395-0 Special Topics in Electrical Engineering and Computer Science, EECS 397-0 Special Projects in Computer Science, and EECS 399-0 Projects may be used for technical elective and project requirements, if appropriate; **consult your CS adviser** for information.
- 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 110-0 Introduction to Computer Programming may be used as an unrestricted elective if taken before EECS 111-0 Fundamentals of Computer Programming. It may not, however, be applied to the computer science major requirements.

Breadth Courses

Theory

Course	Title
EECS 328-0	Numerical Methods for Engineers
EECS 335-0	Introduction to the Theory of Computation
EECS 336-0	Design & Analysis of Algorithms
EECS 356-0	Introduction to Formal Specification & Verification

Systems

Course	Title
EECS 303-0	Advanced Digital Design
EECS 321-0	Programming Languages
EECS 322-0	Compiler Construction
EECS 339-0	Introduction to Database Systems
EECS 340-0	Introduction to Networking
EECS 343-0	Operating Systems
EECS 345-0	Distributed Systems
EECS 346-0	Microprocessor System Design
EECS 350-0	Introduction to Computer Security
EECS 358-0	Introduction to Parallel Computing
EECS 361-0	Computer Architecture I
EECS 440-0	Advanced Networking
EECS 441-0	Resource Virtualization
EECS 443-0	Advanced Operating Systems
EECS 450-0	Internet Security

Artificial Intelligence

Course	Title
EECS 325-1	Artificial Intelligence Programming
EECS 337-0	Natural Language Processing
EECS 344-0	Design of Computer Problem Solvers

EECS 348-0	Introduction to Artificial Intelligence
EECS 349-0	Machine Learning
EECS 360-0	Introduction to Feedback Systems

Interfaces

Course	Title
EECS 330-0	Human Computer Interaction
EECS 332-0	Introduction to Computer Vision
EECS 351-1	Introduction to Computer Graphics
EECS 352-0	Machine Perception of Music & Audio
EECS 370-0	Computer Game Design

Software Development

Course	Title
EECS 338-0	Practicum in Intelligent Information Systems
EECS 394-0	Agile Software Development

Technical electives

Technical elective list

Course	Title
EECS 301-0	Introduction to Robotics Laboratory
EECS 303-0	Advanced Digital Design
EECS 313-0	Tangible Interaction Design and Learning
EECS 314-0	Technology and Human Interaction
EECS 315-0	Design, Technology, and Research
EECS 321-0	Programming Languages
EECS 322-0	Compiler Construction
EECS 323-0	Code Analysis and Transformation
EECS 325-1	Artificial Intelligence Programming
EECS 330-0	Human Computer Interaction
EECS 331-0	Introduction to Computational Photography
EECS 332-0	Introduction to Computer Vision
EECS 335-0	Introduction to the Theory of Computation
EECS 336-0	Design & Analysis of Algorithms
EECS 337-0	Natural Language Processing
EECS 338-0	Practicum in Intelligent Information Systems
EECS 339-0	Introduction to Database Systems
EECS 340-0	Introduction to Networking
EECS 343-0	Operating Systems
EECS 344-0	Design of Computer Problem Solvers
EECS 345-0	Distributed Systems
EECS 346-0	Microprocessor System Design
EECS 348-0	Introduction to Artificial Intelligence
EECS 349-0	Machine Learning
EECS 350-0	Introduction to Computer Security
EECS 351-1	Introduction to Computer Graphics
EECS 351-2	Intermediate Computer Graphics
EECS 352-0	Machine Perception of Music & Audio
EECS 354-0	Network Penetration & Security
EECS 361-0	Computer Architecture I
EECS 367-0	Wireless and Mobile Health: Passive Sensing Data Analytics
EECS 368-0	Programming Massively Parallel Processors with CUDA
EECS 371-0	Knowledge Representation and Reasoning
EECS 372-0	Designing & Constructing Models with Multi-Agent Language

EECS 376-0	Computer Game Design and Development
EECS 377-0	Game Design Studio
EECS 396-0	Special Topics in Computer Science
EECS 397-0	Special Projects in Computer Science
EECS 433-0	Statistical Pattern Recognition
EECS 440-0	Advanced Networking
EECS 441-0	Resource Virtualization
EECS 443-0	Advanced Operating Systems
EECS 445-0	Internet-scale Experimentation
EECS 446-0	Kernel and Other Low-level Software Development
EECS 450-0	Internet Security
EECS 468-0	Programming Massively Parallel Processors with CUDA
EECS 472-0	Designing & Constructing Models with Multi-Agent Language
EECS 473-1	NUvention: Web - Part 1
EECS 473-2	NUvention: Web - Part 2
EECS 474-0	Probabilistic Graphical Models
EECS 496-0	Special Topics in Computer Science
EECS 497-0	Special Projects in Computer Science

Project courses

Project course list

Course	Title
EECS 315-0	Design, Technology, and Research
EECS 322-0	Compiler Construction
EECS 330-0	Human Computer Interaction
EECS 332-0	Introduction to Computer Vision
EECS 337-0	Natural Language Processing
EECS 338-0	Practicum in Intelligent Information Systems
EECS 339-0	Introduction to Database Systems
EECS 340-0	Introduction to Networking
EECS 343-0	Operating Systems
EECS 344-0	Design of Computer Problem Solvers
EECS 345-0	Distributed Systems
EECS 351-1	Introduction to Computer Graphics
EECS 351-2	Intermediate Computer Graphics
EECS 354-0	Network Penetration & Security
EECS 367-0	Wireless and Mobile Health: Passive Sensing Data Analytics
EECS 370-0	Computer Game Design
EECS 371-0	Knowledge Representation and Reasoning
EECS 376-0	Computer Game Design and Development
EECS 377-0	Game Design Studio
EECS 394-0	Agile Software Development
EECS 397-0	Special Projects in Computer Science
EECS 441-0	Resource Virtualization
EECS 450-0	Internet Security
EECS 474-0	Probabilistic Graphical Models
EECS 473-2	NUvention: Web - Part 2
EECS 497-0	Special Projects in Computer Science

Electrical Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Requirements (48 units total)

Course	Title
Core Courses (32 units) ¹	
4 mathematics courses (p. 116)	
4 engineering analysis and computer proficiency courses (p. 116)	
4 units of basic science:	
PHYSICS 135-2 & PHYSICS 136-2	General Physics and General Physics Laboratory
PHYSICS 135-3 & PHYSICS 136-3	General Physics and General Physics Laboratory
1.33 units chosen from McCormick-approved basic science courses (p. 116)	
Maximum of 3 basic science units may come from any one area	
5 basic engineering courses:	
EECS 202-0	Introduction to Electrical Engineering (grade of C– or better required for graduation)
EECS 203-0	Introduction to Computer Engineering (grade of C– or better required for graduation)
EECS 302-0	Probabilistic Systems
EECS 211-0 or EECS 230-0	Fundamentals of Computer Programming II Programming for Engineers
1 course from one of the following basic engineering categories: fluids and solids, materials science and engineering, systems engineering and analysis, thermodynamics	
3 design and communications courses (p. 116)	
7 social sciences/humanities courses (p. 116)	
5 unrestricted electives (p. 116)	
Course	Title
Major Program (16 units)	
5 required courses:	
EECS 221-0	Fundamentals of Circuits
EECS 222-0	Fundamentals of Signals & Systems
EECS 223-0	Fundamentals of Solid State Engineering
EECS 224-0	Fund of Electromagnetics & Photonics
EECS 225-0	Fundamentals of Electronics
10 technical electives: ²	
<i>At least 6 courses from the following tracks:</i>	
Biomedical engineering track (p. 147)	
Circuits and electronics track (p. 147)	
Communications systems track (p. 147)	
Control systems track (p. 147)	
Digital signal processing and machine learning track (p. 147)	
Electromagnetics and optics track (p. 147)	
Solid-state engineering track (p. 148)	
2 courses from 300-level EECS technical electives (which may include EECS 205-0 and the courses above)	
2 courses may be chosen from:	
300-level technical courses in science, mathematics, computer science, or engineering or the courses above	
BIOL_SCI 215-0	Genetics and Molecular Biology
BIOL_SCI 217-0	Physiology
BIOL_SCI 219-0	Cell Biology
CHEM 210-1 & CHEM 210-2 & CHEM 210-3	Organic Chemistry and Organic Chemistry and Organic Chemistry
1 required design course from:	
EECS 347-1	Microprocessor System Projects
EECS 392-0	VLSI Systems Design Projects

EECS 398-0	Electrical Engineering Design
EECS 399-0	Projects ³

- ¹ See general requirements (p. 116) for details.
- ² No more than 2 units of EECS 399-0 Projects will be counted as technical electives. Additional units of EECS 399-0 Projects may be taken but will be counted as unrestricted electives.
- ³ When EECS 399-0 Projects is a design project and the student has senior standing

Technical Elective Tracks

Biomedical Engineering Track

Course	Title
BMD_ENG 317-0	Biochemical Sensors
BMD_ENG 325-0	Introduction to Medical Imaging
BMD_ENG 327-0	Magnetic Resonance Imaging
BMD_ENG 333-0	Modern Optical Microscopy & Imaging

Circuits and Electronics Track

Course	Title
EECS 303-0	Advanced Digital Design
EECS 346-0	Microprocessor System Design
EECS 347-2	Microprocessor System Projects II
EECS 353-0	Digital Microelectronics
EECS 355-0	ASIC and FPGA Design
EECS 391-0	CMOS VLSI Circuit Design
EECS 393-0	Advanced Low Power VLSI and Mixed-signal IC Design

Communications Systems Track

Course	Title
EECS 307-0	Communications Systems
EECS 333-0	Introduction to Communication Networks
EECS 378-0	Digital Communications
EECS 380-0	Wireless Communications

Control Systems Track

Course	Title
EECS 360-0	Introduction to Feedback Systems
EECS 374-0	Introduction to Digital Control
EECS 390-0	Introduction to Robotics
MECH_ENG 333-0	Introduction to Mechatronics

Digital Signal Processing Track

Course	Title
EECS 332-0	Introduction to Computer Vision
EECS 359-0	Digital Signal Processing
EECS 363-0	Digital Filtering

Electromagnetics Engineering Track

Course	Title
EECS 308-0	Advanced Electromagnetics and Photonics
EECS 379-0	Lasers and Coherent Optics
EECS 382-0	Photonic Information Processing
EECS 383-0	Fiber-Optic Communications
EECS 386-0	Computational Electromagnetics and Photonics

Solid-State Engineering Track

Course	Title
MECH_ENG 381-0	Introduction to Micro-electro-mechanical Systems
EECS 250-0	Physical Electronics and Devices
EECS 381-0	Electronic Materials: Properties and Applications
EECS 384-0	Solid State Electronic Devices
EECS 385-0	Optoelectronics
EECS 388-0	Nanotechnology

Computer Science Minor (McCormick School of Engineering)

The department offers a minor in computer science for students who wish to develop stronger competence in computer science while pursuing a degree in another field. The minor will provide essential knowledge for all computer scientists as well as exposure to every critical subfield of the discipline.

Course	Title
Requirements (15 units)	
<i>Prerequisites (6 units)</i>	
MATH 220-0	Differential Calculus of One-Variable Functions
MATH 224-0	Integral Calculus of One-Variable Functions
MATH 230-0	Differential Calculus of Multivariable Functions
Engineering Analysis:	
3 units of engineering analysis:	
GEN_ENG 205-1 & GEN_ENG 205-2 & GEN_ENG 205-3 or GEN_ENG 206-1 & GEN_ENG 206-2 & GEN_ENG 206-3	Engineering Analysis I and Engineering Analysis II and Engineering Analysis III Honor Engineering Analysis and Honors Engineering Analysis and Honors Engineering Analysis
<i>Minor Requirements (9 units)</i>	
Core Courses (6 units) ¹	
6 units of computer science:	
EECS 101-0	Computer Science: Concepts, Philosophy, and Connections
EECS 111-0	Fundamentals of Computer Programming
EECS 211-0	Fundamentals of Computer Programming II
EECS 212-0	Mathematical Foundations of Comp Science
EECS 213-0	Introduction to Computer Systems
EECS 214-0	Data Structures & Algorithms
Breadth Courses (3 units)	
3 courses from the list of breadth courses; each course must be in a different breadth area	
Breadth courses in the Computer Science Degree (p. 145)	

¹ Students without prior programming experience may wish to take EECS 110-0 Introduction to Computer Programming before EECS 111-0 Fundamentals of Computer Programming

Students should begin the minor before the end of their first quarter of their junior year. Students must submit a completed petition form for the minor to the Undergraduate Engineering Office before their last quarter as an undergraduate. At least 5 courses used for the minor may not be used (double-counted) to fulfill requirements in the student's 16-unit major program.

Engineering Design

See Segal Design Institute (p. 156) (including the Segal Design Certificate and bachelor of science degree in manufacturing and design engineering).

Engineering Sciences and Applied Mathematics

mccormick.northwestern.edu/applied-math

The Department of Engineering Sciences and Applied Mathematics offers coursework 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 coursework either in mathematics or one or more areas of application.

Program of Study

- Applied Mathematics Degree (p. 149)

ES_APPM 252-1 Honors Calculus for Engineers (1 Unit) Alternative to standard calculus sequence. Covers more material at a deeper level with more applications. Satisfies same requirements as MATH 230-0 and MATH 234-0. Prerequisite: invitation or consent of instructor.

ES_APPM 252-2 Honors Calculus for Engineers (1 Unit) Alternative to standard calculus sequence. Covers more material at a deeper level with more applications. Satisfies same requirements as MATH 230-0 and MATH 234-0. Prerequisite: invitation or consent of instructor.

ES_APPM 311-1 Methods of Applied Mathematics (1 Unit) Ordinary differential equations; Sturm-Liouville theory, properties of special functions, solution methods including Laplace transforms. Fourier series: eigenvalue problems and expansions in orthogonal functions. Partial differential equations: classification, separation of variables, solution by series and transform methods. Prerequisite: GEN_ENG 205-4, GEN_ENG 206-4, or MATH 250-0.

ES_APPM 311-2 Methods of Applied Mathematics (1 Unit) Ordinary differential equations; Sturm-Liouville theory, properties of special functions, solution methods including Laplace transforms. Fourier series: eigenvalue problems and expansions in orthogonal functions. Partial differential equations: classification, separation of variables, solution by series and transform methods. Prerequisite: GEN_ENG 205-4, GEN_ENG 206-4, or MATH 250-0.

ES_APPM 312-0 Complex Variables (1 Unit) Imaginary numbers and complex variables, analytic functions, calculus of complex functions, contour integration with application to transform inversion, conformal mapping. Prerequisite: GEN_ENG 205-4, GEN_ENG 206-4, or MATH 250-0.

ES_APPM 322-0 Applied Dynamical Systems (1 Unit) 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: ES_APPM 311-1 and ES_APPM 311-2 or equivalent or consent of instructor.

ES_APPM 345-0 Applied Linear Algebra (1 Unit) Understanding and implementation of algorithms to calculate matrix decompositions such as eigenvalue/vector, LU, QR, and SVD decompositions. Applications include data-fitting, image analysis, and ranking algorithms.

ES_APPM 346-0 Modeling and Computation in Science & Engineering (1 Unit) Advanced techniques for initial value problems, differential algebraic systems, bifurcations, chaos, and partial differential equations. Applications drawn from different physical areas. Prerequisites: MATH 234-0, MATH 240-0, and MATH 250-0; or GEN_ENG 205-4 and PHYSICS 135-1, PHYSICS 135-2; or equivalent; familiarity with a programming language; or consent of instructor.

ES_APPM 370-1 Introduction to Computational Neuroscience (1 Unit) From neurons to networks. Ion channels, Hodgkin-Huxley framework, simplified models, cable equation, synapses, spike triggered average, and optimal stimulus. Feedforward and recurrent firing rate networks. Statistical approach, Bayesian modeling. Brief introduction to numerical methods.

ES_APPM 395-0 Special Topics (1 Unit)

ES_APPM 398-0 Introduction to Applied Math Research (0 Unit) This is a seminar course where ESAM faculty present their current and planned research topics in applied mathematics.

ES_APPM 399-0 Projects (1 Unit) Special studies to be carried out under faculty direction. Credit to be arranged.

Applied Mathematics Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Requirements (48 units)	
<i>Core Courses (32 units)</i> ¹	
4 mathematics courses (p. 116)	
4 engineering analysis and computer proficiency courses (p. 116)	
4 units of basic science: ²	
PHYSICS 135-2 & PHYSICS 135-3	General Physics and General Physics
2 units chosen from McCormick-approved basic science courses	
3 design and communication courses (p. 116)	
5 basic engineering courses:	
EECS 230-0 or EECS 211-0	Programming for Engineers Fundamentals of Computer Programming II
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, Thermodynamics (p. 116)	
7 social sciences/humanities courses (p. 116)	
5 unrestricted electives (p. 116)	
<i>Major Program (16 units)</i>	
7 engineering sciences and applied mathematics courses:	

ES_APPM 311-1 & ES_APPM 311-2	Methods of Applied Mathematics and Methods of Applied Mathematics
ES_APPM 312-0 or MATH 325-0	Complex Variables Complex Analysis
ES_APPM 322-0	Applied Dynamical Systems
ES_APPM 346-0	Modeling and Computation in Science & Engineering
MATH 334-0	Linear Algebra: Second Course
ES_APPM 421-1	Models in Applied Mathematics
2 courses chosen from:	
EECS 302-0	Probabilistic Systems
IEMS 202-0	Probability
IEMS 303-0	Statistics
IEMS 310-0	Operations Research
IEMS 313-0	Foundations of Optimization
MATH 310-1	Probability and Stochastic Processes
MATH 310-2	Probability and Stochastic Processes
MATH 310-3	Probability and Stochastic Processes
1 mathematical modeling course chosen from:	
ES_APPM 399-0	Projects
ES_APPM 495-0	Selected Topics in Applied Mathematics (subject to department approval)
4 courses in engineering or the sciences at the 300 level or higher leading to an approved concentration in one of the following areas:	
Engineering	
Mathematical social sciences (e.g., economics)	
Mathematics (e.g., discrete mathematics or analysis)	
Numerics	
The sciences	
2 technical electives at the 300 level or higher in engineering, science, or mathematics	

¹ See general requirements (p. 116) for details.

² Maximum of 3 basic science units may come from any one area

Environmental Engineering

See Civil and Environmental Engineering (p. 127).

Farley Center for Entrepreneurship Program of Study

- Entrepreneurship Minor (p. 150)

ENTREP 225-0 Principles of Entrepreneurship (1 Unit) Introduction to the essential elements of building one's own business, including strategy, finance, accounting, marketing, operations, and choosing the ideal management team. History of entrepreneurship and the entrepreneur psyche. Lectures, guest speakers, and case studies. Teams present a business idea at the conclusion. Taught with IEMS 225-0; may not receive credit for both courses. May not be taken after IEMS 325-0 or ENTREP 325-0.

ENTREP 310-0 Personal Branding and How to Grow Your Fanbase (1 Unit)

ENTREP 311-0 Storytelling for Business (1 Unit)

ENTREP 325-0 Engineering Entrepreneurship (1 Unit) Overview of the entrepreneurial process from an engineering perspective. Idea generation, planning, financing, marketing, protecting, staffing, leading, growing, and

harvesting. Business models for startups. Lectures, guest speakers, and case studies. Taught with IEMS 325-0; may not receive credit for both courses. Prerequisite: ENTREP 330-1.

ENTREP 330-1 Startup Accounting and Finance (1 Unit) The startup ecosystem is synonymous with computer science, engineering and other tech focused educational backgrounds. However, at the heart of every successful startup is a certain level of financial literacy needed by founders to guide and navigate the startup from simply an idea to (hopefully) a lucrative exit. Without a firm grasp on accounting, many founders fail to see their startup reach its full potential, or fail outright. The goal of this course is to lay the foundation for what a founder needs to know to successfully launch and scale a startup, taught from the accountant's perspective. You'll learn not only what exactly accounting is, but how it applies to startups specifically. In addition, we will teach the basics that will enable you to manage your accounting operations during the infancy of a startup's lifecycle. Further, we will provide founders with a level of understanding that equips them to make actionable, strategic decisions from accurate and insightful accounting.

ENTREP 331-0 Entrepreneurial Sales and Marketing (1 Unit) Principles and practices for scaling entrepreneurial ventures. Application of coherent methodology to a student-run venture. Self-organizing teams develop a customer/client focus, provide for continuous improvement in successive iterations, and operate with transparency. Prerequisite: ENTREP 225-0 or ENTREP 325-0 recommended.

ENTREP 332-0 Financing Entrepreneurial Ventures (1 Unit) Topics selected from work of current interest in entrepreneurship and innovation. May be repeated for credit. Prerequisites: ENTREP 225-0 and ENTREP 325-0 recommended.

ENTREP 340-0 Innovate for Impact (1 Unit) This is an experiential, team-based course in which students create social-impact focused entrepreneurial ventures using both lean startup methodology and human-centered design.

ENTREP 350-1 Radical Entrepreneurship (1 Unit) Your idea has legs, and even traction. Radical Entrepreneurship drills down on how to build your venture, while at the same time retaining a collaborative culture and continuous innovation. Using iterative and lean startup methodology, students will explore the necessary mindsets and methods to best position their ventures for continued growth and success. Radical Entrepreneurship is an incubator bootcamp for your real-world project; the coursework centers on students' existing ventures. **Please note, this is a partnership between the Farley Center and the Garage. A portion of the seats in the class will be held for Wildfire teams. The remaining seats will be open for any student with the proper prerequisites to enroll. Students who enroll and are not part of a team will be assigned to work with a Wildfire team. Your participation in class on a Wildfire team does not guarantee that you will become a founding member of that team, and does not guarantee any rights with respect to equity, intellectual property, or any other rights related to that company.

ENTREP 360-0 Leadership, Ethics, and You (1 Unit) What exactly is leadership? Are leaders born? Are you a leader? Where do ethics, and integrity, fit into leadership, and even more importantly into your life? Leading others is hard. Leading oneself is even harder. This course is designed to dig into these questions to help you develop your "True North," a compass that will help you lead yourself (and others), with your values, on your terms, to your destination. Limited to juniors and seniors.

ENTREP 361-0 Entrepreneurship Demystified (1 Unit) This is a discussion and project-based course in which students explore topics in

ethics and leadership with the context of working for a startup or building one's own company.

ENTREP 395-0 Special Topics (1 Unit) Topics selected from work of current interest in entrepreneurship and innovation. May be repeated for credit.

ENTREP 399-0 Independent Study with Farley Center for Entrepreneurship and Innovation (1-3 Units) Special projects under faculty direction. May be repeated for credit. Prerequisite: consent of instructor and department.

Entrepreneurship Minor

The Farley Center undergraduate minor in entrepreneurship is designed for students who are interested in pursuing a practical education in how to start a business or how to make innovation a cornerstone of their career paths.

The minor requires 8 courses, including 5 core courses, and 3 electives. No more than 3 courses may be double counted within a student's major program. Courses with a grade lower than "C-" cannot be applied to the minor.

Please note, many of our graduate level courses are open to undergrads. Refer to the Farley Center website (<http://www.farley.northwestern.edu>) for a complete listing of all courses.

Core courses:

- ENTREP 225-0 Principles of Entrepreneurship OR ENTREP 325-0 Engineering Entrepreneurship (IEMS 325-0 Engineering Entrepreneurship may be substituted for ENTREP 325-0 Engineering Entrepreneurship)
- ENTREP 360-0 Leadership, Ethics, and You
- ENTREP 330-1 Startup Accounting and Finance
- ENTREP 331-0 Entrepreneurial Sales and Marketing
- Any Farley Center experiential course (includes all NUvention courses, Radical Entrepreneurship – ENTREP 350-1 Radical Entrepreneurship, and Innovate for Impact – ENTREP 340-0 Innovate for Impact)

Electives:

- Any Farley Center course
- Independent Study with Farley Center faculty member (ENTREP 399-0 Independent Study with Farley Center for Entrepreneurship and Innovation) - Max. one unit
- Other coursework related to entrepreneurship from other programs, including BIP, Segal, Medill/IMC (must be a 300-level course and students must get prior approval from the Farley Center)

General Engineering

Introductory and General Engineering Courses

Required Introductory Courses

DSGN 106-1 Design Thinking and Communication (0.5 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

communications; use of software tools; discussion of societal and business issues. One lecture, two workshops, lab. Registration for both quarters required. Primarily intended for first-year students.

DSGN 106-2 Design Thinking and Communication (0.5 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 communications; use of software tools; discussion of societal and business issues. One lecture, two workshops, lab. Registration for both quarters required. Primarily intended for first-year students.

GEN_ENG 205-1 Engineering Analysis I (1 Unit) Introduction to linear algebra from computational, mathematical, and applications viewpoints. Computational methods using a higher-level software package such as MATLAB.

GEN_ENG 206-1 Honor Engineering Analysis (1 Unit) Covers topics addressed in GEN_ENG 205-1 at a deeper level. Intended for students with demonstrated strength in mathematics, computer programming, and/or physics. Prerequisite: consent of instructor.

GEN_ENG 205-2 Engineering Analysis II (1 Unit) Linear algebra and introduction to vector methods in engineering analysis. Statics and dynamics of rigid bodies and matrix analysis of trusses and networks. Engineering design problems. Prerequisites: C- or better in GEN_ENG 205-1; MATH 220-0.

GEN_ENG 205-3 Engineering Analysis III (1 Unit) Dynamic behavior of the elements. Modeling of mechanical (both translational and rotational), electrical, thermal, hydraulic, and chemical systems composed of those elements. Prerequisite: C- or better in GEN_ENG 205-2.

GEN_ENG 205-4 Engineering Analysis IV (1 Unit) Solution methods for ordinary differential equations, including exact, numerical, and qualitative methods. Applications and modeling principles; solution techniques. Prerequisites: C- or better in GEN_ENG 205-2; MATH 224-0.

GEN_ENG 206-4 Honors Engineering Analysis IV (1 Unit) Covers topics addressed in GEN_ENG 205-4 at a deeper level. Intended for students with demonstrated strength in mathematics, computer programming, and/or physics. Prerequisite: consent of instructor.

Optional General Engineering Courses

GEN_ENG 190-0 Engineering Freshman Seminar (1 Unit) Broad engineering or interdisciplinary subjects of current interest.

GEN_ENG 220-1 Analy/Comp Graph (0.5 Unit) Introduction to AutoCAD, geographic information systems (GIS), and electronic surveying and measuring.

GEN_ENG 220-2 Analy/Comp Graph II (0.5 Unit) Introduction to AutoCAD, geographic information systems (GIS), and electronic surveying and measuring.

GEN_ENG 295-0 Special Topics in Engineering (1 Unit) Intermediate-level topics suggested by students or faculty members and approved by the curriculum committee.

GEN_ENG 355-0 Domestic Study Affiliated (0 Unit) Fulltime registration in an academic program in the continental United States that is affiliated with Northwestern. Upon successful completion of the program,

registration is replaced with credits transferred from the affiliated institution.

GEN_ENG 395-0 Special Topics in Engineering (1 Unit) Topics suggested by faculty and approved by the curriculum committee.

GEN_ENG 397-0 Selected Topics in Engineering (0.5 Unit) Topics of limited scope as suggested by faculty and approved by the curriculum committee.

GEN_ENG 399-0 Independent Study (1 Unit) Independent study on an engineering subject supervised by a faculty member and concluding with a final report.

Murphy Institute General Engineering Courses

- Participation in the Murphy Institute and its courses is by invitation only. Additional information can be found on the Murphy Institute website: www.mccormick.northwestern.edu/academics/undergraduate/programs/honors-and-combined-degrees/murphy-institute/

GEN_ENG 195-1 Engineering Dialog I (0.33-0.34 Units) Weekly seminar addressing subjects of interest in engineering, design, engineering policy, and entrepreneurial activities. For participants in the invitation-only Murphy Institute Scholars Program. May be repeated.

GEN_ENG 196-1 Engineering Discourse I (0 Unit) Noncredit counterpart to GEN_ENG 195-1.

GEN_ENG 195-2 Engineering Dialog II (0.33-0.34 Units) Weekly seminar addressing subjects of interest in engineering, design, engineering policy, and entrepreneurial activities. For participants in the invitation-only Murphy Institute Scholars Program. May be repeated.

GEN_ENG 196-2 Engineering Discourse II (0 Unit) Noncredit counterpart to GEN_ENG 195-2.

GEN_ENG 195-3 Engineering Dialog III (0.33-0.34 Units) Weekly seminar addressing subjects of interest in engineering, design, engineering policy, and entrepreneurial activities. For participants in the invitation-only Murphy Institute Scholars Program. May be repeated.

GEN_ENG 196-3 Engineering Discourse III (0 Unit) Noncredit counterpart to GEN_ENG 195-3.

GEN_ENG 195-4 Engineering Dialog IV (0.33-0.34 Units) Weekly seminar addressing subjects of interest in engineering, design, engineering policy, and entrepreneurial activities. For participants in the invitation-only Murphy Institute Scholars Program. May be repeated.

GEN_ENG 196-4 Engineering Discourse IV (0 Unit) Noncredit counterpart to GEN_ENG 195-4.

Engineering Career Development

The mission of Engineering Career Development (ECD) is to provide all McCormick students with the tools necessary for lifelong career management and to forge relationships with employer partners for this end.

Engineering Career Development offers students:

- Courses and workshops designed to aid students in preparing and conducting a job search
- Personalized, one-on-one career advising

- Employer events and on campus interviewing opportunities
- Work integrated learning programs that allow students to maintain their student status while enrolling in zero-credit, zero-tuition courses for co-op, internship, research, and service learning experiences.

For more information visit: www.mccormick.northwestern.edu/career-development/

Engineering Career Development Course Offerings

Introductory Coursework

CRDV 301-0 Introduction to Career Development (0 Unit) Course preparing students for the Walter P. Murphy Cooperative Engineering Education Program, internships, and fulltime employment. It includes units on job-search skills, self-assessment, transition to the workplace, workplace-management issues, and transition back to school.

Cooperative Engineering Courses

- All courses in the CRDV 310 sequence are 0 credit.
- Sequence of courses covering the work terms of students in the Walter P. Murphy Cooperative Engineering Education Program.

Course	Title
CRDV 310-1 or CRDV 310-1-GM	Cooperative Engineering Education International Cooperative Engineering Education
CRDV 310-2 or CRDV 310-2-GM	Cooperative Engineering Education International Cooperative Engineering Education
CRDV 310-3 or CRDV 310-3-GM	Cooperative Engineering Education International Cooperative Engineering Education
CRDV 310-4 or CRDV 310-4-GM	Cooperative Engineering Education International Cooperative Engineering Education
CRDV 310-5 or CRDV 310-5-GM	Cooperative Engineering Education International Cooperative Engineering Education
CRDV 310-6 or CRDV 310-6-GM	Cooperative Engineering Education International Cooperative Engineering Education
CRDV 310-7 or CRDV 310-7-GM	Cooperative Engineering Education: Half-time International Cooperative Engineering Education: Half-Time

Engineering Internship Courses

- All courses in the CRDV 311 sequence are 0 credit.
- Series of courses designated for students pursuing the Business Enterprise Certificate, seeking University recognition of their internship experience, or participating in an approved internship during the regular academic year.

Course	Title
CRDV 311-1 or CRDV 311-1-GM	Professional Engineering Internship International Engineering Internship
CRDV 311-2 or CRDV 311-2-GM	Professional Engineering Internship International Engineering Internship
CRDV 311-3 or CRDV 311-3-GM	Professional Engineering Internship International Engineering Internship
CRDV 311-7 or CRDV 311-7-GM	Engineering Internship: Half-time International Engineering Internship: Half-Time

Engineering Projects in Service Learning Courses

- All courses in the CRDV 312 sequence are 0 credit.
- CRDV 312 courses require students to engage in an engineering-related, full-time community service project under the guidance of an appropriate faculty member, agency supervisor or mentor.

Course	Title
CRDV 312-1 or CRDV 312-1-GM	Undergraduate Engineering Projects in Service Learning International Engineering Service Learning
CRDV 312-2 or CRDV 312-2-GM	Undergraduate Engineering Projects in Service Learning International Engineering Service Learning
CRDV 312-3 or CRDV 312-3-GM	Undergraduate Engineering Projects in Service Learning International Engineering Service Learning
CRDV 312-7 or CRDV 312-7-GM	Engineering Projects in Service Learning: Half-time International Engineering Service Learning: Half-Time

Undergraduate Engineering Research Courses

- All courses in the CRDV 313 sequence are 0 credit.
- The CRDV 313 course sequence allows students to maintain half-time enrollment at Northwestern while engaged full-time in an University-based research project under the supervision of a faculty research sponsor. Students are evaluated by ABET criteria, the same as those in the Walter P. Murphy Cooperative Engineering Education Program and the Professional Engineering Internship Program.

Course	Title
CRDV 313-1 or CRDV 313-1-GM	Undergraduate Engineering Research International Engineering Research Experience
CRDV 313-2 or CRDV 313-2-GM	Undergraduate Engineering Research International Engineering Research Experience
CRDV 313-3 or CRDV 313-3-GM	Undergraduate Engineering Research International Engineering Research Experience
CRDV 313-7 or CRDV 313-7-GM	Engineering Research Experience: Half-time International Engineering Research Experience: Half-Time

Engineering Office Of Personal Development

The Engineering Office of Personal Development (EOPD) strives to cultivate a student body of engineers who are:

- More self aware
- Empowered to take ownership of and responsibility for their learning
- Knowledgeable about the opportunities available to them, and how those opportunities connect to their personal goals
- Highly resilient and possess the scope of vision to take on complex problems

For more information visit www.mccormick.northwestern.edu/personal-development/

Engineering Office of Personal Development Course Offerings

PRDV 101-1 McCormick First-Year Experience (0 Unit) A series of peer-led small group discussions for first-year engineering students, covering topics like higher education culture, time management, strategies for success in courses, and mindset. Attendance is required.

PRDV 101-2 McCormick First-Year Experience (0 Unit) A series of peer-led small group discussions for first-year engineering students covering topics such as academic strategies, choice of major, exploration of non-major options, and health and well-being. Attendance is required.

PRDV 325-0 Emotional Intelligence 101 - Managing Yourself, Maximizing Your Potential (1 Unit) Introduction to emotional intelligence theories and concepts; provides practical tools for building skills in stress management, intrapersonal and interpersonal awareness, peak performance, resilience/adaptability, and general mood.

PRDV 335-1 Engineering Improv I: The Art of Allowing (0.5 Unit) Start anywhere, remember you are not the most important person in the scene, and say yes. Through these and other improv techniques, students learn to tackle unexpected obstacles, building skills that can be leveraged in both academic and non-academic contexts to face challenges with resilience.

PRDV 335-2 Engineering Improv II: The Art of Inspiration (0.5 Unit) This course builds on Improv I and takes students deeper into concepts and applications. Prerequisite: Improve I.

PRDV 345-0 Whole-Body Thinking: Collaborative Problem Solving through Partner Dancing (1 Unit) In this approach to swing dancing, the goal is for two people to join hands and use the rhythms they hear in swinging, jazz-rhythm-based music as a means of connecting with each other.

PRDV 395-0 Special Topics in Personal Development (1 Unit) Topics suggested by students or faculty and approved by the curriculum committee. Prerequisite: consent of instructor.

PRDV 396-0 Topics in Personal Development (0 Unit) Topics of limited scope as suggested by faculty or students and approved by the McCormick Office of Personal Development.

PRDV 397-0 Selected Topics in Personal Development (0.5 Unit) Topics of limited scope as suggested by faculty or students and approved by the McCormick Curriculum Committee.

Northwestern Institute on Complex Systems

The Northwestern Institute on Complex Systems (NICO) was founded in 2004 with the goals of uncovering fundamental principles governing complex systems in science, technology, and human behavior and applying these principles to solve societally relevant problems through the analysis, design, and control of complex systems. Today, NICO serves as a hub and facilitator for pathbreaking research in complexity and data science transcending the boundaries of established disciplines. NICO is a collaboration between the McCormick School of Engineering and the Kellogg School of Management.

Northwestern Institute on Complex Systems Course Offerings

NICO 101-0 Introduction to Programming for Big Data (0.67 Unit) The skills needed to go from data to knowledge and application, which go under the name of Data Science, are in big demand in industry, government, and academia. This course provides an introduction to the foundational skills needed by data scientists. Prior knowledge of programming is not needed.

NICO 102-0 Project for Introduction to Programming for Big Data (0.33 Unit) The skills needed to go from data to knowledge and application, which go under the name of Data Science, are in big demand in industry, government, and academia. This course provides an opportunity to develop programming skills by working on a data centered project. *Formal Studies Distro Area*

Industrial Engineering and Management Sciences

mccormick.northwestern.edu/industrial

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 advanced courses in analytics, data science, financial engineering, management science, service operations, 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: management science, healthcare and humanitarian logistics, entrepreneurship, mathematical sciences/graduate preparation, statistics and data analytics, and production and logistics.

In preparation for future careers, students take full advantage of the additional academic, business, and leadership programs available at Northwestern: a minor in computer science or economics, the Kellogg Certificate Program for Undergraduates, study abroad, and the co-op program. The IE Client Project Experience allows students to integrate these experiences with their IE course work to address a current application for a real client.

Program of Study

- Industrial Engineering Degree (p. 155)

IEMS 201-0 Introduction to Statistics (1 Unit) Collecting data; summarizing and displaying data; drawing conclusions from data; probability background, confidence intervals, hypotheses tests, regression, correlation. Not open to industrial engineering degree candidates. May not receive credit for both IEMS 201-0 and any of STAT 210-0, BMD_ENG 220-0, IEMS 303-0, or CHEM_ENG 312-0.

IEMS 202-0 Probability (1 Unit) Introduction to probability theory and its applications. Conditional probabilities and expectation values. Random variables and distributions, including binomial, Poisson, exponential, and normal. Joint distributions and limit laws for foundation of and connection to statistics. Examples in reliability, inventory, finance, and statistics. May not receive credit for both IEMS 202-0 and any of the following: EECS 302-0; MATH 310-1, MATH 314-0, MATH 385-0; STAT 320-1, STAT 383-0. Prerequisite: concurrent enrollment in MATH 234-0.

IEMS 225-0 Principles of Entrepreneurship (1 Unit) Introduction to essential elements of building one's own business, from brainstorming ideas and assessing opportunities to pitching a business idea. History of entrepreneurship and the entrepreneurial psyche. Business plan fundamentals, including strategy, finance, accounting, marketing, operations, and choosing the ideal management team. Taught with ENTREP 225-0; may not receive credit for both courses. May not be taken after IEMS 325-0 or ENTREP 325-0.

IEMS 303-0 Statistics (1 Unit) Introduction to the foundations of statistics and statistical computing for data analysis and their applications. Descriptive statistics and statistical inference for estimation, testing, and prediction. May not receive credit for both IEMS 303-0 and any of IEMS 201-0, STAT 210-0, BMD_ENG 220-0, or CHEM_ENG 312-0. May not be taken for credit with or after STAT 320-1. Prerequisite: IEMS 202-0 or equivalent; EECS 111-0 recommended.

IEMS 304-0 Statistical Learning for Data Analysis (1 Unit) Predictive modeling of data using modern regression and classification methods. Multiple linear regression; logistic regression; pitfalls and diagnostics; nonparametric and nonlinear regression and classification such as trees, nearest neighbors, neural networks, and ensemble methods. Prerequisites: IEMS 303-0 and EECS 111-0 or equivalents.

IEMS 307-0 Quality Improvement by Experimental Design (1 Unit) 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: IEMS 201-0, IEMS 303-0, or equivalent.

IEMS 308-0 Data Science and Analytics (1 Unit) Focuses on select problems in data science, in particular clustering, association rules, web analytics, text mining, and dimensionality reduction. Lectures will be completed with exercises and projects in open source framework R. Prior knowledge of classification techniques and R is required. Prerequisites: IEMS 304-0; EECS 317-0

IEMS 310-0 Operations Research (1 Unit) Survey of operations research techniques. Linear programming, decision theory, stochastic processes, game theory. May not be taken for credit with or after IEMS 313-0. Prerequisites: IEMS 201-0 or IEMS 202-0; GEN_ENG 205-1 or MATH 240-0.

IEMS 313-0 Foundations of Optimization (1 Unit) 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: EECS 111-0; GEN_ENG 205-1; MATH 230-0; sophomore standing.

IEMS 315-0 Stochastic Models (1 Unit) Fundamental concepts of probability theory; modeling and analysis of systems having random dynamics, particularly queueing systems. Prerequisites: IEMS 202-0 and concurrent enrollment in IEMS 303-0; GEN_ENG 205-1.

IEMS 317-0 Discrete Event Systems Simulation (1 Unit) Computer simulation of discrete-change systems subject to uncertainty. Choice of input distributions; development of models; design and analysis of simulation experiments. Mini-projects, exams, and computer labs. Prerequisites: IEMS 303-0; IEMS 310-0 or IEMS 315-0.

IEMS 325-0 Engineering Entrepreneurship (1 Unit) 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. Taught with ENTREP 325-0; may not receive credit for both courses. Prerequisite: 1 course in accounting or finance such as CIV_ENV 205-0 or ENTREP 330-1.

IEMS 341-0 Social Networks Analysis (1 Unit) The use of social network analysis to understand the growing connectivity and complexity in the world around us on different scales, ranging from small groups to the

World Wide Web. How we create social, economic, and technological networks, and how they enable and constrain attitudes and behaviors.

IEMS 342-0 Organizational Behavior (1 Unit) 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 (1 Unit) 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: CIV_ENV 205-0 and IEMS 303-0.

IEMS 344-0 Leading Organizations and Teams (1 Unit) In this class, a combination of theory and practice are leveraged to help students develop their leadership skill-set so that they can become more effective leaders of teams and organizations. In particular, fundamental tools and concepts from the behavioral and social sciences are studied that will help students' to analyze organizational dynamics and to take robust action. In addition, students explore their own "leadership brand" and begin to answer the question of what type of leader they aspire to become so that they can thoughtfully and deliberately manage their careers. Prerequisite: Junior standing.

IEMS 345-0 Negotiations and Conflict Resolution for Engineers (1 Unit) In this highly interactive class, students participate in negotiation and dispute resolution simulations that range in complexity from single-party/single-issue to multiparty/ multi-issue cases. In addition students explore the role of agents and third parties in the managing conflict. Throughout all of the simulations integrative and distributive strategies are emphasized that can be applied across a variety of contexts. Prerequisite: Junior standing

IEMS 351-0 Optimization Methods in Data Science (1 Unit) Introduction to nonlinear mathematical optimization with applications in data science. The theoretical foundation and the fundamental algorithms for nonlinear optimization are studied and applied to supervised learning models, including nonlinear regression, logistic regression, and deep neural networks. Students write their own implementation of the algorithms in the Python programming language and explore their performance on realistic data sets. Prerequisites: EECS 111-0 and IEMS 303-0 and IEMS 313-0, or equivalent.

IEMS 365-0 Analytics for Social Good (1 Unit) Challenges and opportunities in using analytics to pursue social good. Application of data-analysis and decision-making tools and frameworks to such case studies as disaster response and community-based healthcare. For juniors and seniors with interests in humanitarian and nonprofit operations. *Social Behavioral Sciences Distro Area*

IEMS 373-0 Intro to Financial Engineering (1 Unit) 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: CIV_ENV 205-0, IEMS 315-0, MATH 234-0, and EECS 111-0, or equivalent or consent of instructor.

IEMS 381-0 Supply Chain Modeling and Analysis (1 Unit) 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: IEMS 313-0.

IEMS 382-0 Production Planning and Scheduling (1 Unit) 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: IEMS 202-0; IEMS 310-0 or IEMS 313-0.

IEMS 383-0 Service Operations Management (1 Unit) Exploration of service industries: cost-reduction and service-enhancement models, location planning, workforce scheduling, yield management, queuing analysis, and call-center management. Prerequisites: IEMS 313-0, IEMS 315-0.

IEMS 385-0 Introduction to Health Systems Management (1 Unit) Health systems, lean concepts, patient-flow analysis, inference, and data-driven knowledge generation, decisions, and change. Forecasting, operations, and optimization of health resources. Prerequisites: IEMS 303-0, IEMS 313-0.

IEMS 393-1 Industrial Engineering Design Project (1 Unit) 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. Prerequisites: IEMS 313-0, IEMS 315-0, concurrent enrollment in IEMS 317-0, and senior standing.

IEMS 393-2 Industrial Engineering Design Project (1 Unit) 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: IEMS 393-1.

IEMS 394-0 Industrial Engineering Client Project Challenge (1 Unit) Open-ended client projects involving application of operations research techniques to complex data analysis and decision problems. Typically taken at the end of junior year or at the start of senior year. Closed to seniors in spring quarter. Prerequisites: IEMS 202-0, IEMS 303-0, IEMS 304-0, IEMS 313-0, IEMS 315-0, and IEMS 317-0.

IEMS 395-0 Special Topics in Industrial Engineering (1 Unit) Topics suggested by students or faculty members and approved by the department.

IEMS 399-0 Independent Study in Industrial Engineering (1 Unit) Independent study on an industrial engineering topic supervised by a faculty member.

Industrial Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
--------	-------

Requirements (48 units)

*Core Courses (32 units)*¹

4 mathematics courses (p. 116)

4 engineering analysis and computer proficiency courses (p. 116)

4 units of basic science chosen according to McCormick basic science guidelines (p. 116)²

3 design and communications courses (p. 116)

5 basic engineering courses from at least four different areas:

EECS 211-0	Fundamentals of Computer Programming II
------------	---

EECS 317-0	Data Management & Information Processing
------------	--

CIV_ENV 205-0	Economics and Finance for Engineers ³
---------------	--

2 additional courses from two different areas: Computer architecture and numerical methods, Electrical science, Fluids and solids, Materials science and engineering, Thermodynamics (p. 116)

7 social sciences/humanities courses (p. 116)

5 unrestricted electives (p. 116)

Major Program (16 units)

1 computer programming course:

EECS 111-0	Fundamentals of Computer Programming
------------	--------------------------------------

6 IE Methods Core Courses

IEMS 202-0	Probability
------------	-------------

IEMS 303-0	Statistics
------------	------------

IEMS 304-0	Statistical Learning for Data Analysis
------------	--

IEMS 313-0	Foundations of Optimization
------------	-----------------------------

IEMS 315-0	Stochastic Models
------------	-------------------

IEMS 317-0	Discrete Event Systems Simulation
------------	-----------------------------------

1 production and logistics course chosen from:

IEMS 381-0	Supply Chain Modeling and Analysis
------------	------------------------------------

IEMS 382-0	Production Planning and Scheduling
------------	------------------------------------

IEMS 383-0	Service Operations Management
------------	-------------------------------

IEMS 385-0	Introduction to Health Systems Management
------------	---

1 Client Project Course

IEMS 394-0	Industrial Engineering Client Project Challenge
------------	---

7 Electives:

2 industrial engineering/operations research electives (p. 156)

2 management science electives (p. 156)

3 General Technical Electives chosen from

Any 200-level or higher course in McCormick, excluding CRDV and PRDV courses

Any 200-level or higher course in Biology, Chemistry or Physics

Any 300-level or higher course in Math, Statistics, or MMSS

Approved Non-engineering Technical Electives (p. 156)

The following courses may not be used: CHEM 201-0, MATH 310-1, MATH 311-1, MATH 314-0, MATH 385-0, MATH 386-1, PHYSICS 311-1, PHYSICS 311-2, PHYSICS 335-0, STAT 320-1, STAT 383-0

May include up to 2 units of IEMS 399-0

At most 2 courses in this group may be taken P/N; no other electives may be taken P/N.

¹ See general requirements (p. 116) for details.

² PHYSICS 135-2 General Physics and 1 unit of Chemistry (from approved list) recommended.

³ May not be taken with or after KELLG_FE 310-0 Principles of Finance; see adviser for alternatives.

- Concentration (optional): at least 4 courses from an approved list
 - Students may pursue more than one concentration.
 - Concentrations may be created from courses that satisfy other requirements or concentrations.
 - A list of available concentration areas may be found on the department website.

Major Program Electives

Industrial Engineering/Operations Research Electives

Course	Title
3 courses chosen from:	
IEMS 307-0	Quality Improvement by Experimental Design
IEMS 308-0	Data Science and Analytics
IEMS 351-0	Optimization Methods in Data Science
IEMS 365-0	Analytics for Social Good
IEMS 373-0	Intro to Financial Engineering
IEMS 381-0	Supply Chain Modeling and Analysis
IEMS 382-0	Production Planning and Scheduling
IEMS 383-0	Service Operations Management
IEMS 385-0	Introduction to Health Systems Management
IEMS 395-0	Special Topics in Industrial Engineering (selected topics)

Management Science Electives

Course	Title
2 courses chosen from:	
IEMS 325-0	Engineering Entrepreneurship
IEMS 341-0	Social Networks Analysis
IEMS 342-0	Organizational Behavior
IEMS 343-0	Project Management for Engineers
IEMS 344-0	Leading Organizations and Teams
IEMS 345-0	Negotiations and Conflict Resolution for Engineers
IEMS 395-0	Special Topics in Industrial Engineering (selected topics)

Approved Non-engineering Technical Electives

Course	Title
ECON 309-0	Public Finance
ECON 331-0	Economics of Risk and Uncertainty
ECON 336-0	Analytic Methods for Public Policy Analysis
ECON 339-0	Labor Economics
ECON 349-0	Industrial Economics
ECON 350-0	Monopoly Competition & Public Policy
ECON 355-0	Transportation Economics and Public Policy
ECON 360-2	Investments
ECON 362-0	International Finance
ECON 371-0	Economics of Energy
ECON 380-1	Game Theory
ECON 380-2	Game Theory
ECON 381-1	Econometrics
ECON 381-2	Econometrics
IMC 303-0	Integrated Marketing Communications Strategy
ISEN 220-0	Introduction to Energy Systems for the 21st Century
ISEN 230-0	Climate Change and Sustainability: Ethical Dimensions

Segal Design Institute

Human-Centered Design Projects

The Segal Design Institute is the unit of the McCormick School that promotes the importance of design throughout the undergraduate curriculum and is dedicated to fostering innovation among engineering and non-engineering students and faculty. Our students work on projects

that produce tangible results and improve the lives of people around the world. Our team-based approach to education encourages students to use design thinking together to solve complex, authentic problems in product, interaction, service, and business design.

design.northwestern.edu

Programs of Study

- Manufacturing and Design Engineering Degree (p. 157)
- Segal Design Certificate (p. 158)

DSGN 106-1 Design Thinking and Communication (0.5 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 communications; use of software tools; discussion of societal and business issues. One lecture, two workshops, lab. Registration for both quarters required. Primarily intended for first-year students.

DSGN 106-2 Design Thinking and Communication (0.5 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 communications; use of software tools; discussion of societal and business issues. One lecture, two workshops, lab. Registration for both quarters required. Primarily intended for first-year students.

DSGN 208-0 Design Thinking and Doing (1 Unit) Project-based introduction to design, structured as a hands-on studio course. Students learn methods of design innovation and work in teams, exploring ideas, prototyping solutions, and interacting with users. Intended for non-McCormick students.

DSGN 220-0 Introduction to Design Sketching (0.5 Unit) Design sketching to increase one's skills as a basic but essential form of communication. It is the medium for preliminary ideation. Basic rules and skills in a design studio setting.

DSGN 221-0 Design Sketching II (0.5 Unit) Advanced sketching techniques. Further development of skills for the design studio setting. Prerequisite: DSGN 220-0 or consent of instructor.

DSGN 240-0 Introduction to Solid Modeling: Solidworks (0.5 Unit) Solid modeling by creating three-dimensional shapes through two-dimensional sketches. Assemblies of individual parts. CAD modeling theory; modeling objects using different approaches for creating identical features. Lecture balanced with hands-on use of SolidWorks.

DSGN 245-0 Introduction to Computer Aided Design I: NX (0.5 Unit) Introduction to CAD software. Students develop solid models, detailed drawings, and product assemblies.

DSGN 246-0 Introduction to Computer Aided Design II: NX (0.5 Unit) 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. Sequence may not be repeated for credit.

DSGN 253-0 Managing Student-run Projects (1 Unit) Program management, structure, and control for complex, multiyear efforts such as the vehicle teams, a startup business, and other student-run activities.

Developing a team vision, designing strategy, and preparing a multiyear business plan using a combination of casework and a team project.

DSGN 295-0 Introductory Topics in Design (0.5-1 Unit) Topics suggested by students or faculty members and approved by the institute; taught at an intermediate level.

DSGN 297-0 Intermediate Topics in Engineering Design (0.5 Unit) Topics suggested by students and faculty and approved by the institute.

DSGN 300-0 Designing Your Life (1 Unit) The course will approach life as a series of design projects to help students craft a total life. It includes seminar-style discussions, role-playing, short writing assignments, hands-on making, guest speakers, and individual mentoring and coaching.

DSGN 305-0 Human-Centered Service Design (1 Unit) Design of new or improved services that tap deeply into people's needs for connectedness, belonging, and autonomy. Project outcomes may include organizational structures, service designs, and designed products. Prerequisite: DSGN 106-1 or DSGN 208-0.

DSGN 306-0 UX Design (1 Unit) Hands-on course covering the full range of user experience design, from screen-based experience to interaction with physical products to end-to-end environment design. Prerequisite: DSGN 106-1 or DSGN 208-0.

DSGN 308-0 Human-Centered Product Design (1 Unit) Project-based course focusing on user needs: observational methods, brainstorming, prototyping, business models, and the social and engineering concerns for product design. Prerequisite: DSGN 106-1 or 208-0

DSGN 320-0 Introduction to Industrial Design Methods (1 Unit) Process of product development from an industrial design perspective.

DSGN 321-0 Advanced Solid Modeling (0.5 Unit) This course provides advanced instruction on the use of CAD modeling using Solidworks software.

DSGN 322-0 Rendering (0.5 Unit) This course provides an introduction to Keyshot software, a photorealistic rendering package.

DSGN 345-0 Computer-Aided Manufacturing (0.5 Unit) CAM using the NX manufacturing environment to program machining operations for CNC milling. Operations, tool generation, and proper manufacturing geometries. Final project involving design and manufacture, g-code generation, and CNC, with emphasis on design for manufacturing considerations. Prerequisite: DSGN 245-0.

DSGN 346-0 Design for Fabrication: NX (1 Unit) Part design from manufacturing setup and g-code generation to proper machine operation and manufacturing. Final project involving design and CNC manufacturing of a part outside of class time. Prerequisite: DSGN 345-0.

DSGN 348-0 Rapid Prototyping (0.5-1 Unit) The landscape of additive manufacturing processes and the operation of modern RP and reverse engineering equipment. Prerequisites: DSGN 245-0, DSGN 246-0, or consent of instructor.

DSGN 350-0 Intellectual Property and Innovation (1 Unit) The critical role of engineers in the invention/creative process and of technologists in wealth creation. Prerequisite: senior standing or consent of instructor.

DSGN 360-0 Design Competition (1 Unit) Undergraduate teams compete in McCormick's annual autonomous robot contest. Work begins winter

quarter; teams must pass a qualifying milestone to register for credit in spring quarter. Students may register for this course no more than twice.

DSGN 370-0 Engineering Design Portfolio (1 Unit) Creation of design projects that showcase engineering work and further career goals. The portfolio physically presents a story that embodies its creator's goals.

DSGN 375-0 Data as Art (1 Unit) Information visualization across multiple disciplines.

DSGN 380-1 Industrial Design Projects I (1 Unit) Design thinking; user-centric principles of design and DFM. Industrial design project for personal portfolio development. Concept ideation and sketching; use of discovery research and data visualization; problem framing and prototyping; design for manufacturing, Keyshot rendering, rapid prototyping. Prerequisite: DSGN 320-0 or both DSGN 220-0 and DSGN 240-0.

DSGN 380-2 Industrial Design Projects II (1 Unit) Design thinking; user-centric principles of design and DFM. Industrial design project for personal portfolio development. Concept ideation and sketching; use of discovery research and data visualization; problem framing and prototyping; design for manufacturing, Keyshot rendering, rapid prototyping. Prerequisite: DSGN 320-0 or both DSGN 220-0 and DSGN 240-0.

DSGN 384-1 Interdisciplinary Design Projects I (1 Unit) Open-ended, team-based product or system design projects in real-world settings. Sequence must be taken in consecutive quarters. Project research, concept development, professional communication, advanced topics in design. Prerequisite: DSGN 106-1.

DSGN 384-2 Interdisciplinary Design Projects II (1 Unit) Open-ended, team-based product or system design projects in real-world settings. Sequence must be taken in consecutive quarters. Implementation, evaluation, communication, documentation. Prerequisite: DSGN 384-1.

DSGN 386-0 Manufacturing Engineering Design (1 Unit) Hands-on design project addressing manufacturing engineering design topics, such as automation, quality control, process planning, tooling design, concurrent engineering, and continuous improvement. Factory-CAD, Factory-FLOW, and Factory-VIEW. Prerequisite: MECH_ENG 340-1 or consent of instructor.

DSGN 395-0 Special Topics (1 Unit) Topics relevant to design engineering and approved by the institute. Prerequisite: consent of instructor.

DSGN 397-0 Advanced Topics in Design (0.5 Unit) Topics suggested by students and faculty and approved by the institute.

DSGN 399-0 Independent Study Project (1 Unit) Independent study on a manufacturing engineering topic supervised by a faculty member. Prerequisite: consent of instructor.

Manufacturing and Design Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Requirements (48 units)	
<i>Core Courses (32 units)</i> ¹	

4 mathematics courses (p. 116)

4 engineering analysis and computer proficiency courses (p. 116)

4 units of basic science:

PHYSICS 135-2 & PHYSICS 135-3 & PHYSICS 136-2 & PHYSICS 136-3	General Physics and General Physics and General Physics Laboratory and General Physics Laboratory
CHEM 131-0 & CHEM 141-0 or CHEM 151-0 & CHEM 161-0 or CHEM 171-0 & CHEM 181-0	General Chemistry 1 and General Chemistry Laboratory 1 Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1 Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory

3 design and communications courses (p. 116)

5 basic engineering courses:

MECH_ENG 233-0	Electronics Design
CIV_ENV 216-0	Mechanics of Materials I
MAT_SCI 201-0	Introduction to Materials
CIV_ENV 205-0	Economics and Finance for Engineers

1 additional course from any McCormick basic engineering category except Probability, Statistics & Quality Control (p. 116)

7 social sciences/humanities courses (p. 116)

5 unrestricted electives (p. 116)

Major Program (16 units)

9 core courses:

DSGN 308-0 or MECH_ENG 315-0	Human-Centered Product Design Theory of Machines - Design of Elements
IEMS 201-0	Introduction to Statistics ²
IEMS 307-0	Quality Improvement by Experimental Design
IEMS 310-0	Operations Research
IEMS 382-0	Production Planning and Scheduling
MAT_SCI 318-0	Materials Selection
MECH_ENG 240-0	Intro to Mechanical Design & Manufactrng
MECH_ENG 340-1	Comp Integ Manufacturing: Manufacturing Processes
MECH_ENG 340-2 or MECH_ENG 340-3	Computer Integ Manufacturing: CAD/CAM Computer Integ Manuf: Automation

3 project courses:

DSGN 384-1 & DSGN 384-2	Interdisciplinary Design Projects I and Interdisciplinary Design Projects II
DSGN 386-0	Manufacturing Engineering Design (must be taken in the final spring quarter before graduation)

4 technical electives:

2 200-level or 300-level engineering courses.

2 300-level engineering courses.

Courses numbered 395 will need a petition.

Students may only count up to two 399 course towards their tech electives.

¹ See general requirements (p. 116) for details.

² IEMS 303-0 Statistics may be substituted if an additional math course, such as IEMS 202-0 Probability, is also taken

Segal Design Certificate

This certificate program, administered by the Segal Design Institute, develops a set of design and problem-solving skills that prove valuable in a wide range of careers. The program focuses on applying user-centered

design to address real-world problems in team-based, interdisciplinary settings.

Course	Title
Certificate Requirements (6 units)	
1 prerequisite:	
DSGN 106-1 or DSGN 208-0	Design Thinking and Communication Design Thinking and Doing
1 2-quarter design sequence:	
DSGN 384-1 & DSGN 384-2 or DSGN 380-1 & DSGN 380-2	Interdisciplinary Design Projects I and Interdisciplinary Design Projects II Industrial Design Projects I and Industrial Design Projects II
1 portfolio course and public portfolio presentation:	
DSGN 370-0	Engineering Design Portfolio
All students must present their portfolio at a Segal Design Expo. This is typically done as part of DSGN 370-0.	
3 elective courses from an approved list, including: ¹	
1 DSGN course	
2 courses at the 300 level	
Graduate courses may not be used towards the certificate.	
Course with grades lower than a "C" will not be acceptable for this certificate.	
P/N courses are not allowed (except for DSGN 375-0).	
Electives must be from the approved elective list or approved by petition (no more than one unit by petition).	

¹ Only two of the courses used for the Segal Design Certificate may also be used to fulfill the requirements in the "Major Program" or "Major Requirements" of your BS or BA degree.

Materials Science and Engineering

mccormick.northwestern.edu/materials-science

The discipline of materials science and engineering 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 basically apply 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 and participates in the co-op and BS/MS programs. The curriculum centers on basic engineering and materials coursework but also provides the flexibility to focus on different areas of concentration as described below. The 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 the 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 many 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

This concentration is especially appropriate for those planning a career in industry, where engineers typically work in teams on projects requiring experience with design and manufacturing. It builds on the design content in the materials science curriculum and provides additional interdisciplinary design experience. The concentration also develops 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 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.

Energy Materials

Materials play a key role in a variety of energy-related areas, including the search for new and efficient energy sources as well as energy storage and efficient energy utilization. Specific topics covered in this specialization include fuel cell materials, hydrogen generation and storage, solar energy conversion, lithium-ion battery materials, and lightweight energy-efficient structural materials.

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 sizes in the range of 1 to 100 nanometers, is an increasingly important research topic as nanotechnology industries develop. Examples of nanomaterials include ultrahigh-strength materials with nanometer-range structural features and 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 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 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 and interfaces but also to control them.

Sustainable Materials

Many technologies that the materials, manufacturing, energy, and water sectors currently rely on to provide benefits to humanity are not designed to last indefinitely. Redirection toward a more sustainable path is key. This concentration focuses on sustainability as it applies to materials and the manufacturing processes that convert them into a multitude of usable products. Students gain knowledge that bridges the domains of systems design and sustainable materials development and engineering.

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. A unique combination of instruments (cold field-emission transmission electron microscope, atom-probe field-ion microscopes, scanning tunneling microscopes) provides atomic resolution imaging and chemical analysis. These are 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.

Program of Study

- Materials Science and Engineering Degree (p. 161)

MAT_SCI 101-0 Modern Materials and Society (1 Unit) 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. Fulfills Weinberg College distribution requirements; not intended for engineering students. Prerequisites: high school mathematics and science background. *Natural Sciences Distro Area*

MAT_SCI 190-0 MS & E Freshman Seminar (1 Unit) 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 (1 Unit) 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 MAT_SCI 301-0. Prerequisite: CHEM 131-0, CHEM 151-0, or CHEM 171-0.

MAT_SCI 301-0 Materials Science Principles (1 Unit) Bonding, crystal structure, and defects in solids. Phase diagrams in condensed matter systems. Equilibrium and non-equilibrium development of microstructures. Processing/structure/property/performance relationships underlying behavior of metals, ceramics, polymers, and composites. Mechanical, electrical, and chemical properties of engineering materials. Prerequisites: CHEM 131-0, CHEM 151-0, or CHEM 171-0; major in materials science and engineering or chemical and biological engineering.

MAT_SCI 314-0 Thermodynamics of Materials (1 Unit) Classical and statistical thermodynamics; entropy and energy functions in liquid and solid solutions, and their applications to phase equilibria. Lectures, problem solving. Materials science and engineering degree candidates may not receive credit for 314 with or after CHEM 342-1. Prerequisite: CHEM 132-0, CHEM 152-0, or CHEM 172-0; MATH 230-0; or PHYSICS 135-1 or equivalent.

MAT_SCI 315-0 Phase Equilibria & Diffusion of Materials (1 Unit) 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: MAT_SCI 314-0 or equivalent.

MAT_SCI 316-1 Microstructural Dynamics (1 Unit) Principles underlying development of microstructures. Defects, diffusion, phase transformations, nucleation and growth, thermal and mechanical treatment of materials. Lectures, laboratory. Prerequisite: MAT_SCI 315-0 or equivalent.

MAT_SCI 316-2 Microstructural Dynamics (1 Unit) Principles underlying development of microstructures. Defects, diffusion, phase transformations, nucleation and growth, thermal and mechanical treatment of materials. Lectures, laboratory. Prerequisite: MAT_SCI 315-0 or equivalent.

MAT_SCI 318-0 Materials Selection (1 Unit) 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: MAT_SCI 201-0 or equivalent.

MAT_SCI 331-0 Soft Materials (1 Unit) Different kinds of polymeric materials. Relationships between structure and physical properties; rubber elasticity, the glassy state, crystallinity in polymers. Lectures,

laboratory. Prerequisites: MAT_SCI 301-0 or equivalent; MAT_SCI 314-0 or CHEM 342-1; MAT_SCI 316-1 and MAT_SCI 316-2 highly recommended.

MAT_SCI 332-0 Mechanical Behavior of Solids (1 Unit) 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: MAT_SCI 316-1; MAT_SCI 316-2 (may be taken concurrently); CIV_ENV 216-0 or consent of instructor.

MAT_SCI 333-0 Composite Materials (1 Unit) 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: MAT_SCI 316-1, MAT_SCI 316-2, MAT_SCI 332-0.

MAT_SCI 336-0 Chemical Synthesis of Materials (1 Unit) The design of materials targeting important properties through processes that break and form primary chemical bonds. Fundamental principles and main methodologies, including polymerization, biosynthesis, self-assembly, solgel reactions, synthesis of nanomaterials, vapor-phase synthesis, and composite synthesis. Prerequisite: junior standing in materials science and engineering or consent of instructor.

MAT_SCI 337-0 Conducting Polymers (1 Unit) Fundamentals and applications of conducting polymers. Hands-on experience in synthesizing conducting polymer nanostructures. Prerequisite: MAT_SCI 331-0 or consent of instructor.

MAT_SCI 340-0 Ceramic Processing (1 Unit) 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: MAT_SCI 316-1 or equivalent.

MAT_SCI 341-0 Introduction to Modern Ceramics (1 Unit) 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: MAT_SCI 316-1, MAT_SCI 316-2 or consent of instructor.

MAT_SCI 351-1 Introductory Physics of Materials (1 Unit) 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: MAT_SCI 301-0 or equivalent or consent of instructor; GEN_ENG 205-4 or equivalent; PHYSICS 135-2, PHYSICS 135-3; MAT_SCI 351-1 is prerequisite for MAT_SCI 351-2.

MAT_SCI 351-2 Introductory Physics of Materials (1 Unit) 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: MAT_SCI 301-0 or equivalent or consent of instructor; GEN_ENG 205-4 or equivalent; PHYSICS 135-2, PHYSICS 135-3; MAT_SCI 351-1 is prerequisite for MAT_SCI 351-2.

MAT_SCI 355-0 Electronic Materials (1 Unit) Principles, models, and characterization of semiconductor materials. Crystal growth and doping. Diffusion, epitaxy, and monolithic processes. Current transport, non-

equilibrium processes, thin films, low-mobility materials, and interfaces. Prerequisite: MAT_SCI 316-1 or consent of instructor.

MAT_SCI 357-0 Nanomagnetic Materials for Information Storage (1 Unit) Overview of materials used for magnetic data storage and of the recording and read processes. Information storage systems, such as optical, solid-state, and probe. Theoretical background for understanding the four energy terms that control the properties of magnetic materials when they are patterned at the nanoscale.

MAT_SCI 358-0 Electronic and Thermal Properties of Materials (1 Unit) Solid-state electronic structure from a solid-state chemistry perspective.

MAT_SCI 360-0 Introduction to Electron Microscopy (1 Unit) 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: MAT_SCI 301-0; PHYSICS 135-2, PHYSICS 135-3 or equivalent.

MAT_SCI 361-0 Crystallography & Diffraction (1 Unit) 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, PHYSICS 135-3.

MAT_SCI 362-0 Point, Line & Planar Imperfections (1 Unit) Introduction to point defects, dislocations, and internal interfaces in crystalline solids. Interactions among point, line, and planar imperfections. Metals, ionic solids, semiconductors. Prerequisite: MAT_SCI 315-0.

MAT_SCI 370-0 Biomaterials (1 Unit) 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. Taught with BMD_ENG 343-0; may not receive credit for both courses.

MAT_SCI 371-0 Biominerals: Hierarchical Architecture & Function (1 Unit) How biologically based processing of mineralorganic composites used by living organisms inspires new approaches to materials synthesis in many critical applications-locomotion (bones), defense (shells), and sensing (light, acceleration, magnetic fields). Prerequisite: MAT_SCI 316-2 or equivalent, or consent of instructor.

MAT_SCI 376-0 Nanomaterials (1 Unit) Introduction to structure-property relationships of materials processed at the nanometer scale. Highly interdisciplinary course appropriate for undergraduate and graduate students in other departments. Prerequisite: MAT_SCI 351-1 or consent of instructor.

MAT_SCI 380-0 Intro Surface Science & Spectroscopy (1 Unit) Surface spectroscopy, including Auger spectroscopy, photoemission, and LEED. Surface dynamics and thermodynamics. Electronic properties of surfaces and interfaces. Gas-surface interactions. Prerequisite: MAT_SCI 351-1 or equivalent.

MAT_SCI 381-0 Materials for Energy-Efficient Technology (1 Unit) A materials science approach to the challenges of energy efficient technology: energy content of materials; advanced materials for energy harvesting, transmission, storage, and conversion; materials for energy

efficient transportation and housing. Term paper and oral presentation. Prerequisite: MAT_SCI 201-0, MAT_SCI 301-0, or consent of instructor.

MAT_SCI 382-0 Electrochemical Energy Materials and Devices (1 Unit) Thermodynamics and kinetics of electrochemical processes. Materials for fuel cells, batteries, and electrochemical capacitors, including electrolytes and electrodes. Electrical and mass transport. Effect of microstructure. Electrochemical characterization. Device configurations. Prerequisite: senior standing or consent of instructor.

MAT_SCI 385-0 Electronic and Thermal Properties of Materials (1 Unit) Thermoelectric Devices. Solid-state electronic structure from a solid-state chemistry perspective, phonons in complex materials, electronic and thermal transport at room temperature and above (semi-classical) of metals, semiconductors and some insulators.

MAT_SCI 390-0 Materials Design (1 Unit) Analysis and control of microstructures. Quantitative process/structure/property/ performance relations, with case studies. Computer lab for modeling multicomponent thermodynamics and transformation kinetics. Prerequisites: MAT_SCI 315-0, MAT_SCI 316-1, MAT_SCI 316-2, or consent of instructor.

MAT_SCI 391-0 Process Design (1 Unit) 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. Prerequisite: MAT_SCI 316-1 or equivalent.

MAT_SCI 394-0 Honors Project in Materials Science (1 Unit) Independent study and/or research linked to MAT_SCI 396-1 and MAT_SCI 396-2. 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 (1 Unit) Topics suggested by students or faculty and approved by the department.

MAT_SCI 396-1 Senior Project in Materials Science and Engineering (1 Unit) 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 396-2 Senior Project in Materials Science and Engineering (1 Unit) 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 397-0 Special Topics in Materials Science and Engineering (0.34 Unit) Special Topics in Materials Science and Engineering, Laboratory emphasis.

MAT_SCI 399-0 Projects (1 Unit) Individual problems, including library and design work; comprehensive report on a specific phase of modern materials science. Credit to be arranged.

Materials Science and Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Requirements (48 units)	
<i>Core Courses (32 units)</i> ¹	
4 mathematics courses (p. 116)	
4 engineering analysis and computer proficiency courses (p. 116)	
4 units of basic science:	
PHYSICS 135-2 & PHYSICS 136-2 & PHYSICS 135-3 & PHYSICS 136-3	General Physics and General Physics Laboratory and General Physics and General Physics Laboratory
CHEM 131-0 & CHEM 141-0 & CHEM 132-0 & CHEM 142-0	General Chemistry 1 and General Chemistry Laboratory 1 and General Chemistry 2 and General Chemistry Laboratory 2
or CHEM 151-0 & CHEM 161-0 & CHEM 152-0 & CHEM 162-0	Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1 and Accelerated General Chemistry 2 and Accelerated General Chemistry Laboratory 2
or CHEM 171-0 & CHEM 181-0 & CHEM 172-0 & CHEM 182-0	Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory and Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory
3 design and communications courses (p. 116)	
5 basic engineering courses:	
CIV_ENV 216-0	Mechanics of Materials I
MAT_SCI 301-0	Materials Science Principles
MAT_SCI 314-0	Thermodynamics of Materials
MAT_SCI 315-0	Phase Equilibria & Diffusion of Materials
1 additional course from the remaining 5 McCormick basic engineering categories: Computer architecture and numerical methods, Computer programming, Electrical science, Probability, statistics and quality control, and Systems engineering and analysis (p. 116)	
7 social sciences/humanities courses (p. 116)	
5 unrestricted electives (p. 116)	
<i>Major Program (16 units)</i>	
11 required courses:	
MAT_SCI 316-1 & MAT_SCI 316-2	Microstructural Dynamics and Microstructural Dynamics
MAT_SCI 331-0	Soft Materials
MAT_SCI 332-0	Mechanical Behavior of Solids
MAT_SCI 351-1 & MAT_SCI 351-2	Introductory Physics of Materials and Introductory Physics of Materials
MAT_SCI 361-0	Crystallography & Diffraction
MAT_SCI 390-0	Materials Design
MAT_SCI 391-0	Process Design
MAT_SCI 396-1 & MAT_SCI 396-2	Senior Project in Materials Science and Engineering and Senior Project in Materials Science and Engineering
5 technical electives in engineering, natural sciences (usually chemistry or physics), and mathematics chosen to fulfill an area of concentration	

¹ See general requirements (p. 116) for details.

Technical Electives

- 5 technical electives in engineering, natural sciences (usually chemistry or physics), and mathematics chosen to fulfill an area of concentration
 - No more than 2 of the 5 units may be 200-level courses.
 - At least 2 of the 5 must be 300-level materials science and engineering courses.

- Examples of programs for concentrations in biomaterials, design and manufacturing, electronic materials, metals and ceramics, nanomaterials, polymeric materials, surface science, and sustainable materials are described in a departmental manual for degree candidates.
- No more than 1 unit of MAT_SCI 394-0 Honors Project in Materials Science or MAT_SCI 399-0 Projects may be counted.

Mechanical Engineering

mccormick.northwestern.edu/mechanical

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 who possessed the know-how to reduce ideas to practice. In an increasingly competitive world, traditional know-how and creative ability are as necessary as ever but no longer sufficient. It is also necessary to know why things occur and thus be able to guide the earliest stages of planning. With finite resources and increasing awareness of the environment, mechanical engineers must cope with the undesirable effects of pollution as well as the traditional concerns of efficiency and safety. The tools they need must be more sophisticated.

Mechanical engineering plays a dominant role in a wide spectrum of industries, among them transportation (automotive, rail, air, and marine), heavy machinery (machines producing other machines), the power industry, the environmental industry (heating, ventilation, and air-conditioning), robotics, 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 provides a broad fundamental preparation for direct entry into industry as well as for further professional study. The first part of the curriculum is devoted to mathematics, physics, and chemistry. With this background, fundamental mechanical engineering subjects, such as dynamics, solid mechanics, fluid mechanics, and thermodynamics, are studied, 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 technical proficiency, while the elective courses in social sciences, fine arts, history, and philosophy enlarge the 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 4 required elective courses wisely, students can develop a highly personalized curriculum. Some areas of concentration are computer-aided design and manufacturing, fluid mechanics, robotics, systems

and control, and tribology. In addition, there are seven 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 with 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/microelectromechanical systems 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.

Program of Study

- Mechanical Engineering Degree (p. 165)

MECH_ENG 202-0 Mechanics II (1 Unit) 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 222-0 Thermodynamics & Statistical Mechanics - I (1 Unit) Basic definitions; Zeroth Law and the meaning of temperature; the First Law; the Second Law, entropy, and its applications; equations of state; the Third Law of Thermodynamics; and introduction to statistical thermodynamics.

MECH_ENG 224-0 Experimental Engineering (1 Unit) 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: MECH_ENG 233-0; GEN_ENG 205-4.

MECH_ENG 233-0 Electronics Design (1 Unit) Design and prototyping of analog and digital electronic circuits using semiconductor devices: diodes, transistors, op amps, logic chips, etc. Optical and other sensors, power electronics, filters, and feedback control. Extensive hands-on construction and debugging. Intended for engineers in all disciplines.

MECH_ENG 240-0 Intro to Mechanical Design & Manufacturing (1 Unit) 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. Prerequisites: MAT_SCI 201-0; CIV_ENV 216-0.

MECH_ENG 241-0 Fluid Mechanics I (1 Unit) 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. Prerequisite: GEN_ENG 205-4.

MECH_ENG 301-0 Introduction to Robotics Laboratory (1 Unit) A laboratory-based introduction to robotics. Focus will be on both hardware (sensors and actuators) and software (sensor processing and behavior development). Topics will include: the basics in kinematics, dynamics, control and motion planning; and an introduction to Artificial Intelligence (AI) and Machine Learning (ML). Formerly EECS 295-0. Cross-listed as EECS 301-0.

MECH_ENG 314-0 Machine Dynamics (1 Unit) 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: MECH_ENG 202-0.

MECH_ENG 315-0 Theory of Machines - Design of Elements (1 Unit) Factors influencing the proportioning of machine elements-stresses, deformations, and failure criteria-as applied to shafts, springs, belts, bearings, gears. Lectures, laboratory. Prerequisites: MAT_SCI 201-0; CIV_ENV 216-0.

MECH_ENG 316-0 Mechanical Systems Design (1 Unit) Design of mechanical systems such as cams, multi-bar linkages, and precision machines. Design principles and best practices. Case studies and team-based projects. Prerequisite: MECH_ENG 315-0.

MECH_ENG 317-0 Molecular Modeling and the Interface to Micromechanics (1 Unit) 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 (1 Unit) 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 320-0 Micro- and Nanomechanical Properties of Surfaces (1 Unit) 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.

MECH_ENG 322-0 Thermodynamics & Statistical Mechanics - II (1 Unit) Classical and statistical thermodynamics.

MECH_ENG 327-0 Finite Elements for Stress Analysis (1 Unit) 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. Taught with CIV_ENV 327-0; may not receive credit for both courses.

MECH_ENG 333-0 Introduction to Mechatronics (1 Unit) 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: MECH_ENG 233-0, EECS 221-0, or consent of instructor.

MECH_ENG 340-1 Comp Integ Manufacturing: Manufacturing Processes (1 Unit) Use of computers to improve productivity and reduce costs in the manufacture of discrete parts and assemblies. Manufacturing processes: Analysis and evaluation of process usage in the contemporary manufacturing environment. Prerequisite: MECH_ENG 240-0 or consent of instructor.

MECH_ENG 340-2 Computer Integ Manufacturing: CAD/CAM (1 Unit) Use of computers to improve productivity and reduce costs in the manufacture of discrete parts and assemblies. CAD/ CAM: Geometric modeling, dimensioning systems, tolerances, design for manufacture, programming of machine tools. Prerequisite: MECH_ENG 340-1 or consent of instructor.

MECH_ENG 340-3 Computer Integ Manuf: Automation (1 Unit) Use of computers to improve productivity and reduce costs in the manufacture of discrete parts and assemblies. Manufacturing automation: sensors, actuators, and computers for automation; principles of computer control; programmable logic controllers; robotic devices; assembly automation. Prerequisite: MECH_ENG 340-2 or consent of instructor.

MECH_ENG 341-0 Computational Methods for Engineering Design (1 Unit) 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 346-0 Introduction to Tribology (1 Unit) 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 359-0 Reliability Engineering (1 Unit) Probability concepts and random variables. Failure rates and reliability testing. Wearin, 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 360-0 Mechanics of Sports (1 Unit) Applications of mechanics and mathematical modeling to sports, including baseball, basketball, golf, soccer, swimming, and running, among others. Introduction to the biomechanics of sports.

MECH_ENG 362-0 Stress Analysis (1 Unit) 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: CIV_ENV 216-0.

MECH_ENG 363-0 Mechanical Vibrations (1 Unit) Analysis of vibrations in single and multi-degree of freedom systems. Free and forced vibrations with various types of damping. Response to steady-state and transient excitations. Prerequisite: MECH_ENG 202-0

MECH_ENG 366-0 Finite Elements for Design & Optimizatr (1 Unit) Numerical methods for interaction and optimal CAD. Fully stressed design; design sensitivity analysis and descent methods; optimality criteria to automated design. Prerequisites: senior standing; MECH_ENG 327-0 or consent of instructor.

MECH_ENG 367-0 Quantitative Methods in Life Cycle Analysis (1 Unit) Lifecycle analysis (LCA) framework for environmental assessment of technology systems, focusing on modeling methods for systems mass and energy flows, process and input-output-based systems inventories, environmental impact analysis, and methods for robust engineering decisions. MECH_ENG 367-0 is taught with CHEM_ENG 367-0; may not receive credit for both courses.

MECH_ENG 371-0 Combustion Engines (1 Unit) Theoretical and actual cycles, combustion, detonation, carburetion, fuels, performance characteristics, and fuel-cell power.

MECH_ENG 373-0 Engineering Fluid Mechanics (1 Unit) 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: MECH_ENG 241-0.

MECH_ENG 377-0 Heat Transfer I (1 Unit) 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: MECH_ENG 241-0.

MECH_ENG 380-0 Thermal Energy Systems Design (1 Unit) Applications of the principles of energy engineering analysis to the design of thermal systems. Consideration of such systems as air conditioning, oil piping, refrigeration, fluid distribution, and pneumatic control. Projects will be tailored to the class. Solution of open-ended design problems including introduction to EES (Engineering Equation Solver) software that has built-in thermophysical properties. Prerequisites: Basic Thermodynamics or equivalent.

MECH_ENG 381-0 Introduction to Micro-electro-mechanical Systems (1 Unit) Introduction to MEMS 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. Prerequisite: CIV_ENV 216-0 or consent of instructor.

MECH_ENG 382-0 Experiments in Micro- and Nano Science and Engineering (1 Unit) 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: cleanroom microfabrication, flow visualization in micro-channels, nanomechanics, AFM and dippen nanolithography, multiphysics computational tools, and experimental techniques to evaluate micro- and nanoscale devices. Prerequisite: MECH_ENG 381-0 or consent of instructor.

MECH_ENG 385-0 Nanotechnology (1 Unit) 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 (1 Unit) Introduction to engineering principles that govern cellular activities at the molecular

level. Emphasis on the dynamics and kinematics of proteins, especially those that are locomotory or force generating. Lectures, team projects, and presentations. Prerequisite: MATH 230-0 or consent of instructor.

MECH_ENG 390-0 Intro to Dynamic Systems (1 Unit) 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. Prerequisites: MECH_ENG 202-0, MECH_ENG 241-0; CIV_ENV 216-0; GEN_ENG 205-4.

MECH_ENG 395-0 Special Topics in Mechanical Engineering (1 Unit) Topics suggested by students or faculty members and approved by the department.

MECH_ENG 398-1 Engineering Design - Senior Capstone, Quarter 1 (1 Unit) Experience in the creative process of design. Defining product specifications, developing and analyzing ideas, using CAD drawings, building physical prototypes, demonstrating feasibility, and achieving full alpha-level functionality. Prerequisite: senior standing or consent of department.

MECH_ENG 398-2 Engineering Design II - Senior Capstone, Quarter 2 (1 Unit) Experience in the creative process of design. Defining product specifications, developing and analyzing ideas, using CAD drawings, building physical prototypes, demonstrating feasibility, and achieving full alpha-level functionality. Prerequisite: senior standing or consent of department.

MECH_ENG 399-0 Projects (1-3 Units) Special studies to be done under faculty direction. Credit to be arranged.

Mechanical Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Requirements (48 units)	
<i>Core Courses (32 units)</i> ¹	
4 mathematics courses (p. 116)	
4 engineering analysis and computer proficiency courses (p. 116)	
4 units of basic science:	
PHYSICS 135-2 & PHYSICS 135-3 & PHYSICS 136-2 & PHYSICS 136-3	General Physics and General Physics and General Physics Laboratory and General Physics Laboratory
CHEM 131-0 & CHEM 141-0 or CHEM 151-0 & CHEM 161-0 or CHEM 171-0 & CHEM 181-0	General Chemistry 1 and General Chemistry Laboratory 1 Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1 Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory
3 design and communications courses (p. 116)	
5 basic engineering courses:	
MECH_ENG 233-0	Electronics Design ²
CIV_ENV 216-0	Mechanics of Materials I
MECH_ENG 241-0	Fluid Mechanics I
MAT_SCI 201-0	Introduction to Materials
MECH_ENG 222-0	Thermodynamics & Statistical Mechanics - I ³

7 social sciences/humanities courses (p. 116)

5 unrestricted electives (p. 116)

Major Program (16 units)

7 required courses:

MECH_ENG 202-0	Mechanics II
MECH_ENG 224-0	Experimental Engineering
MECH_ENG 240-0	Intro to Mechanical Design & Manufactrng
MECH_ENG 315-0	Theory of Machines - Design of Elements
MECH_ENG 340-1	Comp Integ Manufacturing: Manufacturing Processes
MECH_ENG 377-0	Heat Transfer I
MECH_ENG 390-0	Intro to Dynamic Systems

2 capstone courses:

MECH_ENG 398-1 & MECH_ENG 398-2	Engineering Design - Senior Capstone, Quarter 1 and Engineering Design II - Senior Capstone, Quarter 2 (taken sequentially and counting toward the final 12 units taken before graduation)
------------------------------------	---

3 advanced study courses, including 1 from each group:

Dynamics/controls (p. 165)

Mechanics (p. 166)

Thermofluid science (p. 166)

4 electives:

See Electives Requirements below

- 1 See Core Courses Requirements (p. 116) for details.
- 2 Students planning to take advanced EECS courses may petition to substitute EECS 221-0 Fundamentals of Circuits
- 3 May not be taken with CHEM 342-1 Thermodynamics or CHEM_ENG 211-0 Thermodynamics

Electives Requirements

- 4 electives
 - All technical electives must be 300 level or above.
 - 1 technical elective must be a mathematics or basic science course.
 - 2 technical electives must be mechanical engineering courses.
 - 1 technical elective may be in mathematics, basic science, or engineering
 - Students are encouraged to concentrate electives in areas of interest. A list of nine areas of concentration, including appropriate courses and descriptions, is available on the department website.
 - No more than 2 units of MECH_ENG 399-0 Projects are allowed.
 - DSGN 360-0 Design Competition carries 1 unit of credit only if taken over 2 consecutive quarters. If repeated for credit, only 1 unit may be used as a technical elective, and no more than 2 units total may count toward the degree.
 - DSGN 245-0 Introduction to Computer Aided Design I: NX may not be counted toward the degree even as an unrestricted elective.

Advanced Study Courses

Dynamics/Controls

Course	Title
MECH_ENG 314-0	Machine Dynamics
MECH_ENG 363-0	Mechanical Vibrations
EECS 360-0	Introduction to Feedback Systems

Mechanics

Course	Title
MECH_ENG 327-0	Finite Elements for Stress Analysis
MECH_ENG 362-0	Stress Analysis

Thermofluid Science

Course	Title
MECH_ENG 322-0	Thermodynamics & Statistical Mechanics - II
MECH_ENG 373-0	Engineering Fluid Mechanics

MEDILL SCHOOL OF JOURNALISM, MEDIA, INTEGRATED MARKETING COMMUNICATIONS

medill.northwestern.edu

For students who want to research, report and produce journalism that matters, Medill offers the combination of a top-ranked university and a best-in-class journalism education.

At Medill, reporting and writing are just the start. Students experiment with emerging media, explore global journalism and prepare not only to work in a changing media world but to lead it.

Students learn by doing, taking passions like social justice, politics, global affairs, entrepreneurship, technology, the arts or sports into expertise.

Medill's curriculum allows students to solidify their writing and editing skills and comprises three components:

- The core curriculum is built to put all first-year students on the same page. In these core courses, Medill faculty teach reporting, writing, editing and thinking critically.
- In addition to those core classes, every student selects a concentration in a discipline outside Medill. This allows them to explore political science, history, economics, a foreign language, computer science and much more. Students take a wide variety of courses to ensure a well-rounded education.
- Finally, Medill offers a wide variety of journalism electives. Choose courses that will help you build expertise in the areas you are most passionate about.

Medill also offer a certificate in Integrated Marketing Communications. This allows students to learn how to use data and consumer insights to engage with customers today.

Developed at Medill, the IMC field includes marketing, strategic communications, advertising, digital strategy, social media, marketing analytics and more. Medill offers all Northwestern undergraduates the opportunity to learn more about integrated marketing communications by earning an IMC certificate. You will be eligible for an even wider range of career opportunities because business skills you will learn in the certificate program are applicable to journalism, media and many other fields.

Requirements for the Degree of Bachelor of Science in Journalism

All Medill undergraduates pursue the bachelor of science in journalism degree. They must complete a minimum of 45 units to earn the BSJ. In addition to their studies in journalism, they acquire a strong background in the arts and sciences. The following policies apply:

- Independent of the requirements set by Medill, all students must satisfy the Undergraduate Registration Requirement (p. 26).
- Of the 45 units, at least 27 must be earned in courses outside Medill and at least 14 in Medill courses.

- Journalism students must acquire significant professional experience to earn the BSJ. The requirement may be satisfied through a 4-unit Journalism Residency.
- No course may be counted in more than one requirement category, with one exception: Medill students completing a double major in Weinberg College may apply courses used to meet Medill's distribution requirements toward the second major.
- Exceptions to any degree requirements must be approved by the Medill Student Life. Petitions and rules for filing them are available on the Medill Canvas site.

Grade Requirements

Students must achieve a minimum GPA of 2.0 (C) in all nonjournalism courses taken for a letter grade and a minimum GPA of 2.25 (C+) in journalism courses. In addition, all journalism students are subject to the following grade requirements:

- The journalism GPA is an average of the grades (including F's) in all journalism courses attempted.
- Students who earn a grade of D or worse in a journalism course must retake the course until they have earned a C- or better.
- When courses, including journalism courses, are repeated, both grades are computed in the GPA; one course does not substitute for another.
- Before starting Journalism Residency, students must earn a grade of C+ or better in JOUR 201-1 Reporting & Writing, JOUR 201-2 Multimedia Storytelling, JOUR 202-0 Philosophy of Modern Journalism, JOUR 301-0 Journalism in Practice or JOUR 301-1 Journalism in Practice, JOUR 302-0 Media History: Power, Protest and Passion, JOUR 370-0 Media Law & Ethics and at least 2 300-level journalism courses outside the core requirement.
- Students may earn grades of C- or worse in no more than one-fifth of the courses taken at Northwestern and offered for graduation.
- Students who do not meet the minimum GPA requirements are placed on academic probation. Continued poor performance will result in further academic disciplinary action, including academic probation, suspension, or dismissal.
- Medill undergraduates are required to take the following courses for letter grades (A, A-, B+, B-, C+, C, C-, D, F):
 - All distribution requirements
 - All journalism courses except Journalism Residency
- 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 Journalism Residency). Only 1 course per quarter may be taken P/N.

Academic Policies

Academic Warning, Probation, and Dismissal

The University's policies about academic probation and dismissal are on the Academic Standing page (p. 24). Medill adheres to these policies with the following exceptions and additions:

- A warning letter is sent by email when the student
 - Has a GPA below a C (2.0) for one quarter but a cumulative GPA above 2.5.
 - Receives a grade of W, X, or Y.
 - Merits probation for any reason during his or her first two quarters at Northwestern.
- Academic probation occurs when the student

- Fails to maintain a C+ average (2.25) in journalism courses.
- Receives a D or an F in a journalism course.
- Fails to fulfill the journalism curriculum requirements.
- Receives more than one grade of W, X, or Y in any one quarter.
- Has earned consistently low grades over multiple quarters.
- Students receiving academic warning or probation must meet with their student life adviser and/or the Assistant Dean for journalism to develop a plan for improvement.
- Academic standing may affect a student's eligibility to participate in any of Medill's off-campus programming.

Medill Integrity Code

All Medill students are required to uphold the Medill Integrity Code, which, among other things, requires adherence to principles of honesty, fairness, and integrity in academic efforts and related professional media, journalism, and marketing communications work, whether students are in school, on an internship or a job, or acting as volunteers in a professional or academic activity.

Academic Options

Accelerated Master's Program

Students who exhibit exceptional ability in undergraduate work may apply for early admission to the graduate journalism program. This program allows them to earn both BSJ and MSJ degrees in less than five years. Candidates apply during their junior year and are admitted on the basis of academic excellence and promise of success in journalism. Interested students are encouraged to begin planning for this option early in their undergraduate careers. Information and admission materials are available from the Medill Office of Graduate Admissions and Financial Aid.

Dual Bachelor's Degree Program

Northwestern offers talented students the opportunity to earn in five years both a BSJ from Medill and a BMus or BAMus degree from the Bienen School of Music. This dual bachelor's degree program prepares exceptional students for journalism careers emphasizing music and arts reporting. Prospective students typically apply to this joint program when they apply for undergraduate admission to Northwestern. For a detailed description of the dual-degree program, see the Dual Bachelor's Degrees (p. 35) page.

Integrated Marketing Communications Certificate Program

The Integrated Marketing Communications Certificate Program focuses on effective marketing communications strategies, tactics, and tools for an increasingly consumer-controlled environment. It prepares students for entry-level marketing communications positions in such fields as advertising, public relations, corporate communications, and direct, database, e-commerce, and interactive marketing. Those who complete the certificate are eligible to complete the graduate IMC program in four quarters instead of five. See the Integrated Marketing Communications Certificate (p. 170) page and the Medill website for more information.

Bay Area Immersion Experience

At the new Northwestern educational space based in downtown San Francisco and anchored by Medill and McCormick, students learn from and contribute to the Bay Area's entrepreneurial culture through a customized immersion experience. Students who apply and are accepted into the program take 4 courses that focus on experiential learning in,

and critical thinking about, areas such as design innovation, digital communication, and the intersection of technology and culture.

Medill on the Hill Program

A select group of Medill students may study for one quarter in Medill's Washington, DC, news bureau. These students take 2 intensive journalism electives and a political science course approved by Weinberg College.

Medill on the Hill is an interdisciplinary program that exposes students to the challenging dynamics of Capitol Hill, public policy, political organizations, think tanks, and federal agencies. It is best suited to students interested in learning more about the political process and covering important national and global issues from the nation's capital in a rigorous, web-driven reporting environment.

Internships, Field Studies, and Special Programs

Internship employment may be available to Medill students, particularly during the summer. Many employers look to Medill for talented 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 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 approval from Medill before applying internship or field study credit to the 45 units required for the BSJ degree.

ROTC Course Credits

ROTC course credits may be used as part of the 45 units required for graduation. They are considered elective courses.

Early Graduation

Students who plan to graduate early must meet with Medill's Office of Student Life 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 Registration Requirement (p. 26).

Advising

Each entering student is assigned a first-year faculty adviser and a student life adviser. Advisers offer support and guidance and are valuable sources of information regarding courses and career goals.

Student life advisers help students make the most of their time at the University. They assist students with a variety of issues, including course planning, degree requirements, registration, study abroad, interschool transfers, petitions to graduate, and resources within and outside Medill.

Medill Career Services helps students through career advising and employment services. It works with academic departments and individual faculty members, student services, employers, alumni, and other constituencies to enhance student and alumni career development.

Activities

Through student publications, student broadcast media, and professional organizations, Medill students have many journalism-related opportunities outside the classroom.

The Medill Undergraduate Advisory Council is composed of representatives from each class in Medill and serves as the link between

the student body and the faculty and administration. The students serve as representatives for Medill, plan programming, and collaborate with Medill to improve the student experience.

Professional organizations that promote high standards among journalists maintain chapters on campus, including the Society of Professional Journalists, the Native American Journalists Association, the National Association of Black Journalists, the National Association of Hispanic Journalists, and the National Lesbian and Gay Journalists Association. Top scholars in the senior and graduate classes are initiated into Kappa Tau Alpha, the national journalism honor society.

Integrated Marketing Communications

medill.northwestern.edu/imc

The Integrated Marketing Communications Certificate Program focuses on effective marketing communications strategies and tactics for an increasingly digital media environment. It prepares students for entry-level marketing communications positions in such fields as advertising, public relations, corporate communications, and database and social media marketing.

Students develop skills for understanding and analyzing consumers in traditional markets and newly forming digital communities and social networks. They learn how to conduct research and analyze data on consumer behavior, media usage, and marketing communications outcomes. Students also learn about message creation and delivery through a wide variety of media channels.

The IMC Certificate Program invites applications from students in any undergraduate school at Northwestern. As described on the Medill website, to qualify for admission students must complete 3 prerequisite courses and earn a minimum cumulative GPA of 2.7 in them. Students must earn a cumulative GPA of 3.0 in the five IMC courses to achieve the certificate. Students who receive the undergraduate IMC certificate and are admitted into the MSIMC program can complete the master's program and graduate in just four quarters, rather than the five quarters required for students without the certificate.

Program of Study

- Integrated Marketing Communications Certificate (p. 170)

IMC 300-0 Introduction to Integrated Marketing Communications (1 Unit) Basic introduction to the strategic marketing communications process, including consumer insight and research, market segmentation, brand positioning, communications messages, and media decisions. Overview of tactical areas, such as branding, advertising, digital media, and corporate communications. Course is for non-IMC certificate students only and does not count toward the certificate. Prerequisite: Sophomore standing.

IMC 301-0 Consumer Insight (1 Unit) Psychological, economic, communication, anthropological, and sociological perspectives on why and how individuals, families, and groups acquire, consume, and dispose of goods, services, ideas, brands, and experiences. Goals and experiences as means to understanding people as consumers. Prerequisite: Admission to IMC Certificate Program.

IMC 302-0 Research for Marketing Communications (1 Unit) Analytic methods and metrics, including web analytics and social media metrics,

to develop, execute, and evaluate marketing communications. Designing questionnaires and analyzing survey results and databases to evaluate consumer behavior. Students develop hands-on analytic skills with Qualtrics survey and SPSS statistics software. Prerequisite: Admission to IMC Certificate Program.

IMC 303-0 Integrated Marketing Communications Strategy (1 Unit) Consumer insight and research, market segmentation, brand positioning, communication messages, and media decisions. Brand communications integrated with other aspects of marketing, including product strategy, pricing, and retailing. Case studies and writing-intensive assignments. Prerequisites: IMC 301-0 and IMC 302-0.

IMC 304-0 Media and Message Delivery (1 Unit) The contemporary media landscape and how brand communications adapt to media technology and usage. Current case studies are used to understand the transition from passive consumption of traditional media to active participation in digital and social media. Engaging and communicating effectively with consumers through media. Prerequisite: IMC 303-0.

IMC 305-0 Message Strategy and Persuasive Communications (1 Unit) Development of message strategies for communicating with audiences. Understanding audiences, persuasion, development and execution of brand communications. Hands-on exercises in writing creative briefs and using digital and social media. Prerequisite: IMC 303-0.

IMC 306-0 Strategic Communications (1 Unit) Development and execution of communications strategies and relationship building with employees, the news media, government, investors, and the public. Outlets include traditional print and broadcast media and contemporary channels including blogs, social media platforms, and emerging technologies. Exercises in written communications. Prerequisite: Non-Medill students, IMC 303-0; Medill students, JOUR 301-0.

IMC 307-0 Digital, Social and Mobile Marketing (1 Unit) Focus on the tools, methodologies, and programs used by companies to develop, justify, deploy, and measure their social and mobile marketing programs. Development of complete social marketing programs for actual companies using best-of-breed social monitoring, web analysis, social marketing systems, blogs, Twitter, Google Plus, LinkedIn, and other tools. Prerequisite: IMC 303-0.

IMC 308-0 Marketing Models (1 Unit) Quantitative models for marketing and communications. Multivariate statistical methods, such as factor and cluster analysis, and marketing models, including regression, discrete choice models, and time-series analysis. Hands-on experience in handling data types, using SPSS to conduct analysis, interpreting results, and providing recommendations. Prerequisite: IMC 303-0.

IMC 309-0 Entertainment Marketing (1 Unit) Strategic and tactical use of entertainment, gaming, and other brand engagement programs in integrated marketing communications. The role entertainment plays in the lives of consumers. How entertainment brands are built and how managers use entertainment marketing and communications to achieve brand objectives. The business and financial scope of the entertainment industry, including the success and financial return of marketing programs. Prerequisite: IMC 303-0.

IMC 310-0 Integrated Marketing and Communication Law, Policy and Ethics (1 Unit) Legal and ethical issues and the policy side of communications, media, and marketing. Media law, First Amendment protection of commercial speech, contracts, intellectual property,

privacy, and ethics. Prerequisites: Non-Medill students, IMC 303-0; Medill students, JOUR 301-0.

IMC 311-0 Data Governance: Critical Issues in Digital Marketing Communications (1 Unit) Data Governance will address the rapid move of companies toward digital marketing and communications efforts, and the world of connected devices known as the Internet of Things. With the emphasis on data privacy and security, the class will explore critical legal and technology issues that create liability for marketing professionals and their companies. Prerequisite: Medill students JOUR 301-0; non-Medill IMC Certificate students IMC 303-0.

IMC 320-0 IMC Capstone Project (1 Unit) Students work with sponsoring organizations to develop comprehensive marketing communications programs in real-world settings. The final product is a report outlining the learning and insight behind strategic, creative, and marketing recommendations; a client presentation; and a project book detailing research, analysis, strategy, creative execution, media use, and other integrated communications activities. Prerequisite: IMC 303-0.

IMC 390-0 Special Topics (1 Unit) Specialized courses include Finance for Integrated Marketing Communications -Finance for IMC will focus on the familiarity and use of financial tools important to marketing executives in budget development and spending allocation; Technology and Innovation for Media-This course addresses the profound impact that evolving media strategies have on news, marketing communications and audience experiences. Prerequisite: Medill students JOUR 301-0; non-Medill IMC Certificate students IMC 303-0

IMC 390-SA Integrated Marketing Communications Strategy (1 Unit) Consumer insight and research, market segmentation, brand positioning, communication messages, and media decisions. Brand communications integrated with other aspects of marketing, including product strategy, pricing, and retailing. Case studies and writing-intensive assignments. Prerequisites: IMC 301-0 and IMC 302-0.

IMC 398-0 Practicum (1 Unit) The Harley-Davidson Great Lakes Challenge provides the opportunity for the class to complete an actual project for the company in competition with a student team from Michigan State University. Prerequisite: IMC 303-0

IMC 399-0 Independent Study (1 Unit) Prerequisite: IMC 303-0.

Integrated Marketing Communications Certificate

Course	Title
Certificate Requirements (8 units)	
3 prerequisite courses:	
ECON 202-0	Introduction to Microeconomics
or MMSS 211-1	Social Science Theories & Meth-First Yr
200-level introductory statistics course (see website for approved courses) ¹	
Social science course (see website for approved courses) ¹	
3 core courses:	
IMC 301-0	Consumer Insight
IMC 302-0	Research for Marketing Communications
IMC 303-0	Integrated Marketing Communications Strategy
2 electives from:	
IMC 304-0	Media and Message Delivery
IMC 305-0	Message Strategy and Persuasive Communications
IMC 306-0	Strategic Communications

IMC 307-0	Digital, Social and Mobile Marketing
IMC 308-0	Marketing Models
IMC 309-0	Entertainment Marketing
IMC 310-0	Integrated Marketing and Communication Law, Policy and Ethics
IMC 311-0	Data Governance: Critical Issues in Digital Marketing Communications
IMC 390-0	Special Topics

¹ medill.northwestern.edu/imc/undergraduate-imc-certificate/curriculum/index.html

Journalism

medill.northwestern.edu/bsj

The Medill undergraduate journalism program offers students a variety of exclusive opportunities, including:

Journalism Residency (Domestic and Global)

In the Journalism Residency program, students immerse themselves in a media outlet in Chicago, across the country or around the world.

They report, write and produce content on multiple media platforms for companies that range from news outlets like CNN to public relations and marketing companies. A faculty mentor will work with students to ensure their time in the program results in development of your career.

Medill in San Francisco

At the intersection of media and technology lies the Bay Area Immersion Experience, a groundbreaking, quarter-long program that gives you the opportunity to learn from and contribute to San Francisco's booming entrepreneurial scene.

The program mixes journalism, engineering, design and innovation. Medill offers two versions of the program: one in winter quarter with 12 Medill and 12 McCormick School of Engineering Segal Design Institute students, and another in the spring, in partnership with Farley Center for Entrepreneurship and Innovation, with 15 students from each program.

Medill on the Hill

Events in Washington, D.C., drive much of the nation's news, and the Medill on the Hill program offers select students the rare opportunity to cover Congress, the White House, federal policy and U.S. politics from our Washington newsroom.

Students uncover news and engage in real-time deadline reporting, updating their stories throughout the day using Twitter, Snapchat, Instagram and other social media tools before filing their final stories for the Medill on the Hill website. The most interesting and newsworthy stories are shared with Medill's professional media clients for publication in local newspapers, national outlets and trade publications throughout the country.

National security, the environment, business and technology, education, and health and science are among the beats students focus on during the three days of the week they spend reporting. On the remaining two days, students attend journalism and political science seminars, hearing from professional journalists and learning strategies to cover hot-button issues fairly and accurately.

Global opportunities

Medill offers students both quarter-long and short term opportunities to study and report from another part of the world. From weeklong trips

sophomore year to places like Israel, Panama or London, to quarter-long opportunities in places like South Africa or Medill's campus in Qatar, Medill students can report from across the globe.

Program of Study

- Journalism Degree (p. 173)

JOUR 190-BR Crossing Physical and Ideological Borders in Journalism (1 Unit)

This year marks the 50th anniversary of the Kerner Report, a government prescription for increasing racial diversity in U.S. newsrooms. This course explores the health of journalism's inclusion rate through an examination how newsrooms have changed since 1968.

JOUR 201-1 Reporting & Writing (1 Unit) This course builds a strong foundation for all Medill classes to follow by introducing students to the essentials of accurate journalism necessary for any platform or storytelling format. This includes news judgment, news and information gathering (including sourcing, discovering and covering different kinds of news, interviewing techniques, practices of inclusion and sensitivity); constructing stories (including leads, story structure, using quotes, using data to tell a story, assessing information); editing and presentation (grammar, punctuation, AP style, voice, tone, clarity, brevity); avoiding libel and other legal pitfalls; and visual literacy and presentation.

JOUR 201-2 Multimedia Storytelling (1 Unit) This course continues on the strong foundation created in JOUR 201-1 and significantly expands the base of multi-platform tools needed for effective, relevant and engaging storytelling for specific audiences. Instructors will guide students in the continued development of reporting, interviewing, writing and researching with a more sophisticated audience understanding using text, audio, video and photos for print, broadcast and the Web. Prerequisite: JOUR 201-1

JOUR 202-0 Philosophy of Modern Journalism (1 Unit) Ideational survival skills demanded by a fast-changing media industry and an increasingly discontinuous journalism profession. Development of an analytical framework based on theories of human behavior and media consumption as a means to understand new technologies, content opportunities, and audience relationship building.

JOUR 290-0 Building a Visual Brand (Non-Majors) (1 Unit) Introduction to visual communications in print and digital formats and the fundamental skills of design. Visual thinking, composition, color, and typography. In-class presentation and evaluation of design solutions. Lectures, demonstrations, and at least one client-based project.

JOUR 291-0 Podcasting (1 Unit) TBD.

JOUR 301-0 Journalism in Practice (1 Unit) Practice of reporting, editing, and storytelling skills through topical writing and research assignments. Learning to develop diverse sources and incorporate audio, visual, and multimedia elements for news, magazine, and other audiences. Readings, discussion, and experiential opportunities. Prerequisites: JOUR 201-1, JOUR 201-2 and Medill sophomore standing.

JOUR 301-1 Journalism in Practice (0.5 Unit) Prerequisites: JOUR 201-1, JOUR 201-2 and Medill sophomore standing.

JOUR 302-0 Media History: Power, Protest and Passion (1 Unit) Media history's influence today's world: Who has had the power to tell the stories that shape people's lives? Who has consumed or been affected by those stories? Whose stories have been neglected or distorted? Special attention on journalists who have challenged governments and other

powerful institutions; the changing media landscape in the digital age. Prerequisite: Medill sophomore standing.

JOUR 310-0 Media Presentation: News (1 Unit) Essentials of newspaper editing and online production, including headlines, page layout and design, photo editing, information graphics, and appropriate electronic tools. Prerequisite: Medill sophomore standing.

JOUR 311-0 Media Presentation: Magazine (1 Unit) 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 interactive—and the role of magazines in society. Prerequisite: Medill sophomore standing.

JOUR 312-0 Media Presentation: Video Producing for Broadcast & the Web (1 Unit) Writing and producing broadcasts for television, the web, and alternative digital platforms, using the appropriate computer and editing equipment, news wires, and video feeds. Emphasis on the editorial decision-making process. Prerequisite: Medill sophomore standing .

JOUR 320-0 Storytelling: Interactive News (1 Unit) Storytelling: Interactive News explores how storytelling changes across various platforms—and how it must change when interactivity causes narrative to be user-defined. This course builds on the foundations of audio, photo, and video and adds interactivity to the mix, enabling students to create and build dynamic, interactive narratives for news and feature reporting. Students will split their time between reporting, multimedia editing, and learning open-web technologies (HTML, CSS, JavaScript). Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 321-0 Storytelling: Magazine & Feature Writing (1 Unit) 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. Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 322-0 Storytelling: Video Reporting, Shooting, & Editing (1 Unit) The craft of audio-video storytelling for television and the web, including practice in field reporting and producing packages ranging from one-to-three-minute television news pieces to longer alternative audio-video formats for the web and other digital platforms. Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 331-0 Chicago Speaks: Listening for Power and Place (1 Unit) Exploration of Chicago's diverse racial and ethnic makeup through oral history and storytelling techniques that engage students with neighborhood residents and stakeholders. May fulfill diversity curricular requirements. Prerequisite: Sophomore standing.

JOUR 332-0 Coverage of Gender and Sexual Minorities (1 Unit) Examination of social science research on LGBT communities and translating it for specialized and general audiences. Topics include research aims and limitations; reporting on underrepresented groups; finding fresh angles and credible sources; contextualizing stories of local, national, and international reach. Prerequisite: Sophomore standing.

JOUR 333-0 Bilingual Reporting (1 Unit) This will be a bilingual course that will explore the history, current state and future of the English, Spanish and bilingual media that seek to reach the growing Latino audience. Students will immerse themselves in Chicago's vibrant and diverse Latino community, and write and produce multimedia stories and communications in Spanish and English. This course is designed to empower students to understand and tell the stories of Latin Americans in the United States, as well as in Latin America, and reach these

important audiences in the languages that they use daily. Prerequisite: Medill sophomore standing

JOUR 340-0 Innovation and News in Technology (1 Unit) Students interested in journalism or computer science work together to conceive and build new kinds of tools and technology for distributing and consuming news and information. Prerequisite: Medill sophomore standing

JOUR 341-0 Journalism in a Networked World (1 Unit) Network science behind today's media workings. How people find and share content on the web. Practical skills in using web analytics tools, search engine optimization techniques, and social media strategies. Prerequisite: Medill sophomore standing.

JOUR 342-1 Knight Lab (1 Unit) By application only.

JOUR 343-0 The Googlization of America (1 Unit) This will be a bilingual course that will explore the history, current state and future of the English, Spanish and bilingual media that seek to reach the growing Latino audience. Students will immerse themselves in Chicago's vibrant and diverse Latino community, and write and produce multimedia stories and communications in Spanish and English. This course is designed to empower students to understand and tell the stories of Latin Americans in the United States, as well as in Latin America, and reach these important audiences in the languages that they use daily. Prerequisite: Medill sophomore standing

JOUR 344-0 Advanced Interactive Storytelling & Design (1 Unit)
Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 345-SA Journalism Residency: Argentina (2 Units) By application only.

JOUR 346-SA Journalism Residency: Argentina (2 Units) By application only.

JOUR 347-0 Journalism Residency (1-2 Units) By application only.

JOUR 348-0 Journalism Residency (2 Units) By application only.

JOUR 350-0 National Security (1 Unit) Relationship between the media and the military, especially since 9/11, and impact on public opinion. Topics include field reporting, ethics of reporting classified material, and issues facing the military. Prerequisite: Sophomore standing.

JOUR 351-0 Civil Liberties and National Security (1 Unit) National Security Journalism Initiative-sponsored seminar on civil liberties in the post-9/11 world. Government access to personal information; balance between privacy and national security.

JOUR 352-0 Politics, Media and The Republic (1 Unit) This seminar examines the most challenging period for American political journalism since Watergate and the Vietnam War. Few in the news media recognized the political forces that led to Donald Trump's election and energized Republican efforts to reshape the national landscape. At a time when facts themselves often seem up for grabs, the new president labeled the press an "enemy of the American people" and dismissed unfavorable reporting as "fake news." Expect to go beyond the news of the day to develop your own understandings of how the country reached this point, what role journalism plays and what happens next as Trump fights for his agenda, progressive Democrats resist and the 2018 midterm campaign gets underway.

JOUR 353-0 Dilemmas of American Power (1 Unit) It isn't easy being a superpower. For the past 50 years, U.S. policymakers have struggled to define America's role in an ever more complex world where threats multiply and challenges morph and endure. The period beginning with the Vietnam War traces an arc that reaches from Soviet nuclear arsenals to Islamic suicide bombers, from a fear of falling dominoes in Southeast Asia to hopes for a wave of democracy in the Middle East. And now the rise of right-wing populists in Europe, a newly activist Russia and the presidency of Donald Trump. This course uses an engaging set of examples and materials to chart one of the most intriguing stretches of international engagement in U.S. history. Prerequisite: Medill sophomore standing.

JOUR 354-0 Sports and Society (1 Unit) Prerequisite: Sophomore standing.

JOUR 355-SA Journalism Residency: Qatar (2 Units) By application only.

JOUR 356-SA Journalism Residency: Qatar (2 Units) By application only.

JOUR 365-SA Journalism Residency: South Africa (2 Units) By application only.

JOUR 366-SA Journalism Residency: South Africa (2 Units) By application only.

JOUR 368-0 Documentary (1 Unit) Comprehensive overview of HD video production geared to short documentaries that tell human stories, with emphasis on character, conflict, drama, and surprise. Different documentary styles. How narrative structures are implemented. Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 369-0 Audio Documentary (1 Unit) Different forms of audio documentary production for radio and web-based multimedia distribution. Emphasis on radio reporting techniques, including interviewing, writing to tape, compelling storytelling, and integration of sound and music. Teams produce 7-to 10-minute audio documentaries to be broadcast, quality permitting, on WBEZFM. Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 370-0 Media Law & Ethics (1 Unit) The legal and ethical framework defining media freedoms and constraints in the United States, including copyright and trademark issues. Historical context and focus on the evolution of constitutional, statutory, judicial, and ethical standards. Prerequisite: sophomore standing. Prerequisite: Medill sophomore standing and JOUR 301-0 or JOUR 301-1

JOUR 371-0 Journalism of Empathy (1 Unit) Exploration of writing and reporting about people and places neglected and misunderstood by mainstream America. Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 372-0 International Journalism: South Africa (1 Unit) Introduction to South Africa, with a focus on the country's newspapers, magazines, and broadcast outlets. Students compare and contrast various aspects of South African and US life-especially the history of the HIV/AIDS pandemic-and explore historical, political, and cultural connections between the two countries. Required for South Africa Journalism Residency. Prerequisites: JOUR 301-0 or JOUR 301-1 and junior standing.

JOUR 373-0 Investigative Journalism (2 Units) Students enrolled in this class, supported by the Medill Justice Project, investigate and report on cases of prisoners who may have been wrongfully convicted. Prerequisites: Sophomore standing and by application.

JOUR 374-0 Investigative Reporting (1 Unit) Examines the methods and techniques of investigative reporting through hands-on practice—brainstorming, framing the reporting, digging through documents, analyzing numbers, tracking down sources, writing, and rewriting. Prerequisites: Sophomore standing and by application.

JOUR 375-0 Literary Journalism (1 Unit) 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: JOUR 301-0 or JOUR 301-1.

JOUR 376-0 Media Design (1 Unit) Advanced tools of layout, typographic contrast, and color theory, including creating infographics, with a focus on current approaches to newspaper, magazine, web, and newsletter design. Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 378-0 Introduction to Photojournalism (1 Unit) Advanced skills and practice in telling stories with photographs, photo slide shows, photo galleries, and audio slideshows. Ethics as it applies to photojournalism. Prerequisite: Sophomore standing.

JOUR 379-0 Connecting with Immigrant Communities (1 Unit) Multimedia reporting on immigrant experiences. Developing a forum for community-based personal narratives. Creating a social network across ethnic lines. Prerequisite: Sophomore standing.

JOUR 380-0 Legal Reporting (1 Unit) Students gain in-depth knowledge of legal issues while covering and writing stories related to the courts and the law. Students are encouraged to take this course in conjunction with a non-Medill course complementing the subject matter. Prerequisite: Sophomore standing.

JOUR 381-0 Business Reporting (1 Unit) Students gain in-depth knowledge of business and economic issues while covering and writing stories related to business. Students are encouraged to take this course in conjunction with a non-Medill course complementing the subject matter. Prerequisite: Medill sophomore standing

JOUR 382-0 Environmental Reporting (1 Unit) Students gain in-depth knowledge of environmental issues while covering and writing stories related to the environment. Students are encouraged to take this course in conjunction with a non-Medill course complementing the subject matter. Prerequisite: Sophomore standing.

JOUR 383-0 Health and Science Reporting (1 Unit) Health and Science Reporting teaches students both how to think about science writing and how to write about science and medicine. In this combination writing workshop and seminar we will read some of the best of the best science and health journalism; meet with expert scientists on campus; and meet the editors and writers from leading scientific journals and publications. Students will learn what makes good science writing, how to find sources, how to evaluate information and how to sort out science from pseudo-science. Prerequisite: Sophomore standing.

JOUR 384-0 Covering Washington, D.C. as a Mobile Journalist (2 Units) Hands-on experience as a mobile journalist on a beat, producing up-to-the-minute political stories for the Medill on the Hill website. Focus on instant news gathering and multimedia reporting, especially for a young audience. Practice meeting deadlines and applying innovative storytelling skills. Prerequisite: By application only.

JOUR 388-0 Internship (0 Unit) Student-initiated internships in journalism. Supervised by Medill Career Services. Prerequisites: Sophomore standing and consent of Medill Career Services.

JOUR 388-1 Undergraduate Research (0 Unit) Student initiated research projects.

JOUR 390-0 Special Topics (1 Unit) Specialized experimental courses offered from time to time by faculty. Topics may include journalism in a networked world and depth reporting using documents and databases. Prerequisites: Vary depending on the course.

JOUR 391-0 Special Topics (0.5 Unit) Courses, such as Strategies for Career Success, offered for one-half of a quarter.

JOUR 391-1 Special Topics (0.5 Unit)

JOUR 391-2 Special Topics (0.5 Unit) Special Topics.

JOUR 392-0 Washington D.C. Practicum (2 Units) By application only.

JOUR 394-0 Politics and Presidential Elections (1 Unit)

JOUR 399-0 Undergraduate Independent Study (0.5-1 Unit) Academic work sponsored and supervised by a faculty member working one-on-one with the student. By application.

Journalism Degree

Bachelor of Science in Journalism Degree (45 units)

All Medill students pursue a major in journalism.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Arts and Sciences Requirements (17 units)

Distribution Requirements (12 units)

- 2 units in the social and behavioral sciences
- 2 units in historical studies
- 1 unit in philosophy or religious studies
- 2 units in literature or fine arts
- 1 unit in economics or business understanding
- 4 units in natural sciences, computer science, or formal studies; at least 1 must be in formal studies

Weinberg College Elective Concentration (5 units)

- 5 courses in any one Weinberg College department
 - 1 unit may be at the 100 level
 - 2 units must be at the 300 level
- Only 1 unit of field study or independent study credit may count toward the concentration
- AP credits do not count toward the concentration
- A minor, a second major, or an adjunct major in Weinberg College may count toward the Weinberg College elective concentration.

Non-Medill Elective Requirement (10-14 units)

- 10 to 14 non-Medill credits to explore or extend interests
- At least 3 must be in Weinberg College

Foreign Language Requirement

- 3 units in foreign language or demonstrated proficiency as defined by Weinberg College

Diverse Cultures and Social Inequalities Requirement (2 units)

- 2 courses from a Medill-approved list, 1 of which must be a Medill course
- Selected distribution, Weinberg concentration, and non-Medill elective courses may be used to meet the requirement

Major Requirements (14-18 units)

Course	Title
<i>Core Courses (8 units)</i>	
JOUR 201-1	Reporting & Writing
JOUR 201-2	Multimedia Storytelling
JOUR 202-0	Philosophy of Modern Journalism
JOUR 301-0 or JOUR 301-1	Journalism in Practice
JOUR 302-0	Media History: Power, Protest and Passion
JOUR 370-0	Media Law & Ethics (required before Journalism Residency)
2 300-level journalism courses	
<i>Journalism Residency or Professional Experience (4 units)</i> ¹	
JOUR 347-0 & JOUR 348-0 or JOUR 345-SA & JOUR 346-SA or JOUR 355-SA & JOUR 356-SA or JOUR 365-SA & JOUR 366-SA	Journalism Residency and Journalism Residency Journalism Residency: Argentina and Journalism Residency: Argentina Journalism Residency: Qatar and Journalism Residency: Qatar Journalism Residency: South Africa and Journalism Residency: South Africa
<i>Electives (2–6 units)</i>	
Students must take at least 2 journalism electives.	

¹ Students may complete this requirement with a preapproved noncredit professional experience. Requirements for the professional experience/internship option include 4 courses, 3 of which must be 300-level journalism courses.

JUDD A. AND MARJORIE WEINBERG COLLEGE OF ARTS AND SCIENCES

weinberg.northwestern.edu

The Judd A. and Marjorie Weinberg College of Arts and Sciences—oldest of Northwestern's 12 schools—has been the center of the University's academic and intellectual life since the 1850s. Weinberg College offers a liberal arts education that combines broad exposure to the insights and methods of multiple academic disciplines with focused study in one or more areas. The approximately 650-member college faculty is dedicated to superior teaching informed by advanced research. Nearly all members of the faculty, including the most senior, regularly teach undergraduates in a curriculum that includes more than 2,200 courses each year, as well as tutorials, supervised laboratory experiences, internships, and other individualized forms of instruction. The more than 4,000 undergraduates and 1,400 graduate students in arts and sciences enjoy a great deal of choice, with access to departments and programs offering 42 majors, 6 adjunct majors, and more than 50 minors. Among these are several majors and minors that are interdisciplinary within the College 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 diversity. Required coursework provides an overview of the complexity of the world and different ways of apprehending and solving problems. Students examine how scholars from many backgrounds confront fundamental issues and how social conditions shape their inquiries. Proficiency in writing and competence in a foreign language build communication skills and expand the capability to study and understand another culture, while intensive coursework in a required major and optional minor develops an understanding of advanced concepts and lays the groundwork for original research. Many areas of the curriculum encourage interdisciplinary study that integrates the approaches of different fields and enhances the ability to address questions that cross traditional academic boundaries. A period of study abroad is encouraged in order 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 coursework and synthesize what they learn in their majors.

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

Requirements for the Degree of Bachelor of Arts

Weinberg College offers courses of study in the arts and sciences leading to the degree of bachelor of arts. Students have extensive flexibility in structuring their academic programs within a framework of general education and major requirements specified in this catalog. Guidance in planning a coherent curriculum is available from several sources; see Academic Advising (p. 178).

Students earning the bachelor of arts degree must complete 45 units of credit (p. 177) and fulfill the course and grade requirements (p. 177) described below. These include completing 2 first-year seminars (p. 175), demonstrating proficiency in writing (p. 175) and in a foreign language (p. 175), satisfying distribution requirements (p. 176) in six major areas of intellectual inquiry, and completing the requirements of a major (p. 176) in one of the departments or programs of Weinberg College. They must also complete a specified amount of their coursework within Weinberg College (p. 177).

First-Year Seminar Requirement

First-year students must complete two seminars. Offered by nearly all departments and programs in Weinberg College, these are small, discussion-oriented courses designed to develop basic intellectual skills: how to read critically, think logically, and communicate effectively, typically through the investigation of a specific theme or issue. First-year 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. These seminars ordinarily supplement rather than replace standard introductory courses and usually do not provide the preparation necessary for advanced work in a field. P/N registration (see Grade Requirements (p. 177)) is not allowed in first-year seminars.

Except for students in HPME (p. 34), ISP (p. 278), and MMSS (p. 294), who may take their seminars in winter and spring, incoming first-year students are assigned to a fall seminar based on preferences they submit to the Weinberg Office of Undergraduate Studies and Advising during the summer. The first-year seminar instructor also serves as the students' academic adviser for that quarter. Also during the summer, first-year students are informed of the quarter in which they are to take their second seminar. First-year students also have the opportunity through the Kaplan Humanities Scholars Program (p. 278) 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. First-year seminar instructors make the initial evaluation of writing in their courses. Students who do not write sufficiently well in their first-year seminars or in other courses may be asked to take ENGLISH 105-0 Expository Writing. Courses in expository writing and intermediate composition (p. 358) 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 of these ways:

- Achieving a designated score on a College Board Advanced Placement Examination
- Passing a placement examination given online during the summer and/or at Northwestern during Wildcat Welcome before fall classes start and periodically during the school year (language departments may limit the number of times a placement examination may be taken)
- Providing other evidence of proficiency, such as documentation that secondary schooling was completed in a language other than English
- Successfully completing designated Northwestern coursework (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 to take a placement examination in that language. Petitions are available in the Office of Undergraduate Studies and Advising and must be submitted prior to or during a student's first quarter.

Students with professionally diagnosed disabilities related to foreign language acquisition should contact AccessibleNU about possible accommodations.

Distribution Requirements

To ensure breadth of education, Weinberg College students must take 2 courses¹ in each of the six distribution areas listed below. The lists of courses that satisfy the distribution requirements are established by a Weinberg College committee. Current lists are available on the college website, and eligible courses for each quarter are identified on the registrar's website.

- 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 other 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 influences, groups, and institutions.
- IV. Historical studies
Courses introduce the chronological development of cultural, social, political, and economic affairs and their historical relationships.
- V. Ethics and values
Courses introduce the analysis of moral, social, and religious values and how they have developed.
- VI. Literature and fine arts
Courses foster understanding of how the attitudes, ideas, and values of individuals, groups, societies, or cultures are represented in their literature, arts, and other creative activities.

Courses taken P/N (see Grade Requirements (p. 177)) cannot count toward the distribution requirements. Courses identified as *Interdisciplinary Studies* are those that have been approved for fulfilling distribution requirements in more than one area; this means students may choose which one of the approved areas to apply the course. Students may satisfy a maximum of 2 of their 12 distribution

requirements by achieving sufficient scores on College Board Advanced Placement or higher-level International Baccalaureate examinations; each of these two must be in a different distribution requirement area. A list of qualifying scores and tests as well as detailed information concerning the distribution requirements are available from the Office of Undergraduate Studies and Advising and on the college website.

¹ See Area II under Weinberg College Policies: Distribution Requirement Special Cases (p. 177).

Major Study Requirement

All students must fulfill the requirements of a Weinberg College major, which should be declared by the end of sophomore year. Majors are declared by meeting with a designated department or program adviser to discuss opportunities and requirements, develop a course plan, and complete a Declaration of Major Form. All courses counted toward a major 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 (p. 177))

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 department or program course in one major may also fulfill a related course requirement for another major.

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

Transfer students normally must complete at least four 300-level courses at Northwestern in the major department or program.

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

- Departmental major
Each Weinberg College department offers one or more majors. Requirements are described in detail in the respective department sections of this catalog.
- Area or interdisciplinary major
The college offers many interdisciplinary majors that apply the approaches of several departments to certain scientific, cultural, and political areas. Most are open to all students. American studies, 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 creative writing major. African studies, geography, global health studies, international studies, mathematical methods in the social sciences, and science in human culture are available only as adjunct majors and must be completed with a second major that is not an adjunct major. Requirements for area and interdisciplinary majors are described in detail in their respective sections of this catalog.
- Ad hoc major
Occasionally students with well-defined interests are led to programs of study that do not fit neatly into the mold of a traditional major. They may develop an ad hoc major in astrobiology or medical ethics, 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 contact the Office of Undergraduate Studies and Advising.

Registration Requirements: Number of Courses and Quarters

All Weinberg College students, except those in the Integrated Science Program, the Honors Program in Medical Education, and the dual bachelor's degree programs (BA/BMus and BA/BS), must successfully complete coursework earning at least 45 units of credit in order to graduate. Students must be degree candidates in Weinberg College during the last three quarters before receiving the BA degree. They may take courses in any other Northwestern school, but a limited amount of such coursework may count toward the degree. For details see Number of Weinberg College Courses (p. 177).

In addition to and independent of the requirements set by Weinberg College, all students must satisfy the University's Undergraduate Registration Requirement (p. 26). This requirement addresses the number of quarters for which a student must be registered at Northwestern and the minimum number of units of credit that must be completed at the University.

Grade Requirements

Students must achieve an overall grade point average of C (2.0) or higher in courses used to meet degree requirements. They must earn at least a C– in all major courses and all minor courses, including all related courses for a major. If a major or minor has prerequisites, students must earn at least a C– in these courses as well. To complete the foreign language proficiency requirement through Northwestern coursework, students must earn at least a C– in the third quarter of the second-year language sequence.

Full-time students in Weinberg College are permitted to enroll in a limited number of courses with the understanding that in place of a regular letter grade they will receive the notation P (pass) or N (no credit), neither of which counts in the grade point average. No more than 1 course a quarter and 6 courses in all may be taken under this P/N option. Courses used to satisfy first-year seminar, distribution, foreign language, major, or minor requirements may not be taken P/N. 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.

Number of Weinberg College Courses

Weinberg College students may take advantage of courses offered by Northwestern's other schools, but a minimum of 34 units must be earned in a Weinberg College discipline. These include the following:

- Units of credit earned by completion of courses offered by Weinberg College.
- Units of credit transferred from other institutions or granted based on test scores in academic disciplines represented by Weinberg College academic areas of study. Transfer or test credits will count toward the 34 units if they appear on the Northwestern transcript with a designation corresponding to a Weinberg College area or as general credit (GEN_CRED).
- Approved School of Professional Studies courses in Weinberg College disciplines. Note that students must obtain the advance permission

of the Office of Undergraduate Studies and Advising to register for courses in the School of Professional Studies.

Additional units beyond 34 can be in disciplines taught at Northwestern in schools other than Weinberg College and count towards the required 45 units for the degree, subject to certain limitations. No more than 3 units may be instruction in applied music and no more than 4 units may come from the military studies programs. Certain School of Professional Studies courses are not eligible to count towards College degree requirements. Students can consult their College Adviser for more information.

Weinberg College Policies

Detailed policies are available at weinberg.northwestern.edu/undergraduate/advising/policies-forms/.

Additional information can be found under Academic Options and Support (p. 178).

Taking Courses at Other Institutions

Students must secure prior approval from the Weinberg College Office of Undergraduate Studies and Advising before taking courses at other US institutions that they will submit for Northwestern credit. University, College, and department and program rules govern how many courses taken at other institutions a student may count toward requirements, where they may be taken, in which areas of study they may be, and which requirements they may fulfill. Information about credit from other institutions is available from the Office of the Registrar. Courses taken at other institutions but not accepted for credit by Northwestern cannot count toward a Weinberg College degree.

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

Awards and Honors

Each year Weinberg College awards several prizes and honors to exceptional students. Recognition is given for outstanding writing in first-year seminars and outstanding academic achievement in certain areas of study. Each quarter the college's Dean's List honors students with sufficiently high grades. Each spring the Northwestern chapter of the liberal arts honorary society Phi Beta Kappa elects juniors and seniors to membership. Seniors whose grade point averages meet certain criteria graduate with college honors. In addition, many departments and programs recognize outstanding achievement by their students. This includes recommending students for graduation with department or program honors (see Honors in the Major under Academic Options and Support (p. 178)).

The college also awards funds to students working on research projects and creative activities; see Research Funding under Academic Options and Support (p. 178) for information.

Distribution Requirement Special Cases

Area II: Formal Studies

Completing any one course offered by the Department of Mathematics that is numbered greater than 224-0 with a grade of C- or better satisfies the Weinberg College Formal Studies (Area II) distribution requirement.

For more information about Weinberg College distribution requirements see Requirements for the Degree of Bachelor of Arts (p. 175). For additional rules and policies pertaining to satisfaction of distribution requirements see Rules and Policies for Distribution Requirements at: weinberg.northwestern.edu/undergraduate/degree/distribution-requirements/rules.html

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 Office of Undergraduate Studies and Advising before the middle of the quarter preceding the quarter in which the seminar is held. The plan must include a topic description, a reading list, specification of the work that will be graded (such as term papers and written examinations), prerequisites, and the meeting schedule. Students may enroll in only 1 Student-Organized Seminar (GEN_LA 298-0) a 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.

Academic Options and Support

Additional information can be found under Weinberg College Policies (p. 177) and weinberg.northwestern.edu/undergraduate/.

Academic Advising

Weinberg College provides an integrated academic advising structure 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 first-year student is assigned an adviser who in nearly all cases is the student's instructor in a fall-quarter first-year seminar. At the end of fall quarter each student is assigned a Weinberg College adviser, who will continue to be that student's adviser through graduation. In addition, each Weinberg department and program has a corps of faculty advisers who counsel all undergraduates about course selections, majors and minors, and research and career opportunities.

Arch Scholars Program

The Arch Scholars Program is a suite of programs designed to welcome, engage, and support students who attended high schools with little or no AP/IB options or who were among the first in their families to attend college.

Bio&ChemEXCEL

A pre-orientation program for admitted students thinking about STEM disciplines such as biology, chemistry, or neuroscience, especially if they are interested in learning more about science research at Northwestern. Students take BIOL_SCI 100-0 and CHEM 100-0.

Bridge

Bridge I is a pre-orientation program with two tracks, one for students interested in quantitative disciplines such as math, chemistry, or

economics (courses include MATH 100-BR, CHEM 100-BR, ECON 100-BR); and the other for students interested in the humanities, social sciences, or journalism (courses include HUM 100-1-BR, HUM 100-2-BR, JOUR 190-BR). Bridge II is open to rising sophomores intending to enroll in either organic chemistry or upper-level economics courses. The Bridge II course options are CHEM 199-BR or ECON 299-BR.

NU Bioscientist

A two-quarter program for first-year students interested in conducting research in the biological, biomedical, neurobiological, chemical, or social sciences. In fall, students take Biological Thought and Action (BIOL_SCI 115-6 or other) and in winter BIOL_SCI 116-6; these courses satisfy the Weinberg College First-Year Seminar requirement.

Posner Research Program

This program enables rising sophomores to conduct research under faculty guidance during the summer after their first year.

Cross-School Options

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

Two programs allow undergraduates to combine a bachelor's degree in the liberal arts with a bachelor's degree in another Northwestern undergraduate school. One results in a BA from Weinberg College and a BS from the McCormick School of Engineering and Applied Science, and the other results in a BA from Weinberg College and a BMus from the Bienen School of Music. Both options typically require five years of study. For more information see Dual Bachelor's Degrees (p. 35) section of this catalog.

Honors Program in Medical Education

The Honors Program in Medical Education is designed for unusually well-prepared high school students who seek a career in medicine or medical science. It provides a plan whereby students entering Northwestern are admitted simultaneously to Weinberg College, the McCormick School, or the School of Communication and to the Feinberg School of Medicine. HPME students then spend the first three or four years in undergraduate study and the last four years in the Feinberg School, potentially reducing the period of formal training by one year. For more information see Honors Program in Medical Education (p. 34) in the Dual Graduate & Undergraduate Degrees section of this catalog.

Accelerated Master's Programs

Undergraduate students doing outstanding work may be accepted into one of the accelerated master's programs approved by the Graduate School. These students may receive permission to double-count some courses toward both bachelor's and master's degrees.

The approved BA/MA and BA/MS departmental programs in chemistry, comparative literary studies, economics, French, and linguistics share the goal of selecting and training exceptional students. Students are not self-selected but are recommended by the department to the Graduate School for admission. No particular grade point average in undergraduate courses, however high, automatically entitles a student to participate in an accelerated master's program. Students are officially admitted only after their credentials have been thoroughly reviewed and approved by the senior associate dean of the Graduate School.

See the individual department sections of this catalog for more information on accelerated master's programs. Further details and policies are available from advisers in the relevant departments and on the Graduate School's website at tgs.northwestern.edu/academics/programs/dual-degrees/bachelors-masters.html.

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. Students may earn science certification with a biology, chemistry, or physics designation; social science certification with an economics, history, political science, or sociology designation; or certification in English, French, German, Latin, mathematics, or 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 (p. 106) as described in the School of Education and Social Policy chapter of this catalog. Applications should be submitted to the Office of Student Affairs in the School of Education and Social Policy.

Other Cross-School Options

Weinberg College students participate in many academic opportunities outside of the college, sometimes taking individual courses of interest and sometimes completing a formal program of study. Many possibilities are included in this catalog. Certificates (p. 28) open to Weinberg undergraduates are offered through the School of Education and Social Policy, the McCormick School of Engineering and Applied Science, the Kellogg School of Management, and the Medill School of Journalism, Media, Integrated Marketing Communications. Minors (p. 30) in several of Northwestern's undergraduate schools, as well as other options in music, are also open to Weinberg College students. For more information see the relevant school chapter of this catalog. Interested students should also contact the schools through which the options are offered.

Honors in the Major

Each major in Weinberg College offers a program that may lead to the award of honors in the major to graduating seniors with outstanding records of achievement. Criteria vary by major, but all share certain features. Students recommended for honors in the major must

- Complete with distinction the regular courses required for the major and at least two quarters of 398 or 399 or their equivalent, or 400-level courses, or some combination thereof. (These courses may count toward major requirements in some departments and programs.) Majors set different GPA criteria.
- Complete a research project or other type of integrative work under the guidance of a faculty adviser. The project must result in a research report, thesis, or other tangible record; coursework by itself is not sufficient. Simple data collection, computer programming, analysis of data with canned programs, and summaries of primary or secondary sources are not by themselves bases for the award of honors in the major.

Each major has an undergraduate honors committee responsible for administering its honors program and for preparing the final recommendations for honors submitted in May to the Weinberg College Committee on Undergraduate Academic Excellence. The faculty adviser proposes a student for honors and writes a letter describing and evaluating the student's project. A faculty member typically unconnected with the project must submit another letter giving independent and substantive judgments. The departmental honors committee reviews nominations during spring quarter and takes a separate recorded vote on each candidate. Approved nominations are reviewed by the Committee on Undergraduate Academic Excellence, which makes the final decision.

Information on procedures for students pursuing separate honors in two departments or programs, or interdisciplinary honors spanning

two majors, is available from the Office of Undergraduate Studies and Advising and at weinberg.northwestern.edu/undergraduate/honors-awards/departmental-honors.html.

Independent Study and Undergraduate Seminars

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

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

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

Internships

Many students seek to enrich their education with practical experiences gained off campus. Chicago Field Studies (p. 218) administers several programs that combine seminars taught on campus with internships typically at Chicago-area organizations. Other Weinberg College departments and programs also offer opportunities for off-campus work. These are described in their sections of this catalog. No more than 6 units of credit earned through internship-linked coursework may count toward a Weinberg degree. See the college website for a list of options counting toward this limit.

Minors

Students may choose from more than 50 minors offered at Northwestern; among these are Weinberg College minors, interschool minors, and minors offered by some of Northwestern's other undergraduate schools (see Minors (p. 30) under Additional Baccalaureate Options section of this Catalog). Minor requirements are listed under the appropriate headings in this catalog.

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

Students may not count any course toward both a minor and a major unless the catalog description of the minor explicitly permits this or the course fulfills a related course requirement for the major. A course may not count toward more than one minor. All courses counted toward a minor, including prerequisites for the minor, must be completed with a grade of at least C–.

Preprofessional Study

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

All majors can furnish suitable preparation for professional schools, provided appropriate courses are taken. No major, however, is intended solely as preprofessional training. The college advisers in the Office of Undergraduate Studies and Advising help students design academic programs that combine the breadth of a liberal arts education with adequate preparation for further professional study. Northwestern Career Advancement is another resource; several career counselors specialize in helping Weinberg students identify career goals and paths toward achieving them.

Professional Linkage Seminars

Undergraduates may take specially designed linkage seminars (designated on the transcript by "-LK") 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 and thus focusing on the transition from the academic to the nonacademic world.

Research Funding

Weinberg College is committed to facilitating student research and to helping undergraduates immerse themselves in challenging, intense explorations through well-focused projects. The college, as well as some of its departments and programs, awards competitive grants to support research and creative projects of students working under faculty guidance. Academic-year awards cover some research expenses, and some summer awards also provide assistance with living expenses. Conference travel grants help fund travel to professional conferences to present research or creative work.

The University's Undergraduate Research Grant Program is another source of research funding for qualified students. See Support for Undergraduate Research Endeavors (p. 38) for information.

Student Organizations

Many departments and programs within the college sponsor student organizations. Some are honorary organizations, recognizing students who have achieved distinction within their fields of study. Others provide opportunities for students with common interests to come together for academic, social, career-focused, and service activities that complement classroom experiences.

The Weinberg College Student Advisory Board is the primary source of student advice to the dean and the associate dean for undergraduate academic affairs. Members also serve on several college committees. The board includes representatives from every Weinberg College department and program offering a major or a minor.

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, a political science student might study the European Union in France. The college encourages participation in full-academic-year programs that include extensive study of languages and culture. The Office of the Provost offers grants for intensive summer foreign language study abroad. As early as the first year, interested students should discuss study abroad plans with their advisers and obtain

information from the Office of Undergraduate Learning Abroad (<https://www.northwestern.edu/abroad>).

African American Studies

afam.northwestern.edu

The study of black lives, cultures, and experiences has a long and distinguished history in the United States and abroad. Interdisciplinary from its beginnings, the field has developed exciting insights and firm intellectual and empirical foundations to systematically study the social, political, cultural, and economic dimensions of race both domestically and internationally. With these strengths and traditions, the Department of African American Studies provides opportunities to explore the richness and diversity of black life in a meaningful and coherent way.

The department offers courses that focus on people of African descent in the United States and other regions of the Americas and the African diaspora—the communities created by the dispersion of peoples from the African continent. By comparing the black experience in various parts of the world, students learn to analyze identity, race, and racism as formations that change over time and space. This broad study of the black experience is one of the key features that distinguish the department 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 black experience; the roots and development of black music, literature, and religious styles; analysis of key social, political, and economic institutions such as families, churches, and labor markets; and the traffic of people, ideas, and artifacts throughout the African diaspora.

African American studies provides excellent 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, healthcare 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, as scholars and political leaders pay increased attention to global economic, political, and social phenomena, African American studies touches on issues of far-reaching national and international significance.

Programs of Study

- African American Studies Major (p. 182)
- African American Studies Minor (p. 184)

AF_AM_ST 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

AF_AM_ST 210-0 Survey of African American Literature (1 Unit)

Literature of blacks in the United States from slavery to freedom. Works of major writers and significant but unsung bards of the past. *Literature Fine Arts Distro Area*

AF_AM_ST 211-0 Literatures of the Black World (1 Unit) Introductory survey of fiction, poetry, drama, folktales, and other literary forms of Africa and the African diaspora. Texts may span the precolonial, colonial, and postcolonial periods and cover central themes, such as memory, trauma, spirituality, struggle, identity, freedom, and humor. *Literature Fine Arts Distro Area*

AF_AM_ST 212-1 Introduction to African-American History: Key concepts from 1700-1861 (1 Unit) African origins, the slave trade, origins of slavery and racism in the United States, life under slavery in the North

and the South. AF_AM_ST 212-1 and HISTORY 212-1 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

AF_AM_ST 212-2 Introduction to African American History: Emancipation to Civil Rights Movement (1 Unit) Emancipation to the civil rights era. Reconstruction, rise of legal segregation, strategies of resistance, migration, and urbanization. AF_AM_ST 212-2 and HISTORY 212-2 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

AF_AM_ST 213-0 History of the Black World (1 Unit) Introductory survey of the history of Africans and their descendants across the globe. African civilizations prior to European colonialism, encounters between Africa and Europe, movements of "Africans" to the Americas and elsewhere, and development of black communities in and outside Africa. *Historical Studies Distro Area*

AF_AM_ST 214-0 Comparative Race and Ethnic Studies (1 Unit) Problems and experiences of racialized minorities: blacks, Native Americans, Asian Americans, and Latina/os. Comparison of their relationships with each other and with the majority society. *Historical Studies Distro Area*

AF_AM_ST 215-0 Introduction to Black Social & Political Life (1 Unit) Analysis of class, gender, sexuality, immigrant status, and ethnic origin in black society and politics. Focus on demographic trends, lived experiences, and ideological debates. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

AF_AM_ST 218-0 Asian/Black Historical Relations in the U.S. (1 Unit) Comparative historical analysis of relations of these groups in the United States, including racialized and sexualized discourses structuring interracial relations and social, political, and economic location. Slavery, immigration, model minority myth, cross-racial politics. Taught with AF_AM_ST 218-0 and ASIAN_AM 218-0; may not receive credit for both courses. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

AF_AM_ST 220-0 Civil Rights and Black Liberation (1 Unit) The Northern and Southern civil rights movements and the rise of black nationalism and feminism, 1945-72. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175)*

AF_AM_ST 225-0 African-American Culture (1 Unit) 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. *Literature Fine Arts Distro Area*

AF_AM_ST 236-0 Introduction to African-American Studies (1 Unit) Introduction to the discipline of black studies using key historical and theoretical texts. *Social Behavioral Sciences Distro Area*

AF_AM_ST 245-0 The Black Diaspora and Transnationality (1 Unit) 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. *Historical Studies Distro Area*

AF_AM_ST 250-0 Race, Class and Gender (1 Unit) 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. *Social Behavioral Sciences Distro Area*

AF_AM_ST 251-0 The Mixed Race Experience (1 Unit) Exploration of demographic trends in interracial and interethnic marriages to highlight the complexity of the American experience. Special attention to mixed-race experiences portrayed in film and novels. AF_AM_ST 251-0 and ASIAN_AM 251-0 are taught together; students may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

AF_AM_ST 259-0 Introduction to African-American Drama (1 Unit) Thematic and historical survey of African American drama. Sociopolitical context, the aesthetic reflected in the work, impact on African American and general theater audiences. *Literature Fine Arts Distro Area*

AF_AM_ST 261-0 Queer Literatures in the African Diaspora (1 Unit) Advanced introduction to critical theories of race, gender, and sexuality in the African diaspora from the 19th century to today. *Literature Fine Arts Distro Area*

AF_AM_ST 310-0 Contemporary Asian Black Relations (1 Unit) Divides between these groups, as well as areas of positive cross-cultural collaboration. Historical analysis of reparations, the 1992 Los Angeles riots, and affirmative action. Cross-racial exchange in youth expressions, popular culture, hip-hop. AF_AM_ST 310-0 and ASIAN_AM 310-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area*

AF_AM_ST 315-0 Religion in the Black Atlantic (1 Unit) Afro-Atlantic religions since the 1400s; traditions of Orisa devotion and monotheisms; religion and revolution in African slave religion; racialization and empire; theories of religion, materialities, and diaspora. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175)*

AF_AM_ST 319-0 Race, Ethnicity and the American Constitution (1 Unit) Investigation of how race and ethnicity have influenced the evolution of the US Constitution and legal debate and practice. Topics include affirmative action, school integration, and the death penalty. Prerequisite: AF_AM_ST 220-0 or either POLI_SCI 220-0 or POLI_SCI 230-0. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

AF_AM_ST 320-0 Social Meaning of Race (1 Unit) 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. *Social Behavioral Sciences Distro Area*

AF_AM_ST 327-0 Politics of Black Popular Culture (1 Unit) Examination of the debates within black communities about the proper role and function of black art and artists in relation to black politics. *Interdisciplinary Distro - See Rules (p. 175) Literature Fine Arts Distro Area Social Behavioral Sciences Distro Area*

AF_AM_ST 330-0 Black Women in the 20th Century (1 Unit) 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. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

AF_AM_ST 331-0 The African American Novel (1 Unit) Readings in classic black American fiction. The author as creator and participant.

Works of Wright, Ellison, Baldwin, and others. Prerequisite: sophomore standing. *Literature Fine Arts Distro Area*

AF_AM_ST 334-0 Gender and Black Masculinity (1 Unit) Perceptions and constructions of black masculinity within African American and "American" cultures in the United States; readings in gender and sexuality studies, feminist theory, African American studies, and cultural studies. *Social Behavioral Sciences Distro Area*

AF_AM_ST 335-0 Race and Literature in 19th Century America (1 Unit) 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 339-0 Unsettling Whiteness (1 Unit) Making the historical, political, and cultural formation of whiteness in Western modernity visible and narratable for commentary and analysis. Particular reference to contemporary culture. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Social Behavioral Sciences Distro Area*

AF_AM_ST 342-0 Comparative Slavery (1 Unit) Traces slavery across historical epochs and geographic contexts, with an emphasis on Latin America, the Caribbean, and the United States. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Social Behavioral Sciences Distro Area*

AF_AM_ST 345-0 Afro-Latin America (1 Unit) Exploration of Afro-Latin communities, cultures, and identities throughout Latin America and the Hispanic diaspora after 1800. Emergence of race and nation in modern Latin America, migration, gender, Afro-Latin spiritual systems and religion, family, and politics. *Historical Studies Distro Area*

AF_AM_ST 348-0 Africans in Colonial Latin America (1 Unit) History of Africans and African-descended people throughout Latin America from 1492 to 1800, emphasizing the varied experiences of slavery and freedom struggles, the emergence of race and colonial categories of difference, and the gendered lives of racialized colonial subjects.

AF_AM_ST 350-0 Theorizing Blackness (1 Unit) Advanced introduction to critical theories of race and racialization. Investigation of blackness as a category of critical analysis for analyzing Afro-diasporic formations. Consideration of how blackness is shaped by gender, class, sexuality, and nationality.

AF_AM_ST 355-0 Diaspora Studies (1 Unit) Interdisciplinary examination of the significance of diasporas, their histories, and common dynamics, illustrated with examples drawn from a wide range of cases. *Social Behavioral Sciences Distro Area*

AF_AM_ST 358-0 Performing Memory in the Black World (1 Unit) 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 (1 Unit) In-depth examination of a selected author's body of work. Choice of author varies. May be repeated for credit with change of author. *Literature Fine Arts Distro Area*

AF_AM_ST 363-0 Racism in Western Modernity (1 Unit) Impact of racism in the formation of Western modernity. Critical conceptual and historical analyses of the social formation of "race" and the historical implications of racism in the contemporary West.

AF_AM_ST 365-0 Black Chicago (1 Unit) 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 375-0 Post Colonial African American Studies (1 Unit) Development of critical approaches to African American studies from the perspectives of postcolonial analysis. In particular, examination of the meaning of the colonial in the formation of African American experiences and the significance of modernity, race, and black politics in the historical contexts of the United States, Latin America, and the Caribbean.

AF_AM_ST 378-0 Harlem Renaissance (1 Unit) African American political and social movements and cultural production in theater, music, visual arts, and literature from 1915 to 1930. Prerequisite: AF_AM_ST 210-0 or another African American literature course. *Literature Fine Arts Distro Area*

AF_AM_ST 379-0 Black Women Writers (1 Unit) 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. *Literature Fine Arts Distro Area*

AF_AM_ST 380-0 Topics in African-American Studies (1 Unit) Advanced work on social, cultural, or historical topics. May be repeated for credit with different topic. Prerequisite: advanced student or senior standing.

AF_AM_ST 381-0 Topics in Transnational Black Studies (1 Unit) Examination of texts such as novels, poetry, film, drama, slave narratives, political manifestos, and historical texts in order to compare how people from across the African diaspora have approached issues of identity, culture, and community. Prerequisite: advanced student or senior standing.

AF_AM_ST 390-0 Research Seminar (1 Unit) Methods of researching the African American experience. Identification of research problems; location, selection, and critique of relevant literature; data gathering and analysis; report writing. Topics vary. Prerequisite: advanced student or senior standing.

AF_AM_ST 396-0 Internship in African-American Studies (1 Unit) Analysis of social and cultural institutions through field study and participant observation. Entails a research project sponsored by a Northwestern faculty member. Prerequisite: advanced student or senior standing.

AF_AM_ST 399-0 Independent Study (1 Unit) Open to advanced students with consent of instructor. Prerequisite: advanced student or senior standing.

African American Studies Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Department Courses (12 units)	
5 core courses chosen from:	
AF_AM_ST 210-0	Survey of African American Literature
AF_AM_ST 211-0	Literatures of the Black World
AF_AM_ST 212-1	Introduction to African-American History: Key concepts from 1700-1861
AF_AM_ST 212-2	Introduction to African American History: Emancipation to Civil Rights Movement
AF_AM_ST 213-0	History of the Black World

AF_AM_ST 214-0	Comparative Race and Ethnic Studies
AF_AM_ST 215-0	Introduction to Black Social & Political Life
AF_AM_ST 236-0	Introduction to African-American Studies
AF_AM_ST 245-0	The Black Diaspora and Transnationality
6 elective courses in the department, including at least 4 at the 300 level	
1 senior course chosen from:	
AF_AM_ST 390-0	Research Seminar
AF_AM_ST 396-0	Internship in African-American Studies
AF_AM_ST 399-0	Independent Study

Related Courses (5 units) ^{1,2}

At least 3 must be at the 300 level, and the other 2 can be 200- or 300-level courses

- ¹ Courses must be approved by the department adviser.
- ² See approved related courses (Relevant Courses in Other Departments) below, or consult the director of undergraduate studies for other courses to satisfy this requirement.

Relevant Courses in Other Departments

African Studies

Course	Title
AFST 390-0	Topics in African Studies (With DUS Approval for Relevance)

Anthropology

Course	Title
ANTHRO 255-0	Contemporary African Worlds
ANTHRO 320-0	Peoples of Africa
ANTHRO 327-0	Archaeology of Ethnicity in America (With DUS Approval for Relevance)
ANTHRO 334-0	The Anthropology of HIV/AIDS: Ethnographies (With DUS Approval for Relevance)
ANTHRO 340-0	Visual Anthropology of Africa
ANTHRO 343-0	Anthropology of Race
ANTHRO 365-0	Language, Race, & Ethnicity in the U.S.
ANTHRO 372-0	Third World Urbanization (With DUS Approval for Relevance)
ANTHRO 373-0	Power and Culture in American Cities (With DUS Approval for Relevance)
ANTHRO 384-0	Slavery's Material Record

Art History

Course	Title
ART_HIST 220-0	Introduction to African Art
ART_HIST 222-0	Introduction to Art of the African Diaspora
ART_HIST 384-0	African American Art
ART_HIST 385-0	Black Visual Culture: Race and Representation
ART_HIST 386-0	Art of Africa

Asian American Studies

Course	Title
ASIAN_AM 218-0	Asian/Black Historical Relations in the U.S.
ASIAN_AM 310-0	Contemporary Asian Black Relations

Communication Studies

Course	Title
COMM_ST 326-0	African American Rhetoric

Dance

Course	Title
DANCE 160-0	Jazz I (With DUS Approval for Relevance)
DANCE 260-0	Jazz II (With DUS Approval for Relevance)
DANCE 360-0	Jazz III (With DUS Approval for Relevance)
DANCE 365-0	American Rhythm Dancing & the African American Performance Aesthetic

Economics

Course	Title
ECON 323-1 & ECON 323-2	Economic History of the United States Before 1865 and Economic History of the United States 1865 to Present (With DUS Approval for Relevance)
ECON 327-0	Economic Development in Africa
ECON 354-0	Issues in Urban and Regional Economics (With DUS Approval for Relevance)

English

Course	Title
ENGLISH 242-0	Topics in Literature: (With DUS Approval for Relevance)
ENGLISH 365-0	Studies in Postcolonial Literature
ENGLISH 366-0	Studies in African American Literature
ENGLISH 371-0	American Novel (With DUS Approval for Relevance)

French

Course	Title
FRENCH 362-0	African Literatures and Cultures
FRENCH 364-0	Caribbean Literatures and Cultures

General Music

Course	Title
GEN_MUS 130-0	Non-Major Jazz (With DUS Approval for Relevance)

Gender Studies

Course	Title
GNDR_ST 363-0	Postcolonial Studies and Gender and Sexuality (With DUS Approval for Relevance)
GNDR_ST 380-0	Black Feminist Theory
GNDR_ST 382-0	Race, Gender, and Sexuality

History

Course	Title
HISTORY 210-1	History of the United States, Precolonial to the Civil War
HISTORY 210-2	History of the United States, Reconstruction to the Present
HISTORY 212-1	Introduction to African-American History: Key concepts from 1700-1861
HISTORY 212-2	Introduction to African American History: Emancipation to Civil Rights Movement
HISTORY 255-1	Background to African Civilization and Culture: Origins to 17th C.
HISTORY 255-2	Background to African Civilization and Culture: 16th-19th C.
HISTORY 255-3	Background to African Civilization and Culture: 1875-1994
HISTORY 314-0	The Civil War and Reconstruction (With DUS Approval of Syllabus)

HISTORY 320-0	History of Social Movements in the United States (With DUS Approval for Relevance)
HISTORY 356-1	History of South Africa, Early Times to 1879
HISTORY 356-2	History of South Africa, 20th century
HISTORY 357-0	East Africa
HISTORY 358-0	Topics in West African History
HISTORY 366-0	Race and Nation in the Independence Era (With DUS Approval for Relevance)

Latin American and Caribbean Studies

Course	Title
LATIN_AM 391-0	Topics in Latin American and Caribbean Studies (With DUS Approval for Relevance)

Latina and Latino Studies

Course	Title
LATINO 222-0	Latina & Latino Youth in U.S. Cities (With DUS Approval for Relevance)
LATINO 342-0	Latina and Latino Social Movements (With DUS Approval for Relevance)
LATINO 392-0	Topics in Latina and Latino Social and Political Issues (With DUS Approval for Relevance)

Legal Studies

Course	Title
LEGAL_ST 347-0	Comparative Race & Ethnicity
LEGAL_ST 348-0	Race, Politics, and the Law

Performance Studies

Course	Title
PERF_ST 304-0	Sonic Practices of the Middle East and North Africa (With DUS Approval for Relevance)
PERF_ST 309-0	Black Performance
PERF_ST 310-0	Performance of Women of Color (With DUS Approval for Relevance)
PERF_ST 316-0	Folklore and Oral Traditions (With DUS Approval for Relevance)

Philosophy

Course	Title
PHIL 267-0	Philosophy, Race, and Racism
PHIL 367-0	Studies in African American Philosophy

Political Science

Course	Title
POLI_SCI 326-0	Race and Public Policy
POLI_SCI 327-0	African American Politics
POLI_SCI 358-SA	Contemporary South Africa: A Political Economy/ Policy Perspective (With DUS Approval for Relevance)
POLI_SCI 359-0	Politics of Africa

Religious Studies

Course	Title
RELIGION 264-0	American Religious History from 1865 to the Great Depression (With DUS Approval for Relevance)
RELIGION 360-0	African American Religions

RTVF

Course	Title
RTVF 301-0	Race & Ethnicity in Film & TV

Sociology

Course	Title
SOCIOLOGY 201-0	Social Inequality: Race, Class, and Power
SOCIOLOGY 207-0	Cities in Society (With DUS Approval for Relevance)
SOCIOLOGY 208-0	Race and Society
SOCIOLOGY 218-0	Education and Inequality: Focus on Chicago
SOCIOLOGY 301-0	The City: Urbanization and Urbanism (With DUS Approval for Relevance)
SOCIOLOGY 304-0	Politics of Racial Knowledge
SOCIOLOGY 308-0	Crime, Politics, and Society (With DUS Approval for Relevance)
SOCIOLOGY 323-0	American Subcultures and Ethnic Groups (With DUS Approval for Relevance)
SOCIOLOGY 325-0	Global & Local Inequalities (With DUS Approval for Relevance)
SOCIOLOGY 334-0	Social Protest and Social Change Around the World (With DUS Approval for Relevance)
SOCIOLOGY 345-0	Class and Culture (With DUS Approval for Relevance)
SOCIOLOGY 348-0	Race, Politics, and the Law

Theatre

Course	Title
THEATRE 345-0	African American Theatre

Honors in African American Studies

Majors with strong academic records and an interest in pursuing honors must notify the director of undergraduate studies during fall of senior year. To qualify for honors, a student must complete a substantial senior-year research project. With the director, the student selects a thesis adviser, who need not be a member of the department. Completion of the thesis ordinarily requires at least two quarters of research and writing. During one or both of those quarters students may register for AF_AM_ST 399-0 Independent Study with the thesis adviser. This course counts as either 1 of the 6 required "elective courses" in the major or as the senior-course requirement.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information contact the director of undergraduate studies and see Honors in the Major. (p. 178)

African American Studies Minor

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

Minor Requirements

Course	Title
Core Courses (8 units)	
Four courses chosen from:	
AF_AM_ST 210-0	Survey of African American Literature
AF_AM_ST 211-0	Literatures of the Black World
AF_AM_ST 212-1	Introduction to African-American History: Key concepts from 1700-1861

AF_AM_ST 212-2	Introduction to African American History: Emancipation to Civil Rights Movement
AF_AM_ST 213-0	History of the Black World
AF_AM_ST 214-0	Comparative Race and Ethnic Studies
AF_AM_ST 215-0	Introduction to Black Social & Political Life
AF_AM_ST 236-0	Introduction to African-American Studies
AF_AM_ST 245-0	The Black Diaspora and Transnationality
4 elective courses in the department, including 3 at the 300 level	

African Studies

africanstudies.northwestern.edu

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

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

Programs of Study

- African Studies Adjunct Major (p. 186)
- African Studies Minor (p. 186)

African Studies Courses

AFST 101-6 First-Year Seminar (1 Unit) Freshman seminars in African Studies are small, writing and discussion-oriented courses geared to the investigation of a specific theme or issue and intended to hone your abilities as a critical thinker and effective writer. *WCAS First-Year Seminar*

AFST 276-0 African Literature in Translation (1 Unit) Continental African literature. Content varies. May be repeated for credit with different topic. Taught with COMP_LIT 270-0; may not receive credit for both courses with same topic. *Literature Fine Arts Distro Area*

AFST 360-SA Culture, Language, and Identity in South Africa (1 Unit) Introduction to South African populations and cultures through direct experience and representations in history, art, literature, languages, and customs. Discussions of South African cultures and ethnicity, language use and policy, and identity. Restricted to students in Northwestern's South Africa program. *Social Behavioral Sciences Distro Area*

AFST 390-0 Topics in African Studies (1 Unit) A general examination of topics relevant to African studies. May be repeated for credit with change of topic. Restricted to students in Northwestern's South Africa program.

AFST 390-SA Topics in African Studies (1 Unit) A general examination of topics relevant to African studies. May be repeated for credit with change of topic. Restricted to students in Northwestern's South Africa program.

AFST 392-1 Herskovits Undergraduate Research Award (1 Unit) 2-course sequence required for recipients of the Herskovits Undergraduate Research Award. Consecutive enrollment required in AFST 392-2.

AFST 392-2 Herskovits Undergraduate Research Award (1 Unit) 2-course sequence required for recipients of the Herskovits Undergraduate Research Award. Prerequisite: AFST 392-1.

AFST 395-0 Senior Research Seminar (1 Unit) Capstone seminar addressing both techniques of research and the substance of a significant issue in African studies. Students develop skills at formulating a research topic and organizing research.

AFST 399-0 Independent Study (1 Unit) May be repeated for credit with change of topic.

Swahili Courses

SWAHILI 111-1 Swahili I (1 Unit) Basic literacy skills and interactive proficiency; Swahili in cultural and historical context.

SWAHILI 111-2 Swahili I (1 Unit) Basic literacy skills and interactive proficiency; Swahili in cultural and historical context. Prerequisite: SWAHILI 111-1 or equivalent

SWAHILI 111-3 Swahili I (1 Unit) Basic literacy skills and interactive proficiency; Swahili in cultural and historical context. Prerequisite: SWAHILI 111-2 or equivalent

SWAHILI 111-SA-1 Swahili I (1 Unit) Basic literacy skills and interactive proficiency; Swahili in cultural and historical context.

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

SWAHILI 121-2 Swahili II (1 Unit) Development of literacy and interactive proficiency skills; introduction to verbal arts. In Swahili. Prerequisite: SWAHILI 121-1.

SWAHILI 121-3 Swahili II (1 Unit) Development of literacy and interactive proficiency skills; introduction to verbal arts. In Swahili. Prerequisite: SWAHILI 121-2.

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

SWAHILI 216-1 Introduction to Swahili Literature (1 Unit) Swahili verbal arts in the oral tradition. Prerequisite: SWAHILI 121-3 or equivalent. *Literature Fine Arts Distro Area*

SWAHILI 216-2 Introduction to Swahili Literature (1 Unit) Classical Swahili literature. Prerequisite: SWAHILI 216-1. *Literature Fine Arts Distro Area*

SWAHILI 216-3 Introduction to Swahili Literature (1 Unit) Standard Swahili literature. Prerequisite: SWAHILI 216-2. *Literature Fine Arts Distro Area*

SWAHILI 399-0 Independent Study (1 Unit) For students who have advanced with distinction beyond the regular course offerings in Swahili. Prerequisite: consent of instructor

African Studies Adjunct Major

The adjunct major is structured to serve two broad aims.

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

Second, students engage in in-depth research or immersion practicums, the products of which they develop in a capstone senior research seminar. Practicums often involve a central research component, but other proposed practicums of acceptable quality, depth of immersion, etc., may be approved. Among the experiences that may satisfy this requirement with appropriate content are study abroad in Africa, research connected to the Program of African Studies, internships, and independent study and senior capstone projects.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Adjunct Major Requirements (11 units)

Course	Title
3 core courses chosen from:	
AFST 276-0	African Literature in Translation
ANTHRO 255-0	Contemporary African Worlds
HISTORY 255-1	Background to African Civilization and Culture: Origins to 17th C.
HISTORY 255-2	Background to African Civilization and Culture: 16th-19th C.
HISTORY 255-3	Background to African Civilization and Culture: 1875-1994
POLI_SCI 359-0	Politics of Africa
<i>If more than three are taken, additional courses from this list may count toward the next group.</i>	
7 additional courses chosen from an approved list (available on the program website).	
1 senior seminar:	
AFST 395-0	Senior Research Seminar
There is also a required research or immersion practicum experience (see below)	

- The 11 courses must be selected from at least three departments.
- At least 3 courses must be at the 300 level.
- All adjunct majors require completion of a stand-alone major as well.
- At most 2 courses counted toward the African studies adjunct major may be double-counted toward another major.

Research or Immersion Practicum

- The quarter-long practicum must be approved by the program.
- It must directly relate to African studies.

- Credit earned through the practicum may count as 1 of the 7 additional courses with adviser permission.

Honors in African Studies

Majors with strong academic records and an interest in pursuing honors should submit an application to the director of undergraduate studies during spring of junior year. In addition to the AFST 395-0 Senior Research Seminar, at least 2 of the following must be included among the 11 courses for the adjunct major: AFST 399-0 Independent Study, AFST 392-1 Herskovits Undergraduate Research Award, AFST 392-2 Herskovits Undergraduate Research Award, or an approved graduate seminar. A report on original research or some other integrative capstone project, such as organizing a relevant conference or exhibition, is also required.

Students whose capstone projects and grades meet department criteria are recommended to the college for graduation with honors. For further information contact the director of undergraduate studies and see Honors in the Major (p. 178).

African Studies Minor

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

Minor Requirements (6 units)

Course	Title
At least 2 courses must be from the following sequence:	
HISTORY 255-1	Background to African Civilization and Culture: Origins to 17th C.
HISTORY 255-2	Background to African Civilization and Culture: 16th-19th C.
HISTORY 255-3	Background to African Civilization and Culture: 1875-1994
1 course must be:	
ANTHRO 255-0	Contemporary African Worlds
3 elective courses:	
At least half of the work in a course taken through another department must have African studies content. Selections must be approved by the program.	

- Students must have at least an overall B average in the 6 courses.
- Only 1 course for the minor may be double-counted towards a major.
- Students must declare the minor at least two terms before they intend to graduate. They are encouraged to meet regularly with program staff and the director of undergraduate studies to monitor their progress.

Approved electives are listed on the program website (<http://www.africanstudies.northwestern.edu>) each quarter.

American Studies

amstp.northwestern.edu

The American Studies Program is interdisciplinary, comparative, and internationally oriented. The competitive-admissions major examines the development and expressions of national culture alongside those of borderland and diasporic American cultures and amongst global cultures. It draws on a broad range of faculty from the humanities and social sciences so that students can examine components of US culture and the diverse experiences of Americans and others affected by Americans locally, nationally, and globally. Students are allowed a wide-ranging yet disciplined exploration that crosses the boundaries of traditional academic fields. All students write a thesis explicitly dealing with the United States in a comparative or global dimension.

Because this selective honors program has more applicants than available space, admission depends in part on academic distinction and on demonstrated interest in comparative American cultures. First- and second-year students apply for admission to the major early in spring quarter.

Study abroad and upper-level language proficiency are strongly encouraged.

Program of Study

- American Studies Major (p. 187)

AMER_ST 301-1 Seminar for Majors (1 Unit) Set of required courses structured to share a broad comparativist or internationally oriented theme, integrating methods and materials from different disciplines. Change of instructor each quarter; change of theme every year. Limited to 20 students.

AMER_ST 301-2 Seminar for Majors (1 Unit) Set of required courses structured to share a broad comparativist or internationally oriented theme, integrating methods and materials from different disciplines. Change of instructor each quarter; change of theme every year. Limited to 20 students.

AMER_ST 301-3 Seminar for Majors (1 Unit) Set of required courses structured to share a broad comparativist or internationally oriented theme, integrating methods and materials from different disciplines. Change of instructor each quarter; change of theme every year. Limited to 20 students.

AMER_ST 310-0 Studies in American Culture (1 Unit) Readings and discussions of topics in American cultural life—for example, law in 20th century America or television news in contemporary US culture. Limited enrollment with emphasis on student participation. Prerequisites vary. May be repeated for credit with consent of program director.

AMER_ST 390-1 Senior Project (1 Unit) Thesis or field study. Required of majors.

AMER_ST 390-2 Senior Project (1 Unit) Thesis or field study. Required of majors.

AMER_ST 390-3 Senior Project (1 Unit) Thesis or field study. Required of majors.

AMER_ST 399-0 Independent Study (1 Unit) Readings and conferences on special subjects for students pursuing their theme within the major.

American Studies Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Program Courses (5 units)	
To be taken during the first year in the major:	
AMER_ST 301-1 & AMER_ST 301-2 & AMER_ST 301-3	Seminar for Majors and Seminar for Majors and Seminar for Majors
To be taken during senior year:	
AMER_ST 390-1 & AMER_ST 390-2	Senior Project and Senior Project
Related Courses (10 units) ¹	
1 approved course from African American, Asian American, or Latina and Latino studies	
2 of the following, preferably 1 history and 1 English:	
HISTORY 210-1	History of the United States, Precolonial to the Civil War
HISTORY 210-2	History of the United States, Reconstruction to the Present
ENGLISH 270-1	American Literary Traditions
ENGLISH 270-2	American Literary Traditions
7 additional courses chosen with the program director ^{2,3}	

- 1
- Must be at the 200 or 300 level
- 2
- Theme of courses should have strong US dimension but also global or comparative implications
- 3
- At least 1 course must be relevant to the theme but not centered on the United States.

Honors in American Studies

In senior year all majors participate in the senior project seminar (AMER_ST 390-1 & AMER_ST 390-2) and work on a thesis on a topic of their choice. Students meet weekly with their project advisers, the seminar instructor, and fellow seniors to discuss their projects and common concerns. Students whose senior theses and grades are judged to meet program criteria are recommended to the college for graduation with honors. For more information consult the program director and see Honors in the Major (p. 178).

Anthropology

anthropology.northwestern.edu

Anthropology is the study of humankind from a broadly comparative and historical perspective. Anthropology advances understanding of human biological and cultural diversity around the world and across time. In a changing world, anthropology provides for cross-cultural comparative analysis of diversities and inequalities. Understanding cultural, biological, and linguistic differences and similarities is central to almost any career, and students gain a critical understanding of ethical issues at play in a diverse, globalized world.

Anthropology draws on the humanities, social sciences, and natural sciences to answer compelling questions about humankind, including how the species evolved, how biology, language, and culture became its defining characteristics, and how and why cultures change over time.

Anthropology's breadth makes the major ideal for students seeking a strong liberal arts and sciences education. Students are prepared for careers not only in anthropology and archaeology but also in a range of fields including medicine, public health, law, journalism, marketing, international development, and business.

The department's faculty bring together the four subfields of anthropology (archaeology, cultural anthropology, biological anthropology, and linguistic anthropology) to develop a holistic understanding of human diversity.

Students are encouraged to participate in a variety of departmental field and laboratory research projects in archaeology, ethnography, and human biology that offer the opportunity to conduct original research, which can be an integral part of a senior thesis project.

Programs of Study

- Anthropology Major (p. 191)
- Anthropology Minor (p. 193)

ANTHRO 101-6 First-Year Seminar (1 Unit) Open to first-year students in Weinberg College; does not satisfy major/minor requirements in Anthropology. *WCAS First-Year Seminar*

ANTHRO 105-0 Evolution and Social Behavior: The Basics (1 Unit) Introduction to anthropology; the biological evolution of humankind; the evolution of culture; the comparative study of existing or historically recorded societies. *Social Behavioral Sciences Distro Area*

ANTHRO 211-0 Culture & Society (1 Unit) Introduction to the comparative study of culture, exploring different types of social organization and their economic and political correlates in the context of contemporary globalization. *Social Behavioral Sciences Distro Area*

ANTHRO 211-SA Culture & Society (1 Unit) Introduction to the comparative study of culture, exploring different types of social organization and their economic and political correlates in the context of contemporary globalization. *Social Behavioral Sciences Distro Area*

ANTHRO 213-0 Human Origins (1 Unit) Emergence of the human species through the process of organic evolution, emphasizing genetics, the fossil record, and comparison with our nearest living relatives. *Natural Sciences Distro Area*

ANTHRO 214-0 Archaeology: Unearthing History (1 Unit) The evolution of culture from its earliest beginnings through the development of urbanism and the state. Principles of archaeological research. *Historical Studies Distro Area*

ANTHRO 215-0 The Study of Culture through Language (1 Unit) 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. *Social Behavioral Sciences Distro Area*

ANTHRO 221-0 Social and Health Inequalities (1 Unit) Bidirectional relationship between social (e.g., class, gender, and racial/ ethnic) and health inequalities, including institutional/ structural, individual/family/ psychosocial, and biological mechanisms. SOCIOL 211-0 is taught with ANTHRO 221-0; may not receive credit for both courses.

ANTHRO 232-0 Myth and Symbolism (1 Unit) Introduction to different approaches to the interpretation of myth and symbolism, e.g., Freudian, functionalist, and structuralist. *Ethics Values Distro Area*

ANTHRO 235-0 Language in Asian America (1 Unit) Survey of linguistic anthropological topics relevant to Asian American communities, including bilingualism, code switching, language socialization, language shift, style, sociolinguistic variation, indexicality, media, and semiotics. ANTHRO 235-0 and ASIAN_AM 235-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

ANTHRO 255-0 Contemporary African Worlds (1 Unit) Use of key anthropological insights about value judgments and cultural relativism to examine the survival strategies and turbulent histories of contemporary African societies. *Ethics Values Distro Area*

ANTHRO 290-0 Topics in Anthropology (1 Unit) Intermediate work in areas of developing interest and special significance. May be repeated for credit with different topic.

ANTHRO 306-0 Evolution of Life Histories (1 Unit) Evolved strategies for allocating resources among growth, reproduction, and maintenance; emphasis on the biological processes underlying the human life cycle and its evolution.

ANTHRO 308-0 Global Health in Human History (1 Unit) Exploration of paleopathology, including records of pre-and protohistoric adaptations to human disease, health, and medicine. The biocultural perspective on patterns of disease links past perspectives and current realities. ANTHRO 308-0 and GBL_HLTH 308-0 are taught together; may not receive credit for both courses. Prerequisite: 200-level anthropology, global health, or biology course or consent of instructor. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Natural Sciences Distro Area*

ANTHRO 309-0 Human Osteology (1 Unit) Introduction to human skeletal anatomy and biology. Identification and classification of human bones through hands-on dry-lab-based analysis. *Natural Sciences Distro Area*

ANTHRO 310-0 Evolution and Culture (1 Unit) 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: ANTHRO 213-0 or equivalent.

ANTHRO 311-0 Indians of North America (1 Unit) Aboriginal cultures of northern Mexico, continental United States, Alaska, and Canada. Languages, art, and social, economic, and religious life. *Historical Studies Distro Area*

ANTHRO 312-0 Human Population Biology (1 Unit) 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: ANTHRO 213-0. *Natural Sciences Distro Area*

ANTHRO 313-0 Anthropological Population Genetics (1 Unit) Principles of population genetics applied to primates. Mathematical models, analyses of small populations, and interaction of social and genetic processes. Prerequisite: consent of instructor. *Natural Sciences Distro Area*

ANTHRO 314-0 Human Growth & Development (1 Unit) 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 (1 Unit) Theories of interactions between culture and biology that affect human health. Beliefs and

practices for curing illness and maintaining wellbeing. 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 316-0 Forensic Anthropology (1 Unit) The application of traditional skeletal biology to problems of medicolegal significance, primarily in determining identity and analyzing trauma from human remains. Prerequisite: 200-level anthropology or biology course or consent of instructor. *Natural Sciences Distro Area*

ANTHRO 317-0 Human Evolution (1 Unit) Fossil record and reconstruction of phylogeny; morphological and behavioral adaptation of early hominids and forebears. *Natural Sciences Distro Area*

ANTHRO 318-0 Material Worlds of the Middle Ages (1 Unit) Landscapes, buildings, and material culture of medieval Europe, as seen through archaeology and related disciplines. *Historical Studies Distro Area*

ANTHRO 319-0 Material Life & Culture in Europe, 1500-1800 (1 Unit) Landscapes, buildings, and material culture of early modern Europe, as seen through archaeology and related disciplines. *Historical Studies Distro Area*

ANTHRO 320-0 Peoples of Africa (1 Unit) A survey of the cultures of Africa and the significant similarities and differences among the indigenous societies of the continent. *Social Behavioral Sciences Distro Area*

ANTHRO 320-SA Peoples of Africa (1 Unit) A survey of the cultures of Africa and the significant similarities and differences among the indigenous societies of the continent. *Social Behavioral Sciences Distro Area*

ANTHRO 321-0 Archaeological Field Methods (1 Unit) Practical training in basic methods and techniques at an excavation site; given with summer Archaeology Field School.

ANTHRO 321-SA Archaeological Field Methods (1 Unit) 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 & Methods (1 Unit) 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 324-0 Archaeological Survey Methods (1 Unit) Unique contributions of archaeological surveys to research about past peoples and places. Course uses geospatial technologies, such as shallow geophysics and GIS. *Historical Studies Distro Area*

ANTHRO 325-0 Archaeological Methods Laboratory (1 Unit) Analysis of archaeological methods (faunal, botanical, artifact, or soil analysis) with various techniques. May be repeated for credit.

ANTHRO 327-0 Archaeology of Ethnicity in America (1 Unit) 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. *Historical Studies Distro Area*

ANTHRO 328-0 The Maya (1 Unit) The archaeology of the Maya in Latin America; life and society in pre-Columbian Maya civilization. *Historical Studies Distro Area*

ANTHRO 330-0 Peoples of the World (1 Unit) 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. *Social Behavioral Sciences Distro Area*

ANTHRO 330-SA Peoples of the World (1 Unit) 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. *Social Behavioral Sciences Distro Area*

ANTHRO 332-0 The Anthropology of Reproduction (1 Unit) Marriage and reproduction throughout the world, particularly the developing world and Africa. Conjugal strategies, fertility, contraception. *Social Behavioral Sciences Distro Area*

ANTHRO 334-0 The Anthropology of HIV/AIDS: Ethnographies (1 Unit) The experiences of HIV-positive people; local and global policies shaping access to treatment; contributions of anthropologists to reducing HIV/AIDS globally. Readings from classic and current ethnographies. Prerequisite: 300-level course in anthropology or sociology. *Social Behavioral Sciences Distro Area*

ANTHRO 339-0 Material Culture (1 Unit) 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: ANTHRO 211-0 or consent of instructor. *Social Behavioral Sciences Distro Area*

ANTHRO 340-0 Visual Anthropology of Africa (1 Unit) Anthropological analysis of techniques, visual rhetoric, and narrative strategies embedded in images of Africa and Africans in a variety of contemporary and digital media. Course includes instruction in video production. Prerequisite: 200-level social science or African studies course or consent of instructor.

ANTHRO 341-0 Economic Anthropology (1 Unit) Economic organization in small-scale non-industrialized communities. Traditional structures of primitive and peasant economies. *Social Behavioral Sciences Distro Area*

ANTHRO 343-0 Anthropology of Race (1 Unit) Anthropological approaches to the analysis of race, racialization, and antiracism. Human variation, space, segregation, comparative analysis, and language ideologies. *Social Behavioral Sciences Distro Area*

ANTHRO 350-0 Anthropology of Religion (1 Unit) The human relationship with the supernatural. Action patterns accompanying beliefs. Comparison of nonliterate religions and historical religions. *Ethics Values Distro Area*

ANTHRO 354-0 Gender and Anthropology (1 Unit) Cross-cultural survey of women's roles from three perspectives: biosocial, sociocultural, politico-economic. Theory of gender inequality. Emphasis on the third world. *Social Behavioral Sciences Distro Area*

ANTHRO 355-0 Sexualities (1 Unit) 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. *Social Behavioral Sciences Distro Area*

ANTHRO 359-0 The Human Microbiome and Health (1 Unit) Discussion-based analysis of cutting edge research on the microbes associated with

the human body and their impacts on health. Consideration of historical, social, and political influences on observed patterns. *Natural Sciences Distro Area*

ANTHRO 360-0 Language and Culture (1 Unit) Relationship between language and culture; language as the vehicle of culture and as the manifestation of thought. *Social Behavioral Sciences Distro Area*

ANTHRO 361-0 Talk as Social Action (1 Unit) 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: ANTHRO 215-0 or consent of instructor. *Social Behavioral Sciences Distro Area*

ANTHRO 362-0 Advanced Methods in Quantitative Analysis (1 Unit) Advanced applications of univariate and multivariate statistics to anthropological research questions. Prerequisite: 200-level statistics course. *Formal Studies Distro Area*

ANTHRO 365-0 Language, Race, & Ethnicity in the U.S. (1 Unit) Analysis of connections between language ideologies, language use, and meanings of race and ethnicity. Bilingualism, immigration, identity, accented English, African American English, language policy, English only movement, education, social change. ANTHRO 365-0 and ASIAN_AM 365-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

ANTHRO 368-0 Latina and Latino Ethnography (1 Unit) Sociocultural analysis of US Latina/o communities. Examines ethnographies by and about Latina/os based in the United States. Draws on a broad disciplinary basis to critique and elaborate on ethnographic methods and epistemologies. Prerequisite: ANTHRO 211-0 or consent of instructor. *Ethics Values Distro Area*

ANTHRO 369-0 Contemporary Immigration to the U.S. (1 Unit) Major theories in immigration studies; contemporary processes of immigration and immigrant "community building" in the United States. Prerequisite: 300-level course in anthropology or sociology. *Social Behavioral Sciences Distro Area*

ANTHRO 370-0 Anthropology in Historical Perspective (1 Unit) 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 (1 Unit) Urbanization processes in the third world. Spatial development, wage labor, the informal sector, gender relations, rural-urban migration, and global and transnational interactions. Prerequisite: 100-or 200-level social science course or consent of instructor. *Social Behavioral Sciences Distro Area*

ANTHRO 373-0 Power and Culture in American Cities (1 Unit) 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. Prerequisite: 100-or 200-level cultural anthropology or sociology course or consent of instructor. *Social Behavioral Sciences Distro Area*

ANTHRO 374-0 The Anthropology of Complex Organizations (1 Unit) 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. *Social Behavioral Sciences Distro Area*

ANTHRO 376-0 Socialization (1 Unit) Cross-cultural study of the intergenerational transmission of culture; processes by which social groups pass on social tradition and behavior to succeeding generations. Prerequisite: ANTHRO 211-0, introductory psychology course, or consent of instructor. *Social Behavioral Sciences Distro Area*

ANTHRO 377-0 Psychological Anthropology (1 Unit) Contemporary approaches to cross-cultural behavior: ecocultural aspects of behavior development through maturation and socialization in human and nonhuman primates. Prerequisite: introductory survey course in psychology or anthropology or consent of instructor. *Social Behavioral Sciences Distro Area*

ANTHRO 378-0 Law and Culture (1 Unit) Introduction to the anthropology of law; institutional knowledge as seen in material culture and legal documents; colonial and postcolonial settings; relationships between law and culture, colonialism, evidence, and globalization. Prerequisite: 200-level anthropology course or consent of instructor. *Social Behavioral Sciences Distro Area*

ANTHRO 382-0 Households and Everyday Life (1 Unit) The role of households and everyday life in past and present societies throughout the world. Focus on people, gender, social relations, and interpersonal relations. Prerequisite: 100-or 200-level anthropology, history, or sociology course. *Social Behavioral Sciences Distro Area*

ANTHRO 383-0 Environmental Anthropology (1 Unit) How humans have changed and are changing the environment and what can be done to halt environmental deterioration. Topics include population trends, food supplies, consumerism, environmental regulation, and ecological consciousness.

ANTHRO 384-0 Slavery's Material Record (1 Unit) Archaeological approaches to studying Atlantic world slavery; botanical and material legacies of Africans in the Americas; archaeologies of resistance. *Historical Studies Distro Area*

ANTHRO 386-0 Methods in Human Biology Research (1 Unit) 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: ANTHRO 213-0 or consent of instructor.

ANTHRO 389-0 Ethnographic Methods and Analysis (1 Unit) Descriptive, naturalistic study of the culture of human social groups. Data gathering through observation and interview. Data analysis for ethnographic reporting. Prerequisites: ANTHRO 211-0 and ANTHRO 215-0.

ANTHRO 390-0 Topics In Anthropology (1 Unit) Advanced work in areas of developing interest and special significance. May be repeated for credit with different topic.

ANTHRO 390-SA Topics In Anthropology (1 Unit) 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 (1 Unit) Why study of the past is relevant to the present; examination of ethical issues in archaeology as they arise during the fieldwork experience. Prerequisite: ANTHRO 321-0.

ANTHRO 395-0 Field Study in Anthropology (1 Unit) Ethnographic field experience in the United States or abroad. Offered in conjunction with

summer field schools for exceptional students. Prerequisite: consent of instructor.

ANTHRO 396-0 Advanced Archaeological Field Methods (1 Unit) Complex excavation and survey procedures, topographic map making, excavation drawing, soil description; offered in conjunction with the summer Archaeology Field School.

ANTHRO 398-0 Senior Capstone Seminar (1 Unit) Supervised group discussion of research during preparation of the senior capstone project.

ANTHRO 399-0 Independent Study (1 Unit) Open with consent of department to juniors and seniors who have completed with distinction at least 2 courses or the equivalent in anthropology. Under direction of individual members of department.

Anthropology Major

Students complete a 13-course program (12 courses in anthropology and 1 in formal studies) for a major in anthropology. At the 200 level, courses provide background in the four major subfields of anthropology. At the 300 level, students expand both the breadth and depth of their studies, examining the philosophical and historical roots of the discipline. A research class (ANTHRO 322-0 Introduction to Archaeology Research Design & Methods, ANTHRO 361-0 Talk as Social Action, ANTHRO 386-0 Methods in Human Biology Research, or ANTHRO 389-0 Ethnographic Methods and Analysis) provides an opportunity to learn research skills and gain valuable analytical, critical thinking, and writing skills. ANTHRO 370-0 Anthropology in Historical Perspective provides an overview of the history of the field. Six additional 300-level courses include concentration courses from a subfield and from across the department.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Department Courses (12 units)	
5 core courses:	
ANTHRO 211-0	Culture & Society
ANTHRO 213-0	Human Origins
ANTHRO 214-0	Archaeology: Unearthing History
ANTHRO 215-0	The Study of Culture through Language
ANTHRO 370-0	Anthropology in Historical Perspective
1 research course selected from the following:	
ANTHRO 322-0	Introduction to Archaeology Research Design & Methods
ANTHRO 361-0	Talk as Social Action
ANTHRO 386-0	Methods in Human Biology Research
ANTHRO 389-0	Ethnographic Methods and Analysis
3 300-level courses selected from a subfield:	
Archaeology (p. 191)	
Biological Anthropology (p. 191)	
Cultural Anthropology (p. 191)	
Human Biology (p. 192)	
Linguistic Anthropology (p. 192)	
3 additional 300-level courses selected from any concentration or research course	
Related Course (1 unit)	
1 formal studies course ^{1,2}	

- ¹ For the biological anthropology and human biology concentrations, the formal studies course must be fulfilled by STAT 202-0 Introduction to Statistics, STAT 210-0 Introductory Statistics for the Social Sciences, PSYCH 201-0 Statistical Methods in Psychology, ECON 281-0 Introduction to Applied Econometrics, SESP 210-0 Introduction to Statistics and Research Methodology, or equivalent.
- ² For the archaeology, cultural anthropology, and linguistic anthropology concentrations, statistics or another formal studies course can fulfill this requirement.

Subfields Archaeology

Course	Title
ANTHRO 318-0	Material Worlds of the Middle Ages
ANTHRO 319-0	Material Life & Culture in Europe, 1500-1800
ANTHRO 321-0	Archaeological Field Methods
ANTHRO 324-0	Archaeological Survey Methods
ANTHRO 325-0	Archaeological Methods Laboratory
ANTHRO 327-0	Archaeology of Ethnicity in America
ANTHRO 328-0	The Maya
ANTHRO 343-0	Anthropology of Race
ANTHRO 382-0	Households and Everyday Life
ANTHRO 383-0	Environmental Anthropology
ANTHRO 384-0	Slavery's Material Record
ANTHRO 390-0	Topics In Anthropology
ANTHRO 391-0	Archaeology, Ethics, and Contemporary Society
ANTHRO 396-0	Advanced Archaeological Field Methods
ANTHRO 398-0	Senior Capstone Seminar

Biological Anthropology

Course	Title
ANTHRO 306-0	Evolution of Life Histories
ANTHRO 308-0	Global Health in Human History
ANTHRO 309-0	Human Osteology
ANTHRO 310-0	Evolution and Culture
ANTHRO 312-0	Human Population Biology
ANTHRO 313-0	Anthropological Population Genetics
ANTHRO 314-0	Human Growth & Development
ANTHRO 316-0	Forensic Anthropology
ANTHRO 317-0	Human Evolution
ANTHRO 359-0	The Human Microbiome and Health
ANTHRO 362-0	Advanced Methods in Quantitative Analysis
ANTHRO 390-0	Topics In Anthropology
ANTHRO 398-0	Senior Capstone Seminar

Cultural Anthropology

Course	Title
ANTHRO 310-0	Evolution and Culture
ANTHRO 311-0	Indians of North America
ANTHRO 315-0	Medical Anthropology
ANTHRO 320-0	Peoples of Africa
ANTHRO 330-0	Peoples of the World
ANTHRO 332-0	The Anthropology of Reproduction
ANTHRO 334-0	The Anthropology of HIV/AIDS: Ethnographies
ANTHRO 339-0	Material Culture
ANTHRO 340-0	Visual Anthropology of Africa
ANTHRO 341-0	Economic Anthropology

ANTHRO 350-0	Anthropology of Religion
ANTHRO 354-0	Gender and Anthropology
ANTHRO 355-0	Sexualities
ANTHRO 368-0	Latina and Latino Ethnography
ANTHRO 369-0	Contemporary Immigration to the U.S.
ANTHRO 372-0	Third World Urbanization
ANTHRO 373-0	Power and Culture in American Cities
ANTHRO 374-0	The Anthropology of Complex Organizations
ANTHRO 376-0	Socialization
ANTHRO 377-0	Psychological Anthropology
ANTHRO 378-0	Law and Culture
ANTHRO 390-0	Topics In Anthropology
ANTHRO 395-0	Field Study in Anthropology
ANTHRO 398-0	Senior Capstone Seminar

Human Biology

See Concentration in Human Biology for requirements.

Linguistic Anthropology

Course	Title
ANTHRO 360-0	Language and Culture
ANTHRO 365-0	Language, Race, & Ethnicity in the U.S.
ANTHRO 378-0	Law and Culture
ANTHRO 390-0	Topics In Anthropology
ANTHRO 398-0	Senior Capstone Seminar

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 the social sciences. Coursework emphasizes the study of human biology and health from a comparative and evolutionary perspective.

In their first and second years students complete the introductory (200-level) anthropology requirements as well as foundational courses (which are also premedical school requirements). Junior- and senior-year coursework includes 300-level courses in biological anthropology/human biology and related courses from other departments.

Course	Title
Department Courses (12 units)	
5 core courses:	
ANTHRO 211-0	Culture & Society
ANTHRO 213-0	Human Origins
ANTHRO 214-0	Archaeology: Unearthing History
ANTHRO 215-0	The Study of Culture through Language
ANTHRO 370-0	Anthropology in Historical Perspective
1 research course:	
ANTHRO 386-0	Methods in Human Biology Research
3 concentration courses chosen from:	
ANTHRO 306-0	Evolution of Life Histories
ANTHRO 308-0	Global Health in Human History
ANTHRO 309-0	Human Osteology
ANTHRO 310-0	Evolution and Culture
ANTHRO 312-0	Human Population Biology
ANTHRO 313-0	Anthropological Population Genetics

ANTHRO 314-0	Human Growth & Development
ANTHRO 316-0	Forensic Anthropology
ANTHRO 317-0	Human Evolution
ANTHRO 359-0	The Human Microbiome and Health
ANTHRO 362-0	Advanced Methods in Quantitative Analysis
ANTHRO 390-0	Topics In Anthropology
ANTHRO 398-0	Senior Capstone Seminar
3 additional 300-level courses selected from any concentration or research course	
Related Courses ¹	
BIOL_SCI 215-0	Genetics and Molecular Biology
BIOL_SCI 217-0	Physiology
BIOL_SCI 219-0	Cell Biology
BIOL_SCI 220-0	Genetics and Molecular Processes Laboratory (0.34 units)
BIOL_SCI 221-0	Cellular Processes Laboratory (0.34 units)
BIOL_SCI 222-0	Investigative Laboratory (0.34 units)
Biochemistry not required but strongly recommended:	
BIOL_SCI 301-0	Principles of Biochemistry
or BIOL_SCI 308-0	Biochemistry
CHEM 110-0 & CHEM 131-0 & CHEM 141-0 & CHEM 132-0 & CHEM 142-0	Quantitative Problem Solving in Chemistry and General Chemistry 1 and General Chemistry Laboratory 1 and General Chemistry 2 and General Chemistry Laboratory 2
or CHEM 151-0 & CHEM 161-0 & CHEM 152-0 & CHEM 162-0	Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1 and Accelerated General Chemistry 2 and Accelerated General Chemistry Laboratory 2
or CHEM 171-0 & CHEM 181-0 & CHEM 172-0 & CHEM 182-0	Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory and Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory
CHEM 210-1 & CHEM 210-2 & CHEM 210-3 & CHEM 230-2 & CHEM 230-3	Organic Chemistry and Organic Chemistry and Organic Chemistry and Organic Chemistry Lab I and Organic Chemistry Lab II
or CHEM 212-1 & CHEM 212-2 & CHEM 212-3 & CHEM 232-1 & CHEM 232-2	Organic Chemistry and Organic Chemistry and Organic Chemistry and Organic Chemistry Laboratory I and Organic Chemistry Laboratory II
MATH 220-0 & MATH 224-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions
or MATH 212-0 & MATH 213-0 & MATH 214-0	Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
PHYSICS 130-1 & PHYSICS 130-2 & PHYSICS 130-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3	College Physics and College Physics and College Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory
or PHYSICS 135-1 & PHYSICS 135-2 & PHYSICS 135-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3	General Physics and General Physics and General Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory

or PHYSICS 140-1 & PHYSICS 140-2 & PHYSICS 140-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3	Fundamentals of Physics and Fundamentals of Physics and Fundamentals of Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory
---	---

1 course chosen from:

STAT 202-0	Introduction to Statistics
STAT 210-0	Introductory Statistics for the Social Sciences
PSYCH 201-0	Statistical Methods in Psychology
ECON 281-0 or ECON 381-1	Introduction to Applied Econometrics Econometrics
SESP 210-0	Introduction to Statistics and Research Methodology
or equivalent statistical methods course approved by the department	

¹ Units depend on chemistry and mathematics sequences taken. Most are also premedical school requirements.

Relevant Courses in the Bienen School of Music

Course	Title
MUSICOL 323-0	Topics in Ethnomusicology

Summer Field Schools

Archaeology Field School: Courses may include the following, some of which are also offered on the Evanston campus.

Course	Title
ANTHRO 321-0	Archaeological Field Methods
ANTHRO 322-0	Introduction to Archaeology Research Design & Methods
ANTHRO 325-0	Archaeological Methods Laboratory
ANTHRO 396-0	Advanced Archaeological Field Methods

For additional information, contact the Department of Anthropology.

Honors in Anthropology

Majors with strong academic records and an interest in pursuing original research in anthropology during their senior year are encouraged to submit an application to the honors coordinator by spring of junior year to write a senior honors thesis. The thesis requires completing ANTHRO 399-0 Independent Study in the fall quarter and ANTHRO 398-0 Senior Capstone Seminar in the winter quarter of senior year. ANTHRO 398-0 (but not ANTHRO 399-0) may be counted toward the 300-level requirements for the major.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For additional information review the department website, consult the honors coordinator, and see Honors in the Major (p. 178).

Anthropology Minor

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).

The minor combines 2 200-level courses and 4 300-level courses that constitute a coherent focus.

Students pursuing the minor should consult with the department's undergraduate adviser to establish a program.

Course	Title
Minor Requirements (6 units)	
2 core courses chosen from:	
ANTHRO 211-0	Culture & Society
ANTHRO 213-0	Human Origins
ANTHRO 214-0	Archaeology: Unearthing History
ANTHRO 215-0	The Study of Culture through Language
4 300-level courses	

Arabic

See Middle East and North African Studies (p. 303).

Art History

arthistory.northwestern.edu

Art history studies the world's arts and architecture from antiquity to the present. It analyzes visual objects from multiple perspectives, including their aesthetic and historical contexts, use of technology, relationship to science, ideological or social function, and visual and spatial characteristics. It studies individual artists or makers, cultural institutions, audiences, and intercultural exchanges. Because the field is inherently interdisciplinary, it often engages anthropology, philosophy, political science, history, literature, film, performance, theater, and theories of race, gender, class, and sexuality.

The study of art history provides knowledge of geographically and historically diverse artworks and related cultural practices. Departmental course offerings explore these works and practices with varying intensity and specialization. The major is an essential platform for those interested in the classic art history careers. (Curatorial work in museums normally requires at least a master's degree, and college and university teaching and research require a PhD.) With its liberal arts emphasis on informed and critical reading, writing, speaking, and looking, and with its broad historical, cultural, geographic, and methodological range, the major also offers an excellent foundation for specialization in law, medicine, business, international relations, politics, education, and other areas. The Department of Art History offers a major and a minor.

All majors are assigned a departmental advisor. They are required to confer with their departmental advisor or the Director of Undergraduate Studies at the start of the academic year and are encouraged to do so before each registration period. Those wishing to petition to graduate or to transfer credits must see the Director of Undergraduate Studies.

Programs of Study

- Art History Major (p. 196)
- Art History Minor (p. 196)

ART_HIST 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

ART_HIST 210-0 Introduction to Art History (1 Unit) Conceptual introduction to the problems and methods of art history. Introduces professors and their areas of expertise as well as fundamental concepts,

monuments, and objects in art history. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

ART_HIST 220-0 Introduction to African Art (1 Unit) Thematic and historical survey of the major periods of art making in Africa; analysis of a few exemplary works. *Literature Fine Arts Distro Area*

ART_HIST 222-0 Introduction to Art of the African Diaspora (1 Unit) Introduction to the visual and performance art of the African diaspora, including the Caribbean, Brazil, and the United States. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

ART_HIST 224-0 Introduction to Ancient Art (1 Unit) Introduction to the art and architecture of the ancient Near Eastern, Egyptian, Aegean, Greek, and Roman worlds. *Historical Studies Distro Area Literature Fine Arts Distro Area*

ART_HIST 225-0 Introduction to Medieval Art (1 Unit) Introduction to the art and architecture of the medieval Mediterranean from the late Antique, Byzantine, and Islamic periods through the early medieval, Romanesque, and Gothic artistic traditions. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

ART_HIST 228-0 Introduction to Pre-Columbian Art (1 Unit) 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. *Literature Fine Arts Distro Area*

ART_HIST 230-0 Introduction to American Art (1 Unit) Survey of art and architecture in cultural context, from the art of conquest to contemporary production. *Literature Fine Arts Distro Area*

ART_HIST 232-0 Introduction to the History of Architecture and Design (1 Unit) The theory and history of architecture in relation to cities and landscape; the history of design, 1850 to today. *Literature Fine Arts Distro Area*

ART_HIST 235-0 Introduction to Latin American Art (1 Unit) Survey of the work of artists and groups from throughout the various countries of Central and South America from colonial times to the present. *Literature Fine Arts Distro Area*

ART_HIST 240-0 Introduction to Asian Art (1 Unit) Introduction to the art and architecture of Asia from ancient cultures to contemporary developments, including religious, court, and popular genres. Depending on the instructor, this course covers South/Southeast Asia or East Asia. *Literature Fine Arts Distro Area*

ART_HIST 250-0 Introduction to European Art (1 Unit) Leading centers and artists of Europe from the later Middle Ages to the 19th century. Architecture, sculpture, painting, and graphic arts in relation to their social and cultural settings. *Historical Studies Distro Area Literature Fine Arts Distro Area*

ART_HIST 255-0 Introduction to Modernism (1 Unit) Conceptual introduction to modernism, covering art and visual culture from the late-19th century to the mid-20th century, with a focus on Europe and the United States. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

ART_HIST 260-0 Introduction to Contemporary Art (1 Unit) Conceptual and thematic introduction to art since the 1960s, with attention to the impact of new technologies, social and political change, globalization,

and the ongoing transformation of artistic production and distribution. *Historical Studies Distro Area Literature Fine Arts Distro Area*

ART_HIST 310-1 Ancient Art: Greece (1 Unit) Art and architecture of the Ancient Greco-Roman World. Greece from the prehistoric Aegean to the Hellenistic periods. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 310-2 Ancient Art (1 Unit) Art and architecture of the Ancient Greco-Roman world. Art and architecture of the Roman world from Etruscan forerunners to the High Empire. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 318-0 Exhibiting Antiquity: The Culture and Politics of Display (1 Unit) Examination of the construction of Mediterranean antiquity through modes of reception since 1750. Analysis of programs of collecting and display and the intersection of institutional and scholarly agendas. ART_HIST 318-0, CLASSICS 397-0 and HUM 397-0 taught together; may receive credit for only 1 of these courses. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

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

ART_HIST 320-1 Medieval Art Byzantine (1 Unit) Art and architecture of the Middle Ages. Byzantine. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

ART_HIST 320-2 Medieval Art: Early Medieval (1 Unit) Art and architecture of the Middle Ages. Early medieval. *Literature Fine Arts Distro Area*

ART_HIST 320-3 Medieval Art: Late Medieval (1 Unit) Art and architecture of the Middle Ages. Late medieval. Prerequisite: 200-level art history course. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

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

ART_HIST 330-1 Renaissance Art c. 1300-1550 (High Renaissance) (1 Unit) Painting, sculpture, architecture, and the graphic arts in Europe from c.1300-1550 (High Renaissance). Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 330-2 Renaissance and Mannerism: Southern European Art 1400-1600 (1 Unit) Painting, sculpture, architecture, and the graphic arts in Southern Europe from 1400-1600. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 330-3 Renaissance and Mannerism: Northern European Art 1400-1600 (1 Unit) Painting, sculpture, architecture, and the graphic arts in Northern Europe from 1400-1600. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

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

ART_HIST 340-1 Baroque Art: Southern Europe 1600-1700 (1 Unit)

Painting, sculpture, and the graphic arts in Southern Europe from 1600-1700. Prerequisite: 200-level art history course. *Historical Studies Distro Area Literature Fine Arts Distro Area*

ART_HIST 340-2 Baroque Art: Northern Europe 1600-1700 (1 Unit)

Painting, sculpture, and the graphic arts in Northern Europe from 1600-1700. Prerequisite: 200-level art history course. *Historical Studies Distro Area Literature Fine Arts Distro Area*

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

ART_HIST 350-1 19th Century Art 1: Late 18th Century-1848 (1 Unit)

Survey of European painting and sculpture. The late 18th century to 1848. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 350-2 19th Century Art 2: 1848-1900 (1 Unit)

Survey of European painting and sculpture. 1848-1900. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

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

ART_HIST 360-1 20th Century Art 1 (1 Unit)

Painting, sculpture, architecture, design, and visual culture of the 20th century. 1900-1945. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 360-2 20th Century European Art (1 Unit) Painting, sculpture, architecture, design, and visual culture of the 20th century. Post-World War II. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 365-1 American Art I (1 Unit) Survey of the arts and visual culture in the United States, encompassing architecture, painting, sculpture, photography, prints, film, and popular culture. Colonial times to the Civil War. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 365-2 American Art II (1 Unit) Survey of the arts and visual culture in the United States, encompassing architecture, painting, sculpture, photography, prints, film, and popular culture. Post-Civil War. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 366-0 Contemporary Art (1 Unit) In-depth study of the art of the late 20th and early 21st centuries as seen from a global perspective and with attention to concurrent developments in critical theory. Prerequisite: 200-level art history course.

ART_HIST 367-0 Special Topics in American Art (1 Unit) 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: 200-level art history course.

ART_HIST 368-0 Special Topics in Modern Art (1 Unit) Content varies-for example, art of the Russian Revolution; the avant-garde; totalitarian art; art during war; modernism and its discontents; art and decolonization; medium specificity. Prerequisite: 200-level art history course.

ART_HIST 369-0 Special Topics in 20th Century Art (1 Unit) Content varies and may coincide with local exhibitions- for example, art and

activism; utopia and dystopia in recent practice; participatory art; video art; art criticism; globalization; visual cultural studies; photography in/as art; installation art; truth and fiction in recent practice. Prerequisite: 200-level art history course.

ART_HIST 370-1 Modern Architecture and Design (1 Unit) The history and theory of architecture, especially in relation to cities and landscape. 1800 to present. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 370-2 Modern Architecture and Design (1 Unit) The history of design, 1850 to today. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 372-1 Japanese Art (1 Unit) Survey of historical or media-specific art in Japan and Japanese culture, including, for example including painting, calligraphy, ceramics, architecture, sculpture, textiles, and gardens in religious and secular settings. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 375-0 Media Theory (1 Unit) Comprehensive introduction from a humanistic perspective to theories about the nature of media and the role of technology in modern culture. ART_HIST 375-0 and HUM 225-0 are taught together; may not receive credit for both courses. *Literature Fine Arts Distro Area*

ART_HIST 378-0 Architecture and Urbanism of the Global City in the 20th Century (1 Unit) Critical examination of the modern city as a socioeconomic system. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 379-0 Topics in Modern Architecture (1 Unit) 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: 200-level art history course.

ART_HIST 380-1 Tibetan Buddhist Art 1 (1 Unit) Focused study of Buddhist art made in Tibet and neighboring countries. Art of the Imperial period (7th-9th centuries) through the end of the 14th century, including regional developments in western Tibet. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 380-2 Tibetan Buddhist Art 2 (1 Unit) Focused study of Buddhist art made in Tibet and neighboring countries. Art of the 15th-19th centuries, including regional developments in eastern and northeastern Tibet. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 382-1 Chinese Painting (1 Unit) In-depth study of painting in China with consideration of formal and historical developments. Prerequisite: 200-level art history class. *Literature Fine Arts Distro Area*

ART_HIST 384-0 African American Art (1 Unit) Art of the African-descended cultures of North and South America and the Caribbean. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

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

ART_HIST 386-0 Art of Africa (1 Unit) Thematic and history examination of the art and visual culture of Africa at various historical moments from

the ancient periods (Nubain Egypt) through the 15th century. Prerequisite: 200-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 389-0 Special Topics: Arts of Asia and the Middle East (1 Unit) 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 20th century; art in/about the Middle East. Prerequisite: 200-level art history course.

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

ART_HIST 391-0 Art Historical Methods Seminar (1 Unit) Introduction to the history of the discipline of art history and to the different methodological approaches to the study of art and visual culture. Prerequisite: 300-level art history course.

ART_HIST 395-0 Museums (1 Unit) Museum studies seminars. Content varies-for example, the history of museums, their ethical basis, community responsibilities, educational prerogatives, and future directions. Prerequisite: 300-level art history course. *Literature Fine Arts Distro Area*

ART_HIST 396-0 Internship in the Arts (1 Unit) Direct participation, with oversight by the director of undergraduate studies, in the curatorial/ educational activities of an established arts organization. By petition, on a limited basis; may be taken only once. Prerequisite: 300-level art history course or consent of instructor.

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

Art History Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Department Courses (11 units)	
2 200-level courses	
9 300-level courses including:	
ART_HIST 391-0	Art Historical Methods Seminar
At least 1 seminar:	
ART_HIST 390-0	Undergraduate Seminar
or ART_HIST 395-0	Museums
At least 1 300-level art history course in each of the following four art historical categories: ancient or medieval; Renaissance or baroque; modern or contemporary; and non-Euro-US	
Studio Course (1 unit)	
1 course in Art Theory and Practice, or a related studio course as per DUS approval	
Related Courses (4 units)	
4 additional 200- or 300-level courses from related humanistic or social science fields; no more than 2 courses from the same department	

Honors in Art History

Majors with strong academic records and an interest in pursuing honors must submit an application to write a senior honors thesis to the director

of undergraduate studies by the end of junior year. The thesis is written in the senior year, and submitted for evaluation near Spring break. Honors also requires:

- Successful completion of 2 independent study courses (ART_HIST 399-0 Independent Study), 1 of which may count toward the major (taken in fall and winter quarters of senior year)
- Participation in the departmental senior thesis colloquium

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For further information see the description of the honors program on the art history department website (<https://www.arthistory.northwestern.edu/undergraduate/degree-requirements>), contact the director of undergraduate studies, and see Honors in the Major (p. 178).

Art History Minor

Course	Title
Minor Requirements (8 units) ¹	
2 courses at the 200 level	
6 courses at the 300 level	

¹ At least 1 300-level course must be in a non-Euro-US area.

Art Theory and Practice

art.northwestern.edu

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

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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Program of Study

- Art Theory and Practice Major (p. 197)

ART 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

ART 210-0 Introduction to Drawing (1 Unit) Introduction to basic drawing techniques and problems in line, space, perception, and the

expressive use of various graphic media. No previous experience necessary.

ART 220-0 Introduction to Painting (1 Unit) Introduction to problems in oil painting and visual thinking. Includes surface preparation, color mixing, and composition. No previous experience necessary.

ART 230-0 Introduction to Time Based Arts (1 Unit) Introduction to a wide range of time-based art practices as used in the visual arts, including performance, sound, and video. No previous experience necessary.

ART 240-0 Introduction to Sculpture (1 Unit) Introduction to basic sculptural materials and techniques and issues of three-dimensional form. No previous experience necessary.

ART 250-0 Introduction to Photography (1 Unit) Extensive darkroom instruction focusing on aesthetic problems and the production of high-quality black-and-white prints. No previous experience necessary.

ART 260-0 Studio Practice (1 Unit) Exploration of varied techniques and strategies geared toward the development of an individualized and self-directed studio practice. Prerequisite: junior standing in the major or consent of instructor.

ART 270-0 Contemporary Art Survey (1 Unit) Forms and concerns of art from the 1960s to the present, introduced in slide lecture format. *Literature Fine Arts Distro Area*

ART 272-0 Critical Methods for Contemporary Art (1 Unit) Introduction to basic key terms, concepts, and analytical categories of theoretical discourses relevant to an informed and critical engagement with contemporary art. *Literature Fine Arts Distro Area*

ART 360-0 Senior Critique (1 Unit) Students complete a body of work to be shown in the senior exhibition, develop their critical skills, and learn to give articulate verbal and written expression to the concerns their art explores. Prerequisite: ART 260-0 or consent of instructor.

ART 372-0 Seminar (1 Unit) Content varies. May be repeated for credit with different topic.

ART 382-0 Studio/Seminar (1 Unit) Content varies. May be repeated for credit with different topic.

ART 390-0 Studio (1 Unit) Content varies. May be repeated for credit with different topic.

ART 399-0 Independent Study (1 Unit) For advanced majors pursuing projects outside the context of regularly offered courses. Prerequisite: consent of department chair.

Art Theory and Practice Major

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

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Major Requirements (15 units)	
3 200-level courses	
ART 210-0	Introduction to Drawing
ART 230-0	Introduction to Time Based Arts

ART 240-0	Introduction to Sculpture
3 history and/or theory courses	
ART 270-0	Contemporary Art Survey
or ART_HIST 260-0	Introduction to Contemporary Art
and any 2 of the following	
ART 272-0	Critical Methods for Contemporary Art
or ART 372-0	Seminar
or ART 382-0	Studio/Seminar
ART 260-0	Studio Practice (in junior year)
ART 360-0	Senior Critique (in senior year)
7 additional courses in department	
4 must be studio courses	
ART 372-0, ART 382-0, and ART 390-0 may be taken more than once and counted more than once if each course is a different topic.	

- First-year seminars do not count toward the major.

Honors in Art Theory and Practice

All senior majors enroll in ART 360-0 Senior Critique and produce a final exhibition or project. The department's honors committee reviews all final projects, considering innovation, creativity, scope and ambition, and realization and presentation. Students whose projects and overall records meet department criteria are recommended to the college for graduation with departmental honors. For more information consult the department adviser and see Honors in the Major (p. 178).

Asian American Studies

asianamerican.northwestern.edu

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

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

Both the major and the minor in Asian American studies offer an opportunity to pursue a coherent study of Asian American communities and the experiences of Asian Americans in the United States. Students pursuing the major or minor engage in the interdisciplinary study of race, ethnicity, and migration within the modern global historical development of nationalism, imperialism, and colonialism.

Programs of Study

- Asian American Studies Major (p. 199)
- Asian American Studies Minor (p. 199)

ASIAN_AM 103-6 First-Year Seminar (1 Unit)

ASIAN_AM 106-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

ASIAN_AM 203-0 Topics in Asian American Social and Cultural Analysis (1 Unit) Issues and themes in Asian American society and culture. Recent topics include the Arab American studies, student protests, and minority conservatism. May be repeated for credit with a different topic. *Social Behavioral Sciences Distro Area*

ASIAN_AM 210-0 Introduction to Asian American Studies (1 Unit) Origins of the field, emerging trajectories, core concepts, theories and methodologies. Analyzes race, gender, immigration, diaspora, class, labor, and sexuality as primary subjects of the field. *Social Behavioral Sciences Distro Area*

ASIAN_AM 214-0 Introduction to Asian American History (1 Unit) 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. ASIAN_AM 214-0 and HISTORY 214-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

ASIAN_AM 216-0 Global Asians (1 Unit) Survey of Asian diasporas in the United States and elsewhere in the 19th and 20th centuries, emphasizing causes of migration, process of settlement, relations with other ethnic groups, and construction of diasporic identities. ASIAN_AM 216-0 and HISTORY 216-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

ASIAN_AM 218-0 Asian/Black Historical Relations in the U.S. (1 Unit) Comparative historical analysis of relations of these groups in the United States, including racialized and sexualized discourses structuring interracial relations and social, political, and economic location. Slavery, immigration, model minority myth, cross-racial politics. Taught with AF_AM_ST 218-0 and ASIAN_AM 218-0; may not receive credit for both courses. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Social Behavioral Sciences Distro Area*

ASIAN_AM 220-0 Topics in History (1 Unit) Exploration of theme, event, region, or historical period, with emphasis on historical interpretation. May be repeated for credit with a different topic. *Historical Studies Distro Area*

ASIAN_AM 225-0 Contemporary Issues in Asian American Communities (1 Unit) Critical examination of post-1965 Asian American communities in light of demographic, social, racial, and economic trends in the United States and Asia. *Social Behavioral Sciences Distro Area*

ASIAN_AM 235-0 Language in Asian America (1 Unit) Survey of linguistic anthropological topics relevant to Asian American communities, including bilingualism, code switching, language socialization, language shift, style, sociolinguistic variation, indexicality, media, and semiotics. ANTHRO 235-0 and ASIAN_AM 235-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

ASIAN_AM 247-0 Asian Americans and Popular Culture (1 Unit) Examination of the varied roles of Asian Americans in U.S. popular culture, from representations to cultural production, historically and today. *Literature Fine Arts Distro Area*

ASIAN_AM 251-0 The Mixed Race Experience (1 Unit) Exploration of demographic trends in interracial and interethnic marriages to highlight the complexity of the American experience. Special attention to mixed-race experiences portrayed in film and novels. AF_AM_ST 251-0 and ASIAN_AM 251-0 are taught together; students may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

ASIAN_AM 275-0 Introduction to Asian American Literature (1 Unit) Introduction to Asian American literature from the late 19th century to the present, covering a range of genres and ethnicities. ASIAN_AM 275-0 and ENGLISH 275-0 are taught together; may not receive credit for both courses. *Literature Fine Arts Distro Area*

ASIAN_AM 276-0 Topics in Literary and Cultural Studies (1 Unit) Close study of Asian American literary and cultural texts within a theme, genre, or other organizing criterion. May be repeated for credit with a different topic. *Literature Fine Arts Distro Area*

ASIAN_AM 303-0 Advanced Topics in Social and Cultural Analysis (1 Unit) Detailed exploration of an issue and its ramifications in Asian American society and culture. May be repeated for credit with a different topic. *Social Behavioral Sciences Distro Area*

ASIAN_AM 304-0 Asian American Women's History (1 Unit) Exploration of race, gender, and the contours of US history from the perspective of Asian American women's experiences. Considers migration, exclusion, labor, marriage, family, sexuality, and cross-racial alliances. ASIAN_AM 304-0 and HISTORY 304-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

ASIAN_AM 310-0 Contemporary Asian Black Relations (1 Unit) Divides between these groups, as well as areas of positive cross-cultural collaboration. Historical analysis of reparations, the 1992 Los Angeles riots, and affirmative action. Cross-racial exchange in youth expressions, popular culture, hip-hop. AF_AM_ST 310-0 and ASIAN_AM 310-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area*

ASIAN_AM 320-0 Advanced Topics in History (1 Unit) Close study of Asian American history within a theme, event, or other organizing criterion, with emphasis on primary documents, historical interpretation, and research. May be repeated for credit with a different topic. *Historical Studies Distro Area*

ASIAN_AM 350-0 Asian American Religions (1 Unit) Analysis of the role of religion in Asian American communities; how experiences as immigrants and as racial and ethnic minorities shape religious practices, communities, theologies, and identities. *Ethics Values Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Social Behavioral Sciences Distro Area*

ASIAN_AM 360-0 Studies in Race, Gender, and Sexuality (1 Unit) Exploration of the intersections of gender, race, and sexuality, the construction of masculinity and femininity, and the role of gender and sexuality in the life experiences of Asian Americans. May be repeated for credit with a different topic. *Social Behavioral Sciences Distro Area*

ASIAN_AM 365-0 Language, Race, and Ethnicity in the U.S. (1 Unit) Analysis of connections between language ideologies, language use, and meanings of race and ethnicity. Bilingualism, immigration, identity, accented English, African American English, language policy, English only movement, education, social change. ASIAN_AM 365-0 and ANTHRO 365-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

ASIAN_AM 370-0 Studies in Diaspora (1 Unit) 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. May be repeated for credit with a different topic. *Social Behavioral Sciences Distro Area*

ASIAN_AM 376-0 Advanced Topics in Literary and Cultural Studies (1 Unit) Close study of Asian American literary and cultural texts within a theme, genre, or other organizing criterion, with an emphasis on theory and its application. May be repeated for credit with a different topic.
Literature Fine Arts Distro Area

ASIAN_AM 377-0 The American Century in Asia (1 Unit) Examination of US-Asia connections through history and representations of US wars in cultural and historical texts. *Literature Fine Arts Distro Area*

ASIAN_AM 380-0 Studies in Arts and Performance (1 Unit) 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 a different topic.
Literature Fine Arts Distro Area

ASIAN_AM 392-0 Seminar in Asian American Studies (1 Unit) 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 (1 Unit) Readings and conferences on special subjects for students pursuing areas of interest in Asian American studies.

Asian American Studies Major

Students majoring in Asian American studies must complete 14 courses and an immersion project.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Program Courses (12 units)	
2 core courses chosen from:	
ASIAN_AM 210-0	Introduction to Asian American Studies
ASIAN_AM 214-0	Introduction to Asian American History
ASIAN_AM 216-0	Global Asians
ASIAN_AM 275-0	Introduction to Asian American Literature
4 introductory electives ¹	
6 advanced electives ²	
Related Courses (2 units)	
2 courses in other areas of ethnic studies, such as African American, Latina/o, Native American and indigenous, or critical ethnic studies. Eligible courses are offered by several academic departments and programs. ³	

¹ All 200-level program courses (ASIAN_AM) count toward this requirement, but a course may not be counted toward both this requirement and the 2-course core.

² All 300-level program courses (ASIAN_AM) count toward this requirement.

³ Courses require approval by the major adviser, director of undergraduate studies, or program director. First-year seminar courses do not count toward the major.

Immersion Project

The immersion component is designed to encourage either advanced research or in-depth community engagement.

- All immersion projects must be approved in advance by the major adviser, director of undergraduate studies, or program director.

- No more than 2 units of credit earned through the immersion project may count toward the 14 units required for the major.
- Options for immersion projects are listed below. The first three options require a faculty sponsor or adviser drawn from program faculty (including affiliated faculty).
 - Senior thesis in Asian American studies
 - Independently proposed research project
 - Independently proposed internship at an Asian American community organization or other nonprofit whose work involves Asian American issues; must include a strong academic component with research and substantive written work
- SESP 299-1 Civic Engagement Capstone Research, SESP 299-2 Certificate in Civic Engagement- Capstone Project related to Asian American communities and issues
- Study abroad courses on Asian diasporas
- Chicago Field Studies (p. 218) in a field related to Asian American Studies

Honors in Asian 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, selecting a thesis adviser from among core and affiliated faculty. Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information see the director of undergraduate studies or program director. Also see Honors in the Major (p. 178).

Asian American Studies Minor

Course	Title
Minor Requirements (7 units) ¹	
1 core course chosen from the following:	
ASIAN_AM 210-0	Introduction to Asian American Studies
ASIAN_AM 214-0	Introduction to Asian American History
or HISTORY 214-0	Asian American History
ASIAN_AM 275-0	Introduction to Asian American Literature
or ENGLISH 275-0	Introduction to Asian American Literature
5 additional courses in Asian American Studies. ²	
1 course in a discipline other than Asian American studies that focuses on race and ethnicity; it should provide conceptual and comparative breadth concerning a topic related to Asian American studies.	

¹ At least 3 of the 7 courses must be at the 300 level.

² At most 2 courses from other programs and departments with significant coverage of Asian American issues may count toward the 5 courses with permission of the program director or the director of undergraduate studies.

Asian Languages and Cultures

alc.northwestern.edu

The Department of Asian Languages and Cultures focuses on Asian humanities and languages past and present. Its courses provide students with opportunities to attain linguistic and transcultural competence in one or more of four language areas and to better appreciate Asia as a dynamic site of cultural and linguistic interaction.

The department offers a major in Asian languages and cultures with five areas of focus (Chinese, Hindi-Urdu, Japanese, Korean, and comparative),

as well as two minors: The Advanced Asian Languages Minor (formerly the Asian Languages Minor), which emphasizes language training while allowing students to learn more about the culture of their area of linguistic focus (Chinese, Hindi-Urdu, Japanese, Korean), and the Asian Humanities Minor, which allows students explore interdisciplinary perspectives on the Asian humanities without additional language training. Students majoring in Asian Languages and Cultures (non Comparative tracks) may also earn an Advanced Asian Languages Minor in a separate Asian language or an Asian Humanities Minor, provided they do not double-count courses toward both the major and the minor.

When they graduate, Asian Languages and Cultures majors and Advanced Asian Languages minors will have proficiency in the four core skills of speaking, listening, reading, and writing in an Asian language. They should be able to understand spoken language in conversations and a variety of media; read literature, newspapers, and magazines; and speak and write in formal and informal language. In addition to these core linguistic skills, students will gain sophisticated understanding of the culture of their area or region of focus. Cultural literacy includes knowledge of classical and modern literary texts and visual culture; the ability to analyze and interpret texts orally and in writing; understanding and experience of cultural practices; and the ability to conduct independent research.

Students are encouraged to study abroad, though it is important that they consult with both the study abroad coordinator for their area as well as the director of undergraduate studies before leaving Northwestern.

Language Curricula

The Department of Asian Languages and Cultures offers Chinese, Hindi-Urdu, Japanese, and Korean language courses from beginning through advanced levels.

Chinese Language

General language courses are offered in two tracks -- the regular and the accelerated tracks. The accelerated track is designed for students with uneven language skills -- They have some speaking proficiency but limited or no reading and/or writing proficiency. The accelerated track typically serves heritage language learners, but other students with a similar linguistic profile may be placed into the track. The two tracks are separate, and students cannot move between the tracks. In addition to general language courses, business Chinese courses are also offered at the intermediate to advanced levels.

Regular Track

Courses listed in the same row are year-long sequence, which starts in the fall quarter. Students who have completed CHINESE 311-1,2,3 may move to CHINESE 315 in the accelerated track.

Course	Title
CHINESE 111-1 & CHINESE 111-2 & CHINESE 111-3	Chinese I and Chinese I and Chinese I
CHINESE 121-1 & CHINESE 121-2 & CHINESE 121-3	Chinese II and Chinese II and Chinese II
CHINESE 211-1 & CHINESE 211-2 & CHINESE 211-3	Chinese III and Chinese III and Chinese III
CHINESE 311-1	Chinese IV: Formal Speaking
CHINESE 311-2	Chinese IV: Formal Writing

CHINESE 311-3	Chinese IV: Formal Reading
CHINESE 399-0	Independent Study

Accelerated Track

Courses listed in the same row are year-long sequence, which starts in the fall quarter.

Course	Title
CHINESE 115-1 & CHINESE 115-2 & CHINESE 115-3	Chinese I - Accelerated and Chinese I - Accelerated and Chinese I - Accelerated
CHINESE 125-1 & CHINESE 125-2 & CHINESE 125-3	Chinese II - Accelerated and Chinese II - Accelerated and Chinese II - Accelerated
CHINESE 215-1 & CHINESE 215-2 & CHINESE 215-3	Chinese III - Accelerated and Chinese III - Accelerated and Chinese III - Accelerated
CHINESE 315-1	Chinese IV - Accelerated: Formal Writing and Public Speaking
CHINESE 315-2	Chinese IV - Accelerated: Advanced Reading and Writing
CHINESE 315-3	Chinese IV - Accelerated: Media & Society
CHINESE 320-0	Chinese V: Special Topics in Advanced Chinese
CHINESE 399-0	Independent Study

Business Chinese

Course	Title
CHINESE 212-0	Chinese in Business Practice 1
CHINESE 312-1	Chinese in Business Practice 2
CHINESE 312-2	Multinational Corporations in China

Hindi-Urdu Language

All students taking classes in the Hindi-Urdu Language Program will learn to read and write both the Devanagari and Nastaliq scripts, and grammar and vocabulary common to both as well as specific to each.

Courses listed in the same row are year-long sequence, which starts in the fall quarter.

Course	Title
HIND_URD 111-1 & HIND_URD 111-2 & HIND_URD 111-3	Hindi-Urdu I and Hindi-Urdu I and Hindi-Urdu I
HIND_URD 116-0	Accelerated Hindi-Urdu Literacy
HIND_URD 121-1 & HIND_URD 121-2 & HIND_URD 121-3	Hindi-Urdu II and Hindi-Urdu II and Hindi-Urdu II
HIND_URD 211-1	Hindi-Urdu III
HIND_URD 211-2	Hindi-Urdu III
HIND_URD 211-3	Hindi-Urdu III
HIND_URD 310-0	Hindi-Urdu IV
HIND_URD 399-0	Independent Study

Japanese Language

Courses listed in the same row are year-long sequence, which starts in the fall quarter.

Course	Title
JAPANESE 111-1 & JAPANESE 111-2 & JAPANESE 111-3	Japanese I and Japanese I and Japanese I

JAPANESE 121-1 & JAPANESE 121-2 & JAPANESE 121-3	Japanese II and Japanese II and Japanese II
JAPANESE 211-1 & JAPANESE 211-2 & JAPANESE 211-3	Japanese III and Japanese III and Japanese III
JAPANESE 310-0	Japanese IV: Special Topics in Reading Japanese Literature in Japanese
JAPANESE 311-1	Japanese IV: Reading Modern Japanese Literature in Japanese
JAPANESE 312-1	Japanese IV: Contemporary Japanese Literary Works for Reading & Discussion
JAPANESE 313-1	Japanese IV: Japanese Newspaper Reading and News Listening
JAPANESE 314-1	Japanese IV: Japanese Essay Writing
JAPANESE 399-0	Independent Study

Korean Language

Courses listed in the same row are year-long sequence, which starts in the fall quarter.

Course	Title
KOREAN 111-1 & KOREAN 111-2 & KOREAN 111-3	Korean I and Korean I and Korean I
KOREAN 121-1 & KOREAN 121-2 & KOREAN 121-3	Korean II and Korean II and Korean II
KOREAN 125-1 & KOREAN 125-2	Korean II - Accelerated and Korean II - Accelerated
KOREAN 211-1 & KOREAN 211-2 & KOREAN 211-3	Korean III and Korean III and Korean III
KOREAN 311-1	Korean IV: Readings in Korean Literature
KOREAN 311-2	Korean IV: Korean through Movies
KOREAN 311-3	Korean IV: Topics in the News
KOREAN 399-0	Independent Study

Programs of Study

- Asian Languages and Cultures Major (p. 204)
- Asian Humanities Minor (p. 204)
- Advanced Asian Languages Minor (p. 205)

Asian Humanities Courses

These courses are taught in English.

ASIAN_LC 110-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

ASIAN_LC 290-0 Introductory Topics in Asian Languages and Cultures (1 Unit) Content and prerequisites vary. May be repeated for credit with change of topic. *Literature Fine Arts Distro Area*

ASIAN_LC 390-0 Advanced Topics in Asian Languages and Cultures (1 Unit) Content and prerequisites vary. May be repeated for credit with change of topic. *Literature Fine Arts Distro Area*

ASIAN_LC 397-0 Senior Seminar (1 Unit) Senior capstone research course for majors; topics vary. Prerequisite: consent of instructor.

ASIAN_LC 399-0 Independent Study (1 Unit) The independent study is designed for advanced undergraduates interested in studying topics

not otherwise covered in normal ALC courses. Prerequisite: consent of director of undergraduate studies and instructor.

Language Courses

All students with prior knowledge of any of the languages offered must take the departmental placement test before registering for their first course in that language. A student must pass each language course with grade of C- or above to enroll in the next course in sequence.

Chinese Language Courses

CHINESE 111-1 Chinese I (1 Unit) First-quarter course of the beginning college-level sequence to develop basic literacy and oral proficiency in Chinese.

CHINESE 111-2 Chinese I (1 Unit) Second-quarter course of the beginning college-level sequence to develop basic literacy and oral proficiency in Chinese. Prerequisite: grade of at least C- in CHINESE 111-1 or equivalent.

CHINESE 111-3 Chinese I (1 Unit) Third-quarter course of the beginning college-level sequence to develop basic literacy and oral proficiency in Chinese. Prerequisite: grade of at least C- in CHINESE 111-2 or equivalent.

CHINESE 115-1 Chinese I - Accelerated (1 Unit) First-quarter course of the accelerated beginning college-level sequence to develop basic literacy and oral proficiency in Chinese. Prerequisite: consent of department.

CHINESE 115-2 Chinese I - Accelerated (1 Unit) Second-quarter course of the accelerated beginning college-level sequence to develop basic literacy and oral proficiency in Chinese. Prerequisite: grade of at least C- in CHINESE 115-1 or equivalent.

CHINESE 115-3 Chinese I - Accelerated (1 Unit) Third-quarter course of the accelerated beginning college-level sequence to develop basic literacy and oral proficiency in Chinese. Prerequisite: grade of at least C- in CHINESE 115-2 or equivalent.

CHINESE 121-1 Chinese II (1 Unit) First-quarter course of the second-year Chinese sequence to further develop basic literacy and oral proficiency. Prerequisite: grade of at least C- in CHINESE 111-3 or equivalent.

CHINESE 121-2 Chinese II (1 Unit) Second-quarter course of the second-year Chinese sequence to further develop basic literacy and oral proficiency. Prerequisite: grade of at least C- in CHINESE 121-1 or equivalent.

CHINESE 121-3 Chinese II (1 Unit) Third-quarter course of the second-year Chinese sequence to further develop basic literacy and oral proficiency. Prerequisite: grade of at least C- in CHINESE 121-2 or equivalent.

CHINESE 125-1 Chinese II - Accelerated (1 Unit) First-quarter course of the accelerated intermediate-level sequence with emphasis on reading and writing. Prerequisite: grade of at least C- in CHINESE 115-3 or equivalent.

CHINESE 125-2 Chinese II - Accelerated (1 Unit) Second-quarter course of the accelerated intermediate-level sequence with emphasis on reading and writing. Prerequisite: grade of at least C- in CHINESE 125-1 or equivalent.

CHINESE 125-3 Chinese II - Accelerated (1 Unit) Third-quarter course of the accelerated intermediate-level sequence with emphasis on reading and writing. Prerequisite: grade of at least C- in CHINESE 125-2 or equivalent.

CHINESE 211-1 Chinese III (1 Unit) First-quarter course of the intermediate-level sequence to further develop literacy and oral proficiency. Prerequisite: grade of at least C- in CHINESE 121-3 or equivalent.

CHINESE 211-2 Chinese III (1 Unit) Second-quarter course of the intermediate-level sequence to further develop literacy and oral proficiency. Prerequisite: grade of at least C- in CHINESE 211-1 or equivalent.

CHINESE 211-3 Chinese III (1 Unit) Third-quarter course of the intermediate-level sequence to further develop literacy and oral proficiency. Prerequisite: grade of at least C- in CHINESE 211-2 or equivalent.

CHINESE 212-0 Chinese in Business Practice 1 (1 Unit) Basic business Chinese focused on professional settings. For students interested in using business-related texts to learn Chinese or aspiring to China-focused careers. Prerequisite: grade of at least C- in CHINESE 125-2, CHINESE 211-2 or equivalent.

CHINESE 215-1 Chinese III - Accelerated (1 Unit) First-quarter course of the accelerated intermediate toward advanced-level sequence with emphasis on formal speaking and writing. Prerequisite: grade of at least C- in CHINESE 125-3 or equivalent.

CHINESE 215-2 Chinese III - Accelerated (1 Unit) Second-quarter course of the accelerated intermediate toward advanced-level sequence with emphasis on formal speaking and writing. Prerequisite: grade of at least C- in CHINESE 215-1 or equivalent.

CHINESE 215-3 Chinese III - Accelerated (1 Unit) Third-quarter course of the accelerated intermediate toward advanced-level sequence with emphasis on formal speaking and writing. Prerequisite: grade of at least C- in CHINESE 215-2 or equivalent.

CHINESE 311-1 Chinese IV: Formal Speaking (1 Unit) Development of skills in speaking formal Chinese. Prerequisite: grade of at least C- in CHINESE 211-3 or 212-0, or equivalent.

CHINESE 311-2 Chinese IV: Formal Writing (1 Unit) Development of skills in writing formal Chinese. Prerequisite: grade of at least C- in CHINESE 211-3 or 212-0, or equivalent.

CHINESE 311-3 Chinese IV: Formal Reading (1 Unit) Development of skills in reading different types of authentic Chinese works. Prerequisite: grade of at least C- in CHINESE 211-3 or 212-0, or equivalent.

CHINESE 312-1 Chinese in Business Practice 2 (1 Unit) Training for professional tasks using Chinese. Especially for students who completed CHINESE 212-0 or aspire to China-focused careers or to becoming multi-proficient business professionals. Prerequisite: grade of at least C- in CHINESE 125-3, CHINESE 211-3, CHINESE 212-0 or equivalent.

CHINESE 312-2 Multinational Corporations in China (1 Unit) Training in business reading skills, with a focus on case studies, and speaking/writing skills for discussing business topics professionally. Designed for students interested in China's economic development and using Chinese

in their careers. Prerequisite: grade of at least C- in CHINESE 125-3, CHINESE 211-3, CHINESE 212-0 or equivalent.

CHINESE 315-1 Chinese IV - Accelerated: Formal Writing and Public Speaking (1 Unit) Development of writing and speaking skills in formal Chinese to a near-native level. Prerequisite: grade of at least C- in three of CHINESE 311-1, CHINESE 311-2, CHINESE 311-3, CHINESE 312-1, CHINESE 312-2, or in CHINESE 215-3 or equivalent.

CHINESE 315-2 Chinese IV - Accelerated: Advanced Reading and Writing (1 Unit) Development of skills in reading and writing formal Chinese to a near-native level. Prerequisite: grade of at least C- in three of CHINESE 311-1, CHINESE 311-2, CHINESE 311-3, CHINESE 312-1, CHINESE 312-2, or in CHINESE 215-3 or equivalent.

CHINESE 315-3 Chinese IV - Accelerated: Media & Society (1 Unit) Development of skills in reading primary sociocultural sources to a near-native level. Prerequisite: grade of at least C- in three of CHINESE 311-1, CHINESE 311-2, CHINESE 311-3, CHINESE 312-1, CHINESE 312-2, or in CHINESE 215-3 or equivalent.

CHINESE 320-0 Chinese V: Special Topics in Advanced Chinese (1 Unit) Standalone topics course using films, audiovisual materials, and texts in primary sources to develop ability to analyze diverse textual logic, language patterns, and cultural features. May be repeated for credit with change of topic. Prerequisite: grade of at least C- in three of CHINESE 315-1, CHINESE 315-2, CHINESE 315-3 or equivalent.

CHINESE 399-0 Independent Study (1 Unit) For students who have advanced with distinction beyond the regular course offerings in Chinese. Prerequisite: consent of department.

Hindi-Urdu Language Courses

HIND_URD 111-1 Hindi-Urdu I (1 Unit) Beginning college-level sequence to develop basic literacy and oral proficiency in Hindi-Urdu.

HIND_URD 111-2 Hindi-Urdu I (1 Unit) Beginning college-level sequence to develop basic literacy and oral proficiency in Hindi-Urdu. Prerequisite: grade of at least C- in HIND_URD 111-1 or equivalent.

HIND_URD 111-3 Hindi-Urdu I (1 Unit) Beginning college-level sequence to develop basic literacy and oral proficiency in Hindi-Urdu. Prerequisite: grade of at least C- in HIND_URD 111-2 or equivalent.

HIND_URD 116-0 Accelerated Hindi-Urdu Literacy (1 Unit) One-quarter course for speakers of Hindi-Urdu with no literacy skills. Devanagari and Nastaliq scripts; broad overview of Hindi-Urdu grammar. Prerequisite: consent of department.

HIND_URD 121-1 Hindi-Urdu II (1 Unit) Intermediate-level sequence developing literacy and oral proficiency in Hindi-Urdu. Prerequisite: grade of at least C- in HIND_URD 111-3 or equivalent.

HIND_URD 121-2 Hindi-Urdu II (1 Unit) Intermediate-level sequence developing literacy and oral proficiency in Hindi-Urdu. Prerequisite: grade of at least C- in HIND_URD 121-1 or equivalent.

HIND_URD 121-3 Hindi-Urdu II (1 Unit) Intermediate-level sequence developing literacy and oral proficiency in Hindi-Urdu. Prerequisite: grade of at least C- in HIND_URD 121-2 or equivalent.

HIND_URD 211-1 Hindi-Urdu III (1 Unit) Intermediate-to-early-advanced-level stand-alone courses that can be taken in any order. Focus on social

and cultural issues and language for discussing them. Prerequisite: grade of at least C- in HIND_URD 121-3 or equivalent.

HIND_URD 211-2 Hindi-Urdu III (1 Unit) Intermediate-to-early-advanced-level stand-alone courses that can be taken in any order. Focus on social and cultural issues and language for discussing them. Prerequisite: grade of at least C- in HIND_URD 121-3 or equivalent.

HIND_URD 211-3 Hindi-Urdu III (1 Unit) Intermediate-to-early-advanced-level stand-alone courses that can be taken in any order. Focus on social and cultural issues and language for discussing them. Prerequisite: grade of at least C- in HIND_URD 121-3 or equivalent.

HIND_URD 310-0 Hindi-Urdu IV (1 Unit) Standalone course focused on literature and culture. Emphasis on reading, writing about, and discussing literary culture. May be repeated for credit with change of topic. Prerequisites: grade of at least C- in HIND_URD 211-1, HIND_URD 211-2, HIND_URD 211-3 or equivalent.

HIND_URD 399-0 Independent Study (1 Unit) For students who have advanced with distinction beyond the regular course offerings in Hindi Urdu. Prerequisite: consent of department.

Japanese Language Courses

JAPANESE 111-1 Japanese I (1 Unit) First-quarter course of the beginning college-level sequence to develop basic literacy and oral proficiency in Japanese. This course introduces the Hiragana and Katakana syllabaries and Kanji (Chinese characters).

JAPANESE 111-2 Japanese I (1 Unit) Second-quarter course of the beginning college-level sequence to develop basic literacy and oral proficiency in Japanese. Prerequisite: grade of at least C- in JAPANESE 111-1 or equivalent.

JAPANESE 111-3 Japanese I (1 Unit) Third-quarter course of the beginning college-level sequence to develop basic literacy and oral proficiency in Japanese. Prerequisite: grade of at least C- in JAPANESE 111-2 or equivalent.

JAPANESE 121-1 Japanese II (1 Unit) First-quarter course of the second-year Japanese to further develop basic literacy and oral proficiency. Prerequisite: grade of at least C- in JAPANESE 111-3 or equivalent.

JAPANESE 121-2 Japanese II (1 Unit) Second-quarter course of the second-year Japanese to further develop basic literacy and oral proficiency. Prerequisite: grade of at least C- in JAPANESE 121-1 or equivalent.

JAPANESE 121-3 Japanese II (1 Unit) Third-quarter course of the second-year Japanese to further develop basic literacy and oral proficiency. Prerequisite: grade of at least C- in JAPANESE 121-2 or equivalent.

JAPANESE 211-1 Japanese III (1 Unit) First-quarter course of the intermediate-level sequence to further develop literacy and oral proficiency. Focus on social and cultural issues and language for discussing them. Prerequisite: grade of at least C- in JAPANESE 121-3 or equivalent.

JAPANESE 211-2 Japanese III (1 Unit) Second-quarter course of the intermediate-level sequence to further develop literacy and oral proficiency. Focus on social and cultural issues and language for

discussing them. Prerequisite: grade of at least C- in JAPANESE 211-1 or equivalent.

JAPANESE 211-3 Japanese III (1 Unit) Third-quarter course of the intermediate-level sequence to further develop literacy and oral proficiency. Focus on social and cultural issues and language for discussing them. Prerequisite: grade of at least C- in JAPANESE 211-2 or equivalent.

JAPANESE 310-0 Japanese IV: Special Topics in Reading Japanese Literature in Japanese (1 Unit) Reading of original texts of Japanese literature, criticism, and nonfiction focused on particular themes. Translation skills are emphasized; discussion in English. Prerequisite: grade of at least C- in JAPANESE 211-3 or equivalent. *Literature Fine Arts Distro Area*

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

JAPANESE 312-1 Japanese IV: Contemporary Japanese Literary Works for Reading & Discussion (1 Unit) Focus on reading contemporary Japanese poems, essays, short stories, and novels; discussion in Japanese. Prerequisite: grade of at least C- in JAPANESE 211-3 or equivalent.

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

JAPANESE 314-1 Japanese IV: Japanese Essay Writing (1 Unit) Focus on refining writing skills-narrative, descriptive, persuasive, and argumentative. Review of grammar and expressions through writing clinics. Prerequisite: grade of at least C- in JAPANESE 211-3 or equivalent.

JAPANESE 399-0 Independent Study (1 Unit) For students who have advanced with distinction beyond the regular course offerings in Japanese. Prerequisite: consent of department.

Korean Language Courses

KOREAN 111-1 Korean I (1 Unit) First-quarter course of the beginning college-level sequence to develop basic four language skills in Korean.

KOREAN 111-2 Korean I (1 Unit) Second-quarter course of the beginning college-level sequence to develop basic four language skills in Korean. Prerequisite: grade of at least C- in KOREAN 111-1 or equivalent.

KOREAN 111-3 Korean I (1 Unit) Third-quarter course of the beginning college-level sequence to develop basic four language skills in Korean. Prerequisite: grade of at least C- in KOREAN 111-2 or equivalent.

KOREAN 121-1 Korean II (1 Unit) First-quarter course of the second-year Korean sequence to further develop four language skills in Korean. Prerequisite: grade of at least C- in KOREAN 111-3 or equivalent.

KOREAN 121-2 Korean II (1 Unit) Second-quarter course of the second-year Korean sequence to further develop four language skills in Korean. Prerequisite: grade of at least C- in KOREAN 121-1 or equivalent.

KOREAN 121-3 Korean II (1 Unit) Third-quarter course of the second-year Korean sequence to further develop four language skills in Korean. Prerequisite: grade of at least C- in KOREAN 121-2 or equivalent.

KOREAN 125-1 Korean II - Accelerated (1 Unit) First-quarter course of the accelerated intermediate-level sequence for heritage learners to further develop four language skills. Prerequisite: consent of department.

KOREAN 125-2 Korean II - Accelerated (1 Unit) Second-quarter course of the accelerated intermediate-level sequence for heritage learners to further develop four language skills in Korean. Prerequisite: grade of at least C- in KOREAN 125-1 or equivalent.

KOREAN 211-1 Korean III (1 Unit) First-quarter course of the intermediate-toward-advanced level sequence to further develop four language skills in Korean. Prerequisite: grade of at least C- in KOREAN 121-3, or in KOREAN 125-3 if taken prior to 2016-17, or in KOREAN 125-2 if taken in 2016-17 or later; or equivalent.

KOREAN 211-2 Korean III (1 Unit) Second-quarter course of the intermediate-toward-advanced level sequence to further develop four language skills in Korean. Prerequisite: grade of at least C- in KOREAN 211-1 or equivalent.

KOREAN 211-3 Korean III (1 Unit) Third-quarter course of the intermediate-toward-advanced level sequence to further develop four language skills in Korean. Prerequisite: grade of at least C- in KOREAN 211-2 or equivalent.

KOREAN 311-1 Korean IV: Readings in Korean Literature (1 Unit) Reading literature in Korean to further develop literacy skills and understanding of Korean culture and society. Prerequisite: grade of at least C- in KOREAN 211-3 or equivalent

KOREAN 311-2 Korean IV: Korean through Movies (1 Unit) Through Korean films and documentaries, improving oral and writing proficiency, and gaining the knowledge of Korean history, culture, and society. Prerequisite: grade of at least C- in KOREAN 211-3 or equivalent

KOREAN 311-3 Korean IV: Topics in the News (1 Unit) Through current news, improving oral and writing proficiency and better understanding Korean culture and society. Prerequisite: grade of at least C- in KOREAN 211-3 or equivalent

KOREAN 399-0 Independent Study (1 Unit) For students who have advanced with distinction beyond the regular course offerings in Korean. Prerequisite: consent of department.

Asian Languages and Cultures Major

The Asian Languages and Cultures major is designed for students who wish to combine proficiency in an Asian language or languages (Chinese, Hindi-Urdu, Japanese, Korean) with rigorous training in the humanistic study of an Asian culture or cultures (China, Japan, Korean, South Asia or Comparative). In addition to developing the four core linguistic skills (speaking, listening, reading, and writing), students will acquire the cultural literacy necessary for effective communication and sophisticated understanding of at least one cultural sphere or region of Asia. The humanities component of the major is designed to introduce students to advanced methods of critical reading, viewing, interpretation and academic writing through training in literary studies, film and media studies, gender studies and cultural studies, among other approaches.

While most Asian Languages and Cultures majors focus on one Asian language and area of focus, the major is also designed to accommodate

students who wish to work comparatively withing or between regions. For example, students may combine the study of Korean and Japanese language and culture or explore colonial and post-colonial experiences in East and South Asia. Students interested in pursuing a comparative focus will work closely with the director of undergraduate studies to develop a coherent course of study.

Students may apply for (but are not guaranteed) language credit towards the major for courses taken while studying abroad (Placement test upon return in required.) Pending departmental review of relevant course materials and the approval of the director of undergraduate studies, up to 2 humanities courses taken while studying abroad may also be counted toward the major. For more information about the review process, please contact the director of undergraduate studies and refer to the relevant section of the department's website (<http://www.alc.northwestern.edu/undergraduate/majors-minors>).

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Major Requirements (15 units)	
Prerequisites:	
For students focusing on a single language/area, a first year language course or equivalent proficiency is required. For students working comparatively, there are no prerequisites.	
Required Language Courses (6 units):	
3 courses in Chinese, Hindi-Urdu, Japanese or Korean at the second-year level	
3 courses in the same language at the third-year level OR 3 courses in an additional Asian language at the first-year level or higher	
Humanities Courses (9 units): 200- and 300-level ASIAN_LC courses	
6 ASIAN_LC courses selected in consultation with the director of undergraduate studies to represent an area of focus (China, Japan, Korea, South Asia or comparative), of which:	
At least 3 must be at the 300-level	
At most 2 may be relevant courses from outside the department selected from the list of pre-approved courses or in consultation with the director of undergraduate studies	
2 ASIAN_LC courses from outside the area of focus, selected in consultation with the director of undergraduate studies	
1 Senior Seminar (ASIAN_LC 397-0)	

Honors in Asian Languages and Cultures

Majors with a strong academic record (a GPA of 3.5 both in the major and overall) and interest in writing an honors thesis should contact the director of undergraduate studies in spring of junior year. Students who are approved to write an honors thesis must take two quarters of ASIAN_LC 399-0 Independent Study in addition to the 15 courses required for the major. For more information, please contact the director of undergraduate studies, review the department's website (<http://www.alc.northwestern.edu/undergraduate/majors-minors/honors-program.html>), and see Honors in the Major (p. 178).

Asian Humanities Minor

The Asian Humanities Minor is designed for students who do not require or are unable to pursue extensive language training, but who still wish to make a serious commitment to the study of Asian cultures. Students may choose, in consultation with the director of undergraduate studies, either a geographic area of focus (China, Japan, Korea, South Asia or

Comparative) or a thematic concentration (literary studies, film, media, etc.) to provide focus and depth to their course of study.

In some cases, courses taken abroad may also be counted towards the minors with the approval of the director of undergraduate studies and pending departmental review. For language credits taken abroad to count towards the minor, students must take the placement test upon return.

For more information about the review process, please contact the director of undergraduate studies and refer to the relevant section of the department's website (<http://www.alc.northwestern.edu/undergraduate/majors-minors>).

Course	Title
Minor Requirements (7 units)	
Prerequisites:	
None	
Required Humanities Courses (7 units)	
7 ASIAN_LC courses chosen in consultation with the director of undergraduate studies	
At least 3 must be at the 300-level	
At most 2 may be relevant courses from outside the department selected from the list of pre-approved courses or in consultation with the director of undergraduates studies.	

Advanced Asian Languages Minor

The Advanced Asian Languages Minor (formerly the Asian Languages Minor) is designed for students who wish to gain a high level of proficiency in an Asian language.

In some cases, courses taken abroad may also be counted towards the minors with the approval of the director of undergraduate studies and pending departmental review. For more information about the review process, please contact the director of undergraduate studies and refer to the relevant section of the department's website (<http://www.alc.northwestern.edu/undergraduate/majors-minors>). For language credits taken abroad to count towards the minor, students must take the placement test upon return.

Course	Title
Minor Requirements (7 units)	
Prerequisites:	
First and second year language courses in area of focus (or equivalent)	
Required Language Courses (5 units)	
3 courses in area of focus (Chinese, Hindi-Urdu, Japanese or Korean) at the third-year level	
2 courses in the same language at the fourth-year level	
Required Humanities Courses (2 units)	
2 ASIAN_LC courses in area of focus (China, Japan, Korea, South Asia) chosen in consultation with the director of undergraduate studies	

Asian Studies

asian-studies.northwestern.edu

The Asian Studies Program offers individualized, interdisciplinary study of the languages, histories, societies, and cultures of the peoples of Asia, past and present. Through the study of a relevant language (Chinese, Hindi-Urdu, Japanese, or Korean) and coursework in history, the humanities, and the social sciences, students gain a sophisticated critical understanding of a specific Asian region (East, South, or Southeast) or country. They also learn to examine the world and themselves through

the lens of another language and culture. The program encourages in-depth study while also promoting more general inquiry into fundamental issues, such as cultural difference and its social and political implications and the significance of the transcultural and transnational flow of people and ideas.

Asian studies students hone their aptitude for analyzing problems, conducting research, and presenting ideas in writing and in speech and thus succeed in a wide range of careers, including law, medicine, business, media, government, education, and nonprofit work. Others go on to graduate study. Some graduates work primarily overseas.

The program offers a major and a minor. Study of a relevant language is required for the major and encouraged but not required for the minor. Approved courses are listed on the program website. Students should contact the program director for further information about requirements.

Programs of Study

- Asian Studies Major (p. 205)
- Asian Studies Minor (p. 206)

ASIAN_ST 110-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

ASIAN_ST 390-3 Advanced Topics in Asian Studies (1 Unit) Content and prerequisites vary. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change of topic. *Social Behavioral Sciences Distro Area*

ASIAN_ST 390-4 Adv Topics in Asian Studies (1 Unit) Content and prerequisites vary. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change of topic. *Historical Studies Distro Area*

ASIAN_ST 390-6 Advanced Topics in Asian Studies (1 Unit) Content and prerequisites vary. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change of topic. *Literature Fine Arts Distro Area*

ASIAN_ST 399-0 Independent Study (1 Unit) Reading and conferences on special subjects. For advanced undergraduates; requires permission of director of undergraduate studies and instructor.

Asian Studies Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Major Requirements (17 units)

- 6 language courses in Chinese, Hindi-Urdu, Japanese, or Korean beyond the first year; native-speaker proficiency does not count for course credit
- 11 additional courses chosen from the approved list
 - 9 distributed among three disciplinary categories
 - 3 in social sciences chosen from ASIAN_ST 390-3 Advanced Topics in Asian Studies, and courses in anthropology, economics, linguistics, political science, psychology, and sociology
 - 3 in history may include ASIAN_ST 390-4 Adv Topics in Asian Studies.
 - 3 in humanities chosen from ASIAN_ST 390-6 Advanced Topics in Asian Studies, and courses in art history, art theory

and practice, comparative literary studies, philosophy, and religious studies

- 2 additional courses from any of the three disciplinary categories
- At least 6 must focus on one of three culturally differentiated areas—East Asia, Southeast Asia, or South Asia—typically corresponding to the language specialization.
- At least 2 must be research courses related to the major (courses titled “research seminar,” other advanced seminars [with permission], or independent study; students are expected to produce an 18-20 page independent research paper in each course)
- At most 2 courses may be double-counted toward another major.
- The major also requires a study abroad experience in Asia. Students who for compelling reasons are unable to study abroad may petition for a waiver by writing to the program director by junior year.

Honors in Asian Studies

Majors with strong academic records and an interest in pursuing honors should secure a faculty adviser and submit an honors application, including a brief research proposal, to the program office by the first week of spring quarter of junior year. (Those studying abroad have another two weeks.) Accepted students complete a thesis, normally through three quarters of senior-year independent study (ASIAN_ST 399-0 Independent Study), which can count for credit in the relevant disciplinary category.

Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information consult the program website, visit the program office, and see Honors in the Major (p. 178).

Asian Studies Minor

Minor Requirements (8 units)

- Chosen from the approved list
- Typically at least 2 courses are selected in each of the three disciplinary categories: social sciences, history, and humanities.
- At least 4 courses must relate to one of three culturally differentiated areas: East Asia, Southeast Asia, or South Asia.
- Students who satisfactorily complete two years of language study in Chinese, Hindi-Urdu, Japanese, or Korean may complete the minor with only 6 disciplinary courses. (Native-speaker proficiency does not count for course credit.)

Astronomy

See Physics and Astronomy (p. 316).

Biological Sciences

biosci.northwestern.edu

The science of biology constitutes the study of organisms at all levels of complexity and in all their diversity. The Program in Biological Sciences provides a broad, modern curriculum in the life sciences leading to a bachelor of arts degree. To majors it offers focused concentrations and the potential for laboratory research.

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 conduct research

In addition to biology courses, majors must complete the courses listed as related courses (see biological sciences major (p. 209)). First-year students usually complete 100-level chemistry and the calculus and statistics requirements; in spring quarter they take BIOL_SCI 215-0 Genetics and Molecular Biology.

During the sophomore year, a student will usually complete organic chemistry (CHEM 210-1, CHEM 210-2), BIOL_SCI 217-0 Physiology, BIOL_SCI 219-0 Cell Biology, BIOL_SCI 220-0 Genetics and Molecular Processes Laboratory, BIOL_SCI 221-0 Cellular Processes Laboratory, BIOL_SCI 222-0 Investigative Laboratory, and BIOL_SCI 301-0 Principles of Biochemistry.

Typically BIOL_SCI 341-0 Population Genetics or BIOL_SCI 342-0 Evolutionary Processes is taken in junior year.

The program's core courses address the central topics in contemporary biology with the goal of preparing students for further study in either the biological sciences or professional school. BIOL_SCI 220-0 Genetics and Molecular Processes Laboratory, BIOL_SCI 221-0 Cellular Processes Laboratory and BIOL_SCI 222-0 Investigative Laboratory constitute laboratories that provide students with an appreciation of the discipline as an experimental science.

The junior and senior years permit students to explore a focused area in biological sciences that builds on the principles of the core. There are five areas of concentration. A student's concentration will be noted on the transcript; only one concentration may be noted. (Biochemistry and biophysics is not available as a concentration to students also pursuing a biochemistry track in the chemistry major. Molecular and developmental neurobiology is not available to students also pursuing a neuroscience major.)

Students have the opportunity to conduct a research project in the laboratory of a faculty sponsor with whom they design a plan of study. The sponsor may be a Northwestern faculty member in any department who is engaging in biological research. Research interests of faculty are discussed on the biological sciences website.

Declared biological sciences majors are assigned specific faculty advisers. Majors pursuing independent research also have research supervisors.

Honors Program in Medical Education Students

See the relevant section of this Catalog for information on the Honors Program in Medical Education (p. 34). Waiver of the 300-level elective course is the only HPME waiver that may be applied toward the biological sciences major.

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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Programs of Study

- Biological Sciences Major (p. 209)
- Biological Sciences Second Major for ISP Students (p. 210)

BIOL_SCI 100-0 Introduction to Biological Sciences at Northwestern (1 Unit) For participants in Bio&ChemEXCEL summer program. An overview of recent advances in biological research and leadership within the field of biology. Taken with CHEM 100-0. *Natural Sciences Distro Area*

BIOL_SCI 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 102-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 103-0 Diversity of Life (1 Unit) Comparative survey of organisms, emphasizing adaptation and phylogenetic relationships. Particular emphasis on animals. *Natural Sciences Distro Area*

BIOL_SCI 103-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 104-0 Plant-People Interactions (1 Unit) Biology and history of the interaction of humans and flowering plants. *Natural Sciences Distro Area*

BIOL_SCI 104-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 105-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 106-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 107-6 First-Year Seminar (1 Unit)

BIOL_SCI 108-6 First-Year Seminar (1 Unit)

BIOL_SCI 109-0 The Nature of Plants (1 Unit) Plant adaptations for growth, survival, and reproduction. Plant defense against herbivory, pollination, and seed dispersal. *Natural Sciences Distro Area*

BIOL_SCI 109-6 First-Year Seminar (1 Unit)

BIOL_SCI 110-6 First-Year Seminar (1 Unit)

BIOL_SCI 111-6 First-Year Seminar (1 Unit)

BIOL_SCI 112-6 First-Year Seminar (1 Unit)

BIOL_SCI 115-6 First-Year Seminar (1 Unit) For participants in the NUBioscientist program. Biological Thought & Action; preparatory to BIOL_SCI 116-6. *WCAS First-Year Seminar*

BIOL_SCI 116-6 First-Year Seminar (1 Unit) For participants in the NUBioscientist program. Science Research Preparation; follows BIOL_SCI 115-6. *WCAS First-Year Seminar*

BIOL_SCI 150-0 Human Genetics (1 Unit) Basic principles of human inheritance and genetic variation. *Natural Sciences Distro Area*

BIOL_SCI 160-0 Human Reproduction (1 Unit) Basic biology of reproduction; relation between hormones, emotions, intelligence, and behavior; related policy issues. *Natural Sciences Distro Area*

BIOL_SCI 164-0 Genetics and Evolution (1 Unit) Principles of inheritance as they apply to evolution. May not receive credit after taking BIOL_SCI 215-0. *Natural Sciences Distro Area*

BIOL_SCI 213-0 Undergraduate Laboratory Teaching Assistant (0 Unit)
Prerequisite: consent of instructor.

BIOL_SCI 215-0 Genetics and Molecular Biology (1 Unit) Principles of inheritance; gene function; mechanisms by which DNA is replicated, transcribed into RNAs, and translated into proteins; basics of the process of natural selection. Prerequisite: CHEM 131-0, CHEM 151-0, or CHEM 171-0. *Natural Sciences Distro Area*

BIOL_SCI 217-0 Physiology (1 Unit) Organization and functioning of the major organ systems in mammals. Prerequisite: CHEM 131-0, CHEM 151-0, or CHEM 171-0. *Natural Sciences Distro Area*

BIOL_SCI 219-0 Cell Biology (1 Unit) Mechanisms that cells use to compartmentalize and transport proteins, to move, to regulate growth and death, and to communicate with their environments. Prerequisite: CHEM 131-0, CHEM 151-0, or CHEM 171-0. *Natural Sciences Distro Area*

BIOL_SCI 220-0 Genetics and Molecular Processes Laboratory (0.34 Unit) Laboratory techniques and experiments in fundamental aspects of transmission genetics and molecular biology. Prerequisite: CHEM 131-0, CHEM 151-0, or CHEM 171-0.

BIOL_SCI 221-0 Cellular Processes Laboratory (0.34 Unit) Laboratory techniques and experiments in fundamental aspects of cell biology. Prerequisite: BIOL_SCI 220-0.

BIOL_SCI 222-0 Investigative Laboratory (0.34 Unit) A culminating life-science lab experience. Prerequisite: BIOL_SCI 221-0.

BIOL_SCI 240-0 Molecular and Cell Biology for ISP (1 Unit) Cell biology, transcription, translation, regulation of gene expression. Prerequisite: ISP standing.

BIOL_SCI 241-0 Biochemistry for ISP (1 Unit) Synthesis and metabolism of organic molecules; structure and function of proteins. Prerequisites: ISP standing and previous or concurrent registration in CHEM 212-1.

BIOL_SCI 301-0 Principles of Biochemistry (1 Unit) Biochemical processes. May not receive credit for both BIOL_SCI 301-0 and BIOL_SCI 308-0. Prerequisite: CHEM 210-2 or CHEM 212-2. *Natural Sciences Distro Area*

BIOL_SCI 302-0 Fundamentals of Neurobiology (1 Unit) Cellular and biochemical approaches to the nervous system, focusing on neuron structure and function. May not receive credit for both BIOL_SCI 302-0 and NEUROSCI 202-0. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or BIOL_SCI 308-0.

BIOL_SCI 303-0 Molecular Neurobiology (1 Unit) Exploration of the overlap between neurobiology and molecular biology. Prerequisite: BIOL_SCI 302-0 or NEUROSCI 311-0.

BIOL_SCI 305-0 Neurobiology Laboratory (1 Unit) Hands-on experience in the performance of experiments in cellular neurophysiology. Prerequisites: BIOL_SCI 222-0; BIOL_SCI 302-0 or NEUROSCI 311-0.

BIOL_SCI 307-0 Brain Structure, Function, and Evolution (1 Unit) An overview of the evolution of the nervous system and cognition, from the origin of neurons to the structure and function of the human brain. No

P/N. Prerequisites: BIOL_SCI 302-0, BIOL_SCI 325-0, or BIOL_SCI 344-0.
Natural Sciences Distro Area

BIOL_SCI 308-0 Biochemistry (1 Unit) Fundamental biochemical processes in cells. May not receive credit for both BIOL_SCI 308-0 and BIOL_SCI 301-0. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 217-0, BIOL_SCI 219-0; CHEM 210-2 or CHEM 212-2. *Natural Sciences Distro Area*

BIOL_SCI 315-0 Advanced Cell Biology (1 Unit) Relationship of shape, structural dynamics, and function with the cellular state and gene expression; cell-to-cell communication. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or BIOL_SCI 308-0.

BIOL_SCI 319-0 Biology of Animal Viruses (1 Unit) Virus structure, synthesis of viral nucleic acids and proteins, the interaction of the viral and cellular genomes. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or BIOL_SCI 308-0.

BIOL_SCI 323-0 Bioinformatics: Sequence and Structure Analysis (1 Unit) Use of informational and modeling techniques to explore evolutionary and other problems related to the genome. Prerequisites: BIOL_SCI 241-0, BIOL_SCI 301-0, or BIOL_SCI 308-0.

BIOL_SCI 325-0 Animal Physiology (1 Unit) Physiological principles and mechanisms responsible for the ability of animals to regulate variables in the steady state. Prerequisite: BIOL_SCI 217-0.

BIOL_SCI 326-0 Neurobiology of Learning and Memory (1 Unit) Molecular and neural bases of memory. May not receive credit for both BIOL_SCI 326-0 and NEUROSCI 326-0. Prerequisite: BIOL_SCI 302-0 or NEUROSCI 311-0.

BIOL_SCI 327-0 Biology of Aging (1 Unit) Biological aspects of aging, from molecular to evolutionary. Prerequisites: BIOL_SCI 219-0.

BIOL_SCI 328-0 Microbiology (1 Unit) How microbes interact with their environments, including with humans. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0, BIOL_SCI 222-0; BIOL_SCI 301-0 or BIOL_SCI 308-0.

BIOL_SCI 330-0 Plant Biology (1 Unit) Plant structure, physiology, photosynthesis, evolutionary diversity, and ecology. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0.

BIOL_SCI 332-0 Conservation Genetics (1 Unit) Critical issues in the management and understanding of endangered populations. Prerequisite: BIOL_SCI 215-0 or ENVR_SCI 202-0.

BIOL_SCI 334-0 Soils and the Environment: The Earth's Critical Zone (1 Unit) Soil development and morphology; physical, chemical, hydrologic, and biological properties of soils. Prerequisite: BIOL_SCI 215-0 or ENVR_SCI 202-0.

BIOL_SCI 336-0 Spring Flora (1 Unit) Life cycles, vegetative and reproductive structures, and adaptations for pollination and fruit and seed dispersal of the wildflowers, trees, and shrubs of oak woodland. Prerequisite: BIOL_SCI 215-0 or ENVR_SCI 202-0.

BIOL_SCI 337-0 Quantitative Methods for Ecology and Conservation (1 Unit) Approaches, methods, and techniques for analyzing datasets in ecology and conservation biology. Prerequisites: BIOL_SCI 215-0 or ENVR_SCI 202-0; a course in statistics.

BIOL_SCI 339-0 Critical Topics in Ecology and Conservation (1 Unit) Seminar discussing historical and modern publications in the field. Prerequisite: BIOL_SCI 215-0 or ENVR_SCI 202-0.

BIOL_SCI 341-0 Population Genetics (1 Unit) Processes that affect allele frequency change and thus cause evolution. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; a course in statistics.

BIOL_SCI 342-0 Evolutionary Processes (1 Unit) Evolutionary mechanisms (natural selection, genetic drift), evolutionary history (speciation, phylogenetics), and adaptations (sex, cooperation, aging, life history). Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; a course in statistics.

BIOL_SCI 344-0 Anatomy of Vertebrates (1 Unit) Vertebrate phylogeny illustrated via comparative morphology; anatomical/ functional and ontogenetic considerations; dissections. Prerequisite: BIOL_SCI 103-0, BIOL_SCI 164-0, or BIOL_SCI 215-0; BIOL_SCI 220-0

BIOL_SCI 345-0 Topics in Biology (1 Unit) Topics vary but always deal with an area of advanced study in the life sciences. With laboratory. May be repeated for credit with different topic. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0, BIOL_SCI 222-0.

BIOL_SCI 346-0 Field Ecology (1 Unit) An intensive experience in field ecological research. Prerequisites: BIOL_SCI 215-0; a course in statistics.

BIOL_SCI 347-0 Conservation Biology (1 Unit) Evolution, ecology, and conservation of patterns of biological diversity. Prerequisites: BIOL_SCI 215-0 or ENVR_SCI 202-0; a course in statistics.

BIOL_SCI 349-0 Plant Community Ecology (1 Unit) Abundance, distribution, diversity, and scaling in plant communities in space-time. Prerequisite: BIOL_SCI 330-0.

BIOL_SCI 350-0 Plant Evolution and Diversity Lab (1 Unit) Introduction to the diversity and evolutionary history of land plants. Prerequisite: BIOL_SCI 330-0.

BIOL_SCI 353-0 Molecular Biology Laboratory (1 Unit) Project-based approach to learning lab skills in eukaryotic molecular biology. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or BIOL_SCI 308-0.

BIOL_SCI 354-0 Quantitative Analysis of Biology (1 Unit) Random genetic processes, gene expression, cell adaptation, cell cycle, developmental morphogens, phylgenomics. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; MATH 220-0 or MATH 224-0; PHYSICS 130-1, PHYSICS 130-2, PHYSICS 130-3 or PHYSICS 135-1, PHYSICS 135-2, PHYSICS 135-3. *Natural Sciences Distro Area*

BIOL_SCI 355-0 Immunobiology (1 Unit) Nature of host resistance; characteristics of antigens, antibodies; basis of immune response; hypersensitivity. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0, BIOL_SCI 222-0; BIOL_SCI 301-0 or BIOL_SCI 308-0.

BIOL_SCI 356-0 Endocrinology (1 Unit) Physiology and biochemistry of hormones and glands of internal secretion in vertebrates; endocrine glands. Prerequisite: BIOL_SCI 325-0.

BIOL_SCI 358-0 Advanced Physiology Laboratory (1 Unit) Experiments in several physiological systems. Design, techniques, data analysis, and report writing emphasized. Prerequisites: BIOL_SCI 217-0, BIOL_SCI 222-0.

BIOL_SCI 359-0 Quantitative Experimentation in Biology (1 Unit) Laboratory in experimental methods in quantitative biology. Random genetic processes, gene expression, cell cycle, developmental

morphogens, genome sequencing. Prerequisites: BIOL_SCI 354-0 and permission of instructor. *Natural Sciences Distro Area*

BIOL_SCI 360-0 Principles of Cell Signaling (1 Unit) Emphasis on principles, components, and logic that are common to different cell signaling systems. Modern experimental strategies for studying cellular signaling as well as the implications of disrupting cell communication pathways in disease will be described. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0

BIOL_SCI 361-0 Protein Structure and Function (1 Unit) Structure and function of proteins; x-ray crystallography and NMR. Prerequisite: BIOL_SCI 301-0 or BIOL_SCI 308-0.

BIOL_SCI 363-0 Biophysics (1 Unit) Protein interaction with small molecules; protein tertiary structure determination. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or BIOL_SCI 308-0.

BIOL_SCI 378-0 Functional Genomics (1 Unit) Patterns of gene expression and their causes. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; a course in statistics.

BIOL_SCI 380-0 Biology of Cancer (1 Unit) The disease of cancer: causation at the cell and molecular levels; treatment. Prerequisites: BIOL_SCI 315-0 or BIOL_SCI 390-0.

BIOL_SCI 390-0 Advanced Molecular Biology (1 Unit) Nucleic acid structure; DNA mutation, repair, recombination, replication, restriction, and modification; translation. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or BIOL_SCI 308-0.

BIOL_SCI 391-0 Development and Evolution of Body Plans (1 Unit) Molecular mechanisms underlying early embryonic development, including establishment of the body and organogenesis. Discussion of original literature. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or BIOL_SCI 308-0.

BIOL_SCI 392-0 Developmental Genetics Laboratory (1 Unit) Development of independent projects alongside classic readings and experiments exploring key concepts in developmental biology. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0, BIOL_SCI 222-0; BIOL_SCI 301-0 or BIOL_SCI 308-0.

BIOL_SCI 393-0 Genetic Analysis (1 Unit) Advanced transmission and regulatory genetics. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or BIOL_SCI 308-0. *Natural Sciences Distro Area*

BIOL_SCI 395-0 Molecular Genetics (1 Unit) Exploration of recent advances that have revolutionized the fields of gene expression and cell regulation. Discussion of articles and primary research papers. Prerequisite: BIOL_SCI 378-0, BIOL_SCI 390-0, or BIOL_SCI 393-0.

BIOL_SCI 397-0 Senior Thesis Colloquium (1 Unit) Supervision while writing a Senior Thesis. Discussion of students' research. Instructor feedback on thesis drafts. Continued student research. Enrollment limited to Senior Biological Sciences majors hoping to graduate with Program Honors and/or to produce a Senior Thesis. Registration required for all Honors candidates.

BIOL_SCI 398-0 Tutorial in Biology (1 Unit) Supervised reading and discussion or supervised laboratory work. P/N only.

BIOL_SCI 399-0 Independent Research (1 Unit) Supervised independent research project. Prerequisite: BIOL_SCI 398-0 or previous BIOL_SCI 399-0.

Biological Sciences Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Program Courses (10 units)	
<i>8 core courses (6.02 units):</i>	
BIOL_SCI 215-0	Genetics and Molecular Biology
BIOL_SCI 217-0	Physiology
BIOL_SCI 219-0	Cell Biology
BIOL_SCI 220-0	Genetics and Molecular Processes Laboratory (0.34 units)
BIOL_SCI 221-0	Cellular Processes Laboratory (0.34 units)
BIOL_SCI 222-0	Investigative Laboratory (0.34 units)
BIOL_SCI 301-0	Principles of Biochemistry
BIOL_SCI 341-0	Population Genetics
or BIOL_SCI 342-0	Evolutionary Processes
<i>1 300-level BIOL_SCI elective¹</i>	
<i>3 courses from one of the concentration areas:</i>	
Biochemistry and Biophysics (p. 210)	
Cell Biology and Physiology (p. 210)	
Genetics and Genomics (p. 210)	
Molecular and Developmental Neurobiology (p. 210)	
Plant Biology (p. 210)	
Related Courses²	
CHEM 132-0	General Chemistry 2
or CHEM 152-0	Accelerated General Chemistry 2
or CHEM 172-0	Advanced General Physical Chemistry
CHEM 210-1 & CHEM 210-2	Organic Chemistry and Organic Chemistry
or CHEM 212-1 & CHEM 212-2	Organic Chemistry and Organic Chemistry
MATH 214-0	Single Variable Calculus III
or MATH 224-0	Integral Calculus of One-Variable Functions
<i>1 statistics course - STAT 202-0 recommended</i>	
PHYSICS 130-1 & PHYSICS 130-2	College Physics and College Physics
or PHYSICS 135-1 & PHYSICS 135-2	General Physics and General Physics
or PHYSICS 140-1 & PHYSICS 140-2	Fundamentals of Physics and Fundamentals of Physics

¹ The following do not count as a 300-level BIOL_SCI elective: BIOL_SCI 397-0 Senior Thesis Colloquium, BIOL_SCI 398-0 Tutorial in Biology, or BIOL_SCI 399-0 Independent Research.

² Number of related course units depend on chemistry and mathematics sequences taken. Laboratory components of general and organic chemistry courses and physics courses require separate registration and bear separate credit. See chemistry (p. 212) and physics (p. 316) pages of this Catalog for more information.

Concentration Courses

Biochemistry and Biophysics

Course	Title
BIOL_SCI 323-0	Bioinformatics: Sequence and Structure Analysis
BIOL_SCI 361-0	Protein Structure and Function
BIOL_SCI 363-0	Biophysics

Cell Biology and Physiology

Course	Title
BIOL_SCI 315-0	Advanced Cell Biology
BIOL_SCI 325-0	Animal Physiology

1 course chosen from:

BIOL_SCI 327-0	Biology of Aging
or BIOL_SCI 328-0	Microbiology
or BIOL_SCI 344-0	Anatomy of Vertebrates
or BIOL_SCI 355-0	Immunobiology
or BIOL_SCI 356-0	Endocrinology
or BIOL_SCI 358-0	Advanced Physiology Laboratory

Genetics and Genomics

Course	Title
BIOL_SCI 390-0	Advanced Molecular Biology

2 courses chosen from: ¹

BIOL_SCI 378-0	Functional Genomics
BIOL_SCI 392-0	Developmental Genetics Laboratory
BIOL_SCI 393-0	Genetic Analysis
BIOL_SCI 395-0	Molecular Genetics

¹ At least 1 must be BIOL_SCI 378-0 Functional Genomics or BIOL_SCI 393-0 Genetic Analysis

Molecular and Developmental Neurobiology

Course	Title
BIOL_SCI 302-0	Fundamentals of Neurobiology
BIOL_SCI 303-0	Molecular Neurobiology

1 course chosen from:

BIOL_SCI 305-0	Neurobiology Laboratory
or BIOL_SCI 307-0	Brain Structure, Function, and Evolution
or BIOL_SCI 326-0	Neurobiology of Learning and Memory

Plant Biology

Course	Title
BIOL_SCI 330-0	Plant Biology
BIOL_SCI 349-0	Plant Community Ecology

1 course chosen from:

BIOL_SCI 336-0	Spring Flora
or BIOL_SCI 339-0	Critical Topics in Ecology and Conservation
or BIOL_SCI 346-0	Field Ecology
or BIOL_SCI 350-0	Plant Evolution and Diversity Lab

Honors in Biological Sciences

Majors with strong academic records and an interest in pursuing honors must register for BIOL_SCI 397-0 Senior Thesis Colloquium in Winter Quarter of Senior Year.

Seniors may be recommended to the college for graduation with honors if they have completed at least 2 quarters of BIOL_SCI 397-0 Senior

Thesis Colloquium, BIOL_SCI 398-0 Tutorial in Biology or BIOL_SCI 399-0 Independent Research, have written an approved honors thesis based on their independent study, and have sufficiently high grades.

For more information consult the biological sciences website and see the Honors in the Major (p. 178).

Biological Sciences Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

The Integrated Science Program is a highly selective BA program in Weinberg College (see Integrated Science Program (p. 278)). Students majoring in ISP who wish to complete a second major in biological sciences should fulfill the following requirements. For concentration area options, see those listed on the stand-alone Biological Sciences Major (p. 209) page.

Course	Title
Required courses:	
CHEM 212-2	Organic Chemistry

The required 3 courses for the chosen concentration in biological sciences

Honors in Biological Sciences

Majors with strong academic records and an interest in pursuing honors must register for BIOL_SCI 397-0 Senior Thesis Colloquium in Winter Quarter of Senior Year.

Seniors may be recommended to the college for graduation with honors if they have completed at least 2 quarters of BIOL_SCI 397-0 Senior Thesis Colloquium, BIOL_SCI 398-0 Tutorial in Biology or BIOL_SCI 399-0 Independent Research, have written an approved honors thesis based on their independent study, and have sufficiently high grades.

For more information consult the biological sciences website and see the Honors in the Major (p. 178).

Business Institutions

cbi.northwestern.edu

The minor in business institutions offered by the Harvey Kapnick Center for Business Institutions is designed to provide undergraduates with a rigorous introduction to business and management fundamentals. It allows students to prepare for employment in the business world by building on skills and knowledge they acquire through other Northwestern coursework. The program also connects students' study of business and management fundamentals to broader areas of academic inquiry, both by linking the study of business management principles to the social sciences scholarship on which it is based, and by introducing social sciences and humanities scholarship on the cultural, political, philosophical, literary, and social aspects of business institutions. Thus, the program is not meant to serve as narrowly conceived preprofessional training; instead it offers a broad multidisciplinary perspective on a significant area of inquiry in 21st-century society.

Students without extensive quantitative training are particularly encouraged to apply. The program is designed so students can acquire

the necessary quantitative background by completing four basic prerequisite courses in mathematics, statistics, and economics.

Program of Study

- Business Institutions Minor (p. 211)

BUS_INST 301-0 Accounting (1 Unit) Introduction to both financial and managerial accounting. Use of organizations' financial statements for making decisions. Prerequisites: ECON 201-0 and ECON 202-0.

BUS_INST 302-0 Marketing Management (1 Unit) Basic principles and applications of marketing management. Marketing segmentation, target marketing, brand positioning, consumer behavior, channels strategy, pricing, advertising and promotion. Prerequisites: ECON 201-0 and ECON 202-0.

BUS_INST 303-0 Leadership in Organizations (1 Unit) Social science tools for solving organizational problems and influencing individuals, groups, and organizations. Competitive decision making, reward system design, team building, strategic negotiation, political dynamics, corporate culture, and strategic organizational design. Prerequisites: ECON 201-0 and ECON 202-0. *Social Behavioral Sciences Distro Area*

BUS_INST 304-0 Corporate Finance (1 Unit) Effects of time and uncertainty on valuation and decision making. Discounting techniques, stock and bond valuation, capital budgeting, firm valuation, capital asset pricing model, financial options. May not receive credit for both this course and ECON 360-1. Not for students who have previously taken KELLG_FE 310-0. Prerequisites: ECON 201-0 and ECON 202-0; STAT 210-0 or equivalent; MATH 212-0 or MATH 220-0; and BUS_INST 301-0.

BUS_INST 321-0 Business and Economic Institutions in Historical Perspective (1 Unit) Factors affecting economic growth and challenges to achieving economic success. Organization of firms and financial markets; corporate governance; innovation; financial crises; income inequality; race and gender. Prerequisites: ECON 201-0 and ECON 202-0; STAT 210-0 or equivalent; and MATH 212-0 or MATH 220-0. *Historical Studies Distro Area*

BUS_INST 399-0 Independent Study (1 Unit)

Business Institutions Minor

The minor in business institutions requires the successful completion with a grade of C– or above of 11 courses:

- 4 prerequisite courses in mathematics, statistics, and economics
- 4 business tools courses
- 1 writing and speaking course
- 2 social sciences and humanities electives

Students must complete the 4 prerequisite courses before declaring the minor.

Interested students should consult a program adviser or visit the program office for information.

See more details about the minor (p. 210).

Course	Title
Prerequisites (4 units) ^{1,2}	
ECON 201-0	Introduction to Macroeconomics
ECON 202-0	Introduction to Microeconomics

STAT 210-0	Introductory Statistics for the Social Sciences (or equivalent) ³
MATH 212-0 or MATH 220-0	Single Variable Calculus I Differential Calculus of One-Variable Functions
Minor Requirements (7 units) ⁴	
4 business tools courses:	
BUS_INST 301-0	Accounting
BUS_INST 302-0	Marketing Management
BUS_INST 303-0	Leadership in Organizations
BUS_INST 304-0	Corporate Finance (or equivalent) ⁵
1 writing and speaking in business course:	
ENGLISH 282-0	Writing and Speaking in Business ⁶
2 social sciences and humanities electives that have business institutions and practices as a central focus of inquiry, chosen from an approved list on the program website.	

See requirements below. (p. 211)

- 1 All prerequisites must be completed with a minimum grade of C– before declaring the minor.
- 2 AP credit may be used to fulfill prerequisite requirements.
- 3 Equivalents include BMD_ENG 220-0 Introduction to Biomedical Statistics, CHEM_ENG 312-0 Probability and Statistics for Chemical Engineering, IEMS 201-0 Introduction to Statistics, PSYCH 201-0 Statistical Methods in Psychology, POLI_SCI 312-0 Statistical Research Methods, SESP 210-0 Introduction to Statistics and Research Methodology, and STAT 202-0 Introduction to Statistics
- 4 None of the 7 courses may be double-counted toward any major, minor, or certificate except as a related course for a major or a home-school distribution requirement.
- 5 Equivalents include ECON 360-1 Foundations of Corporate Finance Theory, KELLG_FE 310-0 Principles of Finance, and the former IEMS 326-0 Economics and Finance for Engineers.
- 6 Students completing majors in the humanities that involve significant writing, such as English, History, or Philosophy, may petition the program director to waive this requirement. However, these students are strongly encouraged to consider taking ENGLISH 282-0 Writing and Speaking in Business because it covers communications skills related to the business environment that may not be covered in writing-intensive courses in other disciplines.

Social Sciences and Humanities Electives Requirements

- Students may petition the program director to approve other humanities or social sciences courses with a significant focus on business institutions or practices.
- Students may substitute 1 of the following courses for at most 1 of the 2 required social sciences and humanities electives:

Course	Title
CFS 388-0	Field Studies in Business Culture
CFS 393-1	Modern Workplace Culture
CFS 395-1	Business Workplace Culture
ENTREP 325-0	Engineering Entrepreneurship
ENTREP 332-0	Financing Entrepreneurial Ventures
ENTREP 395-0	Special Topics

- Students earning a major in Economics may not use economics courses to fulfill the social sciences and humanities elective requirements.

- Students earning a minor in Economics may not use 200-level economics courses to fulfill the social sciences and humanities elective requirements.

Catholic Studies

A Minor in Catholic Studies (p. 337) is offered by the department of Religious Studies (p. 334).

Chemistry

chemistry.northwestern.edu

Chemistry is the study of molecular structure, chemical reactions, and the molecular basis of solids, liquids, and gases. Training in chemistry blends descriptive, conceptual, and mathematical elements in both lectures and laboratory work. While developing chemical knowledge is essential, the progressive honing of analytical abilities and application of this knowledge to research are just as important. Courses are carefully designed to give a rigorous introduction to chemistry for both science and nonscience students.

The broad applicability of phenomena and rigorous methodology of chemistry provide a wide range of career options for majors.

The department meets the needs of students with diverse career objectives—including professional chemistry, medicine, and teaching—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
- opportunities to participate in research

Options are also provided for Northwestern's engineering, biological sciences, and prehealth professional programs.

The chemistry faculty is actively engaged in a wide spectrum of original research in which undergraduates are encouraged to participate along with graduate students and visiting scholars from around the world. Undergraduates have opportunities to use modern instrumentation and to participate in seminars, colloquia, and informal contacts with scholars.

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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

General Chemistry, Advanced Placement, and Course Credit

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 one of the following:

- CHEM 110-0 Quantitative Problem Solving in Chemistry
- CHEM 151-0 Accelerated General Chemistry 1
- CHEM 171-0 Advanced General Inorganic Chemistry (with credit for Chem 1X0 listed on their transcript)
- Organic Chemistry, either CHEM 210-1 or CHEM 212-1 (with 1 credit for each Chem 1X0, 1X1, and 1X2, and with 0.34 credit for each Chem 11X and 12X on their transcript)

Students may not start any general chemistry sequence with CHEM 131-0, CHEM 152-0, or CHEM 172-0 regardless of their AP credit. Questions should be directed to the director of undergraduate studies in chemistry.

Students may not retain both AP credit and credit for a course at a lower level than placed by the AP score. For example:

- Students who receive 1 test credit listed as Chem 1X0 may take CHEM 151-0 for credit, but they may not retain credit for both.
- Students who receive 1 test credit listed as Chem 1X1 may take CHEM 171-0 for credit, but they may not retain credit for both.
- Students who receive 1 test credit listed as Chem 1X2 may take CHEM 172-0 for credit, but they may not retain credit for both.
- Students who receive 1 test credit listed as Chem 11X may take CHEM 181-0 for credit, but they may not retain credit for both.
- Students who receive 1 test credit listed as Chem 12X may take CHEM 182-0 for credit, but they may not retain credit for both.

Due to overlap in content, the following restrictions apply:

- Students may receive credit for only 1 of CHEM 131-0, CHEM 151-0, or CHEM 171-0
- Students may receive credit for only 1 of CHEM 132-0, CHEM 152-0, or CHEM 172-0
- Students may receive credit for only 1 of CHEM 141-0, CHEM 161-0, or CHEM 181-0
- Students may receive credit for only 1 of CHEM 142-0, CHEM 162-0, or CHEM 182-0.

Students whose AP or chemistry placement exam scores place them into organic chemistry but who choose instead to begin with CHEM 171-0/CHEM 181-0 must also complete CHEM 172-0/CHEM 182-0 before taking organic chemistry. Students who place into organic chemistry may not take CHEM 110-0 or CHEM 151-0/CHEM 161-0.

The laboratory components of general and organic chemistry courses require separate registration and bear separate credit. When such a course is listed as a prerequisite for another course, the associated lab is also a prerequisite.

Programs of Study

- Chemistry Major (p. 215)
- Chemistry Minor (p. 217)
- Chemistry Second Major for ISP Students (p. 217)
- Chemistry BA/MS (p. 218)

The laboratory components of general and organic chemistry courses require separate registration and bear separate credit. When such a course is listed as a prerequisite for another course, the associated lab is also a prerequisite.

CHEM 100-0 Introduction to Calculus and Chemistry (1 Unit) For participants in Bio&ChemEXCEL summer program. Introduction to calculus and general chemistry. Taken with BIOL_SCI 100-0.

CHEM 100-BR Introduction to Problem Solving in Chemistry (1 Unit) For participants in Bridge I summer program. Developing facility with quantitative tools to solve problems in chemistry. Taken with MATH 100-BR.

CHEM 105-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

CHEM 110-0 Quantitative Problem Solving in Chemistry (1.34 Unit) Solution strategies for traditional word problems and their application to basic chemistry quantitative problems: dimensional analysis, chemical equations, stoichiometry, limiting reagents. Prerequisite: permission of department.

CHEM 131-0 General Chemistry 1 (1 Unit) Quantum mechanics, electronic structure, periodic properties of elements, chemical bonding, thermodynamics, intermolecular forces, properties of solids and liquids, special topics in modern chemistry. Prerequisite: CHEM 110-0 (C- or better). *Natural Sciences Distro Area*

CHEM 132-0 General Chemistry 2 (1 Unit) Solutions and colligative properties, chemical equilibrium, aqueous solution equilibria, chemical kinetics, metals in chemistry and biology, oxidation-reduction reactions and electrochemistry, special topics in modern chemistry. Prerequisite: CHEM 131-0, CHEM 141-0 (C- or better). *Natural Sciences Distro Area*

CHEM 141-0 General Chemistry Laboratory 1 (0.34 Unit) Chemical analysis of real samples using basic laboratory techniques including titration, colorimetric analysis, density measurements, and atomic spectroscopy. Planning, data collection, interpretation, and reporting on experiments. Must be taken concurrently with CHEM 131-0. Prerequisite: CHEM 110-0 (C- or better).

CHEM 142-0 General Chemistry Laboratory 2 (0.34 Unit) Chemistry laboratory techniques applied to materials science and nanotechnology, acid-base chemistry, and chemical kinetics. Planning, data collection, interpretation, and reporting on experiments. Must be taken concurrently with CHEM 132-0. Prerequisites: CHEM 131-0, CHEM 141-0 (C- or better).

CHEM 151-0 Accelerated General Chemistry 1 (1 Unit) Quantum mechanics, electronic structure, periodic properties of elements, chemical bonding, thermodynamics, gas laws, intermolecular forces, properties of solids and liquids, special topics in modern chemistry. Prerequisite: permission of department by placement exam. *Natural Sciences Distro Area*

CHEM 152-0 Accelerated General Chemistry 2 (1 Unit) Solutions and colligative properties, chemical equilibrium, aqueous solution equilibria, chemical kinetics, metals in chemistry and biology, oxidation-reduction reactions and electrochemistry, special topics in modern chemistry. Prerequisite: CHEM 151-0, CHEM 161-0 (C- or better). *Natural Sciences Distro Area*

CHEM 161-0 Accelerated General Chemistry Laboratory 1 (0.34 Unit) Chemical analysis of real samples using basic laboratory techniques including titration, colorimetric analysis, density measurements, and atomic spectroscopy. Planning, data collection, interpretation, and reporting on experiments. Must be taken concurrently with CHEM 151-0.

CHEM 162-0 Accelerated General Chemistry Laboratory 2 (0.34 Unit) Chemistry laboratory techniques applied to materials science and nanotechnology, acid-base chemistry, and chemical kinetics. Planning,

data collection, interpretation, and reporting on experiments. Must be taken concurrently with CHEM 152-0. Prerequisites: CHEM 151-0, CHEM 161-0 (C- or better).

CHEM 171-0 Advanced General Inorganic Chemistry (1 Unit) 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. Must be taken concurrently with CHEM 181-0. Prerequisite: department placement exam or appropriate AP credit. *Natural Sciences Distro Area*

CHEM 172-0 Advanced General Physical Chemistry (1 Unit) 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. Must be taken concurrently with CHEM 182-0. Prerequisites: CHEM 171-0, CHEM 181-0 (C- or better); MATH 220-0. *Natural Sciences Distro Area*

CHEM 181-0 Advanced General Inorganic Chemistry Laboratory (0.34 Unit) Laboratory techniques for studying chemical analysis and chemical reactions relevant to environmental or materials research. Planning, data collection, interpretation, and reporting on experiments. Must be taken concurrently with CHEM 171-0. Prerequisite: appropriate AP credit.

CHEM 182-0 Advanced General Physical Chemistry Laboratory (0.34 Unit) Study of the physical chemistry (acid base chemistry, kinetics, etc.) behind the operating principles of biosensors. Planning, data collection, interpretation, and reporting on these experiments. Must be taken concurrently with CHEM 172-0. Prerequisite: CHEM 171-0 (C- or better).

CHEM 199-BR Foundations of Organic Chemistry (1 Unit) For participants in Bridge II summer program. Exploring foundations and problem-solving skills in organic chemistry.

CHEM 201-0 Chemistry of Nature and Culture (1 Unit) Chemistry for the nonscientist. Chemicals commonly encountered in everyday life. With laboratory. *Natural Sciences Distro Area*

CHEM 210-1 Organic Chemistry (1 Unit) Basic concepts of structure, stereochemistry, and reactivity of organic compounds. The chemistry of hydrocarbons and alcohols. Prerequisites: CHEM 132-0 and CHEM 142-0, or CHEM 152-0 and CHEM 162-0, or CHEM 172-0 and CHEM 182-0 (C- or better). *Natural Sciences Distro Area*

CHEM 210-2 Organic Chemistry (1 Unit) The chemistry of aromatic, carbonyl, and nitrogen compounds; characterization of organic substances by chemical and spectral methods; reaction mechanisms. Must be taken concurrently with CHEM 230-2. Prerequisite: CHEM 210-1 (C- or better). *Natural Sciences Distro Area*

CHEM 210-3 Organic Chemistry (1 Unit) The chemistry of poly-functional compounds of biological and medicinal interest. Modern organic synthesis, bioorganic chemistry, and recent developments in organic chemistry. Must be taken concurrently with CHEM 230-3. Prerequisite: CHEM 210-2 and CHEM 230-2 (C- or better). *Natural Sciences Distro Area*

CHEM 212-1 Organic Chemistry (1 Unit) Primarily for chemistry majors and students in ISP. Similar to CHEM 210-1 except with required concurrent laboratory course CHEM 232-1. No P/N registration.

Prerequisites: CHEM 132-0 and CHEM 142-0, or CHEM 152-0 and CHEM 162-0, or CHEM 172-0 and CHEM 182-0 (C- or better), and consent of department, enrollment in ISP, or department placement. *Natural Sciences Distro Area*

CHEM 212-2 Organic Chemistry (1 Unit) Primarily for chemistry majors and students in ISP. Similar to CHEM 210-2. No P/N registration. Must be taken concurrently with CHEM 232-2. Prerequisites: CHEM 212-1 and CHEM 232-1 (C- or better). *Natural Sciences Distro Area*

CHEM 212-3 Organic Chemistry (1 Unit) Primarily for chemistry majors and students in ISP. Similar to CHEM 210-3 except with no concurrent laboratory course. No P/N registration. Prerequisites: CHEM 212-2 and CHEM 232-2 (C- or better). *Natural Sciences Distro Area*

CHEM 220-0 Introductory Instrumental Analysis (1 Unit) 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: CHEM 132-0 and CHEM 142-0, or CHEM 152-0 and CHEM 162-0, or CHEM 172-0 and CHEM 182-0 (C- or better), or equivalent.

CHEM 230-2 Organic Chemistry Lab I (0.34 Unit) Instruction in experimental techniques of modern organic chemistry emphasizing chemical separations, spectroscopic characterization, and reactions of alkanes, alkenes, alkyl halides, alcohols, carbonyls, esters, and aromatic compounds. Must be taken concurrently with CHEM 210-2. Prerequisite: CHEM 210-1 (C- or better).

CHEM 230-3 Organic Chemistry Lab II (0.34 Unit) Experimental techniques of modern organic chemistry emphasizing chemical separations, spectroscopic characterization, and reactions such as amide synthesis, Grignard reaction, aldol condensation, Robinson annulation, and DielsAlder reaction. Must be taken concurrently with CHEM 210-3. Prerequisite: CHEM 210-2 and CHEM 230-2 (C- or better).

CHEM 232-1 Organic Chemistry Laboratory I (0.34 Unit) For ISP students and chemistry majors. Molecular modeling, unknown identification by spectroscopic methods, and experimental techniques of modern chemistry emphasizing reactions of alkanes, alkenes, alkyl halides, alcohols, and carbonyls. Must be taken concurrently with CHEM 212-1. Prerequisite: CHEM 132-0 and CHEM 142-0, or CHEM 152-0 and CHEM 162-0, or CHEM 172-0 and CHEM 182-0 (C- or better), or equivalent.

CHEM 232-2 Organic Chemistry Laboratory II (0.34 Unit) For ISP students and chemistry majors. Techniques of modern organic chemistry including NMR spectroscopy and reactions such as electrophilic aromatic substitution, esterification, Grignard reaction, aldol condensation, Robinson annulation, and DielsAlder reaction. Must be taken concurrently with CHEM 212-2 (C- or better). Prerequisite: CHEM 212-1 and CHEM 232-1 (C- or better).

CHEM 301-0 Principles of Organic Chemistry (1 Unit) Introduction to the field of physical organic chemistry. Topics include bonding and structure, conformational analysis, stereochemistry, acids and bases, reactivity, and reaction mechanisms. CHEM 301-0 and CHEM 401-0 are taught together. Prerequisite: CHEM 212-3 or CHEM 210-3 and CHEM 230-3 (C- or better) and 1 quarter of physical chemistry; or consent of instructor.

CHEM 302-0 Principles of Inorganic Chemistry (1 Unit) Topics in advanced inorganic chemistry. CHEM 302-0 and CHEM 402-0 are taught together. Prerequisite: CHEM 333-0 or consent of instructor.

CHEM 303-0 Principles of Physical Chemistry (1 Unit) An overview of advanced topics in physical chemistry. CHEM 303-0 and CHEM 403-0 are taught together. Prerequisite: CHEM 342-1 and CHEM 342-2 and CHEM 342-3.

CHEM 305-0 Chemistry of Life Processes (1 Unit) Topics in the chemistry and biochemistry of life processes. Taught with CHEM 405-0. Prerequisite: CHEM 210-3 and CHEM 230-2 or CHEM 212-3 and 1 biochemistry course; or consent of instructor.

CHEM 306-0 Environmental Chemistry (1 Unit) Topics in the physical chemistry of the environment. Taught with CHEM 406-0. Prerequisites: CHEM 210-3 and CHEM 230-3 or CHEM 212-3 (C- or better); MATH 234-0, MATH 250-0; PHYSICS 135-1 and PHYSICS 135-2; or consent of instructor.

CHEM 307-0 Materials and Nanochemistry (1 Unit) Introduction to frontier research at the interface of chemistry and materials science. CHEM 307-0 and CHEM 407-0 are taught together. Prerequisite: CHEM 212-3 or CHEM 210-3 and CHEM 230-3 (C- or better).

CHEM 308-0 Design, Synthesis, and Applications of Nanomaterials (1 Unit) Fabrication, chemical synthesis, assembly, and characterization of controlled-dimensionality materials, including metals, semiconductors, oxides, polymers, and mesoporous scaffolds. Interfacial phenomena and particle stability, nano forms of carbon, and material design. Taught with CHEM 408-0. Prerequisites: 1 quarter of physical chemistry or consent of instructor.

CHEM 313-0 Advanced Organic Chemistry 1. Advanced concepts of organic reactivity and selectivity in synthesis. (1 Unit) Strategies and tactics involved in complex target synthesis. Modern reaction classes as applied to chemical synthesis, coupled to in-depth discussion of the underlying key principles of synthesis design and execution, are covered in the class. Students will gain experience in problem solving, creative thinking, structural analysis and presentation skills.

CHEM 314-0 Bioorganic Chemistry (1 Unit) Introduction to using chemical principles in biology and medicine. Experimental techniques and experiments in chemical biology. Suitable for students in chemistry, engineering, and biology. Taught with CHEM 415-0. Prerequisites: CHEM 210-3 and CHEM 230-3 or CHEM 212-3 (C- or better) and 1 quarter of biology; or consent of instructor.

CHEM 316-0 Medicinal Chemistry: the Organic Chemistry of Drug Design and Action (1 Unit) 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: CHEM 210-3 and CHEM 230-3, or CHEM 212-3 (C- or better), or consent of instructor.

CHEM 319-0 Advanced Organic Synthesis - Concepts and Applications (1 Unit) Synthesis of natural products and other medicinally relevant organic compounds. Retrosynthetic analysis, substructure keying, and pattern recognition. Classic and modern organic reactions. Terpenes, alkaloids, polyketides, steroids, proteins, and pharmaceuticals. Prerequisite: CHEM 210-3 and CHEM 230-3 or CHEM 212-3 (C- or better).

CHEM 329-0 Analytical Chemistry (1 Unit) Principles and applications of analytical methods, with emphasis on advanced separation science, dynamic electrochemistry, and advanced mass spectrometry. No P/N registration. Prerequisite: CHEM 342-1 or CHEM 342-2 (C- or better).

CHEM 333-0 Inorganic Chemistry (1 Unit) Descriptive chemistry of some important elements. Current concepts and models of chemical bonding. Prerequisites: 2 200- or 300-level chemistry courses.

CHEM 342-1 Thermodynamics (1 Unit) Laws of applications of thermodynamics. Thermochemistry, chemical potentials, solution thermodynamics, nonideal gases. Prerequisites: CHEM 132-0 and CHEM 142-0, or CHEM 152-0 and CHEM 162-0, or CHEM 172-0 and CHEM 182-0 (C- or better); MATH 230-0; PHYSICS 135-1 and PHYSICS 136-1 and PHYSICS 135-2 and PHYSICS 136-2 (PHYSICS 135-2 and PHYSICS 136-2 may be taken concurrently).

CHEM 342-2 Quantum Mechanics and Spectroscopy (1 Unit) Quantum mechanics with emphasis on atomic and molecular electronic structure. Electronic, vibrational, rotational, and magnetic resonance spectroscopy. Prerequisites: MATH 230-0 (MATH 234-0 recommended also); PHYSICS 135-1 and PHYSICS 136-1 and PHYSICS 135-2 and PHYSICS 136-2.

CHEM 342-3 Kinetics and Statistical Thermodynamics (1 Unit) Chemical kinetics, including experimental techniques and theories of rate processes. Statistical mechanics, including Boltzmann distribution, partition functions, and applications to thermodynamics. Prerequisites: CHEM 342-1 and CHEM 342-2 (C- or better).

CHEM 348-0 Physical Chemistry for ISP (1 Unit) Gas laws and properties; kinetic theory; first, second, and third laws; phase equilibria; mixtures, phase diagrams, statistical thermodynamics, kinetics. Prerequisites: ISP enrollment; CHEM 172-0 and CHEM 182-0 (C- or better); MATH 281-1, MATH 281-2, MATH 281-3; or consent of department.

CHEM 350-1 Advanced Laboratory 1 (1 Unit) Advanced laboratory techniques in synthetic and analytical chemistry and spectroscopy: mass spectrometry, chromatography, NMR spectroscopy, and organic synthesis techniques. Prerequisites: CHEM 220-0 and CHEM 212-3 (C- or better) or equivalent.

CHEM 350-2 Advanced Laboratory 2 (1 Unit) Advanced laboratory techniques in synthetic and analytical chemistry and spectroscopy, polymer characterization methods, electrochemistry, x-ray crystallography, atomic spectroscopy, and inorganic synthesis techniques. Prerequisites: CHEM 333-0 and CHEM 350-1 (C- or better) or equivalent.

CHEM 350-3 Advanced Laboratory 3 (1 Unit) Advanced laboratory techniques in synthetic and analytical chemistry and spectroscopy: infrared and Raman spectroscopy, electronic spectroscopy, fast kinetics, organic and inorganic synthesis techniques in a self-guided project. Prerequisites: CHEM 342-2 or equivalent and CHEM 350-2 (C- or better).

CHEM 360-0 Nanopatterning: Top-down meets Bottom-up (1 Unit) Introduction to current problems in nanoscale science and technology; hands-on experience with nanoscale characterization tools and benchtop nanoscale experiments. With laboratory. Prerequisite: CHEM 132-0 and CHEM 142-0, or CHEM 152-0 and CHEM 162-0, or CHEM 172-0 and CHEM 182-0 (C- or better), or equivalent. *Natural Sciences Distro Area*

CHEM 393-0 Green Chemistry (1 Unit) Practices of environmentally benign chemistry as applied to the chemical industry. Introduction to the

concept and discipline of green chemistry; growth and expansion of the discipline in historical context from its origins in the early 1990s to the present. Prerequisite: CHEM 210-3 and CHEM 230-3 or CHEM 212-3 (C- or better).

CHEM 398-0 Undergraduate Seminar (1 Unit) Advanced work for superior students through supervised reading, research, and discussion. Prerequisite: consent of department.

CHEM 399-0 Independent Study (1 Unit) Faculty-directed research. Must be taken P/N for first 2 quarters. Prerequisite: consent of department.

Chemistry Major

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.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Department Courses (16.68–17.68 units)	
14.68–15.68 core units providing a solid basis in chemistry	
CHEM 110-0 & CHEM 131-0 & CHEM 141-0 & CHEM 132-0 & CHEM 142-0 or CHEM 151-0 & CHEM 161-0 & CHEM 152-0 & CHEM 162-0 or CHEM 171-0 & CHEM 181-0 & CHEM 172-0 & CHEM 182-0	Quantitative Problem Solving in Chemistry and General Chemistry 1 and General Chemistry Laboratory 1 and General Chemistry 2 and General Chemistry Laboratory 2 Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1 and Accelerated General Chemistry 2 and Accelerated General Chemistry Laboratory 2 Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory and Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory
CHEM 220-0	Introductory Instrumental Analysis
CHEM 212-1 & CHEM 212-2 & CHEM 212-3 & CHEM 232-1 & CHEM 232-2 or CHEM 210-1 & CHEM 210-2 & CHEM 210-3 & CHEM 230-2 & CHEM 230-3	Organic Chemistry and Organic Chemistry and Organic Chemistry and Organic Chemistry Laboratory I and Organic Chemistry Laboratory II Organic Chemistry and Organic Chemistry and Organic Chemistry and Organic Chemistry Lab I and Organic Chemistry Lab II
CHEM 333-0	Inorganic Chemistry
CHEM 342-1 & CHEM 342-2 & CHEM 342-3	Thermodynamics and Quantum Mechanics and Spectroscopy and Kinetics and Statistical Thermodynamics
CHEM 350-1 & CHEM 350-2 & CHEM 350-3	Advanced Laboratory 1 and Advanced Laboratory 2 and Advanced Laboratory 3
2 courses from one of these concentration areas:	
Biochemistry (p. 216)	
Environmental Chemistry (p. 216)	
Inorganic Chemistry (p. 216)	
Organic Chemistry (p. 216)	

Physical Chemistry (p. 216)	
Materials/Nanotechnology (p. 216)	
Self-designed Concentration (p. 217)	
Related Courses (Units depend on mathematics courses taken.)	
BIOL_SCI 241-0	Biochemistry for ISP
or BIOL_SCI 301-0	Principles of Biochemistry
or BIOL_SCI 308-0	Biochemistry
MATH 220-0 & MATH 224-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions
or MATH 212-0 & MATH 213-0 & MATH 214-0	Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
MATH 230-0 & MATH 234-0	Differential Calculus of Multivariable Functions and Multiple Integration and Vector Calculus
or MATH 281-1 & MATH 281-2	Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year
or MATH 285-2 & MATH 285-3	Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year
or MATH 290-2 & MATH 290-3	MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus
or MATH 291-2 & MATH 291-3	MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus
PHYSICS 125-1 & PHYSICS 125-2 & PHYSICS 125-3 & PHYSICS 126-1 & PHYSICS 126-2 & PHYSICS 126-3	General Physics ISP and General Physics for ISP and General Physics for ISP and Physics for ISP Laboratory and Physics for ISP Laboratory and Physics for ISP Laboratory
or PHYSICS 135-1 & PHYSICS 135-2 & PHYSICS 135-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3	General Physics and General Physics and General Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory
or PHYSICS 140-1 & PHYSICS 140-2 & PHYSICS 140-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3	Fundamentals of Physics and Fundamentals of Physics and Fundamentals of Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory

Concentration Courses

- Areas of concentration draw upon courses within the department as well as in other departments.
- Concentration courses are typically taken during the final year of undergraduate study.
- The concentration areas, along with eligible courses, are:

Biochemistry

Course	Title
CHEM 305-0	Chemistry of Life Processes
CHEM 314-0	Bioorganic Chemistry
CHEM 316-0	Medicinal Chemistry: the Organic Chemistry of Drug Design and Action
CHEM 329-0	Analytical Chemistry
CHEM 415-0	Advanced Organic Chemistry
CHEM 432-0	X-Ray Crystallography
BIOL_SCI 361-0	Protein Structure and Function

Environmental Chemistry

Course	Title
CHEM 306-0	Environmental Chemistry
CHEM 329-0	Analytical Chemistry
CHEM 393-0	Green Chemistry
CIV_ENV 260-0	Environmental Systems and Processes
CIV_ENV 314-0	Organic Geochemistry
CIV_ENV 365-0	Environmental Laboratory
CIV_ENV 367-0	Chemical Processes in Aquatic Systems

Inorganic Chemistry

Course	Title
CHEM 302-0	Principles of Inorganic Chemistry
CHEM 329-0	Analytical Chemistry
CHEM 411-0	Organic Spectroscopy
CHEM 432-0	X-Ray Crystallography
CHEM 433-0	Structural Inorganic Chemistry
CHEM 434-0	Inorganic Chemistry
CHEM 435-0	Advanced Inorganic Chemistry

Organic Chemistry

Course	Title
CHEM 313-0	Advanced Organic Chemistry 1. Advanced concepts of organic reactivity and selectivity in synthesis.
CHEM 314-0	Bioorganic Chemistry
CHEM 316-0	Medicinal Chemistry: the Organic Chemistry of Drug Design and Action
CHEM 319-0	Advanced Organic Synthesis - Concepts and Applications
CHEM 329-0	Analytical Chemistry
CHEM 410-0	Physical Organic Chemistry
CHEM 412-0	Organometallic Reaction Mechanisms
CHEM 414-0	Advanced Organic Chemistry
CHEM 415-0	Advanced Organic Chemistry
CHEM 418-0	Organometallic Chemistry and Homogeneous Catalysis

Physical Chemistry

Course	Title
CHEM 303-0	Principles of Physical Chemistry
CHEM 329-0	Analytical Chemistry
CHEM 442-1	Quantum Chemistry
CHEM 442-2	Quantum Chemistry
CHEM 443-0	Kinetics
CHEM 444-0	Elementary Statistical Mechanics
CHEM 445-0	Advanced Physical & Analytical Chemistry
CHEM 448-0	Computational Chemistry

Materials/Nanotechnology

Course	Title
CHEM 307-0	Materials and Nanochemistry
CHEM 308-0	Design, Synthesis, and Applications of Nanomaterials
CHEM 329-0	Analytical Chemistry
CHEM 360-0	Nanopatterning: Top-down meets Bottom-up
MAT_SCI 201-0	Introduction to Materials
MAT_SCI 301-0	Materials Science Principles
MAT_SCI 331-0	Soft Materials

MAT_SCI 333-0	Composite Materials
MAT_SCI 370-0	Biomaterials

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 2 courses from the areas above or with a common theme.

Honors in Chemistry

Majors who have done outstanding work in the classroom and research laboratory may be eligible for graduation with honors in chemistry. Students who intend to submit a senior thesis should send an e-mail message (including the name of the research adviser) to the director of undergraduate studies by fall of senior year. To be eligible for honors, a student must meet minimum GPA requirements, engage in original research during at least two quarters of CHEM 399-0 Independent Study, and write a senior thesis on this research. The CHEM 399-0 credits are not required for and do not count toward the chemistry major.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information consult the director of undergraduate studies and see Honors in the Major (p. 178).

Honors Program in Medical Education Students

Chemistry majors who are also participating in the HPME program (p. 34) 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.

Chemistry Minor

The minor in chemistry allows majors in other fields to complete a significant portion of the coursework required for the chemistry major. It allows the flexible selection of coursework from the traditional subdisciplines of organic, inorganic, physical, and analytical chemistry.

Course	Title
Prerequisites	
CHEM 132-0 & CHEM 142-0	General Chemistry 2 and General Chemistry Laboratory 2
or CHEM 152-0 & CHEM 162-0	Accelerated General Chemistry 2 and Accelerated General Chemistry Laboratory 2
or CHEM 172-0 & CHEM 182-0	Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory
or equivalent	
Chemistry courses at the 300 level may have additional chemistry, physics, and/or mathematics prerequisites.	
Minor Requirements (6 units plus additional units for required labs)	
Six 200- or 300- level lecture courses ¹	

¹ Exclusive of CHEM 201-0 Chemistry of Nature and Culture, CHEM 398-0 Undergraduate Seminar, or CHEM 399-0 Independent Study.

- Life science majors and premedical students are advised to take:

Course	Title
CHEM 210-1 & CHEM 210-2 & CHEM 210-3 & CHEM 230-2 & CHEM 230-3	Organic Chemistry and Organic Chemistry and Organic Chemistry and Organic Chemistry Lab I and Organic Chemistry Lab II
or CHEM 212-1 & CHEM 212-2 & CHEM 212-3 & CHEM 232-1 & CHEM 232-2	Organic Chemistry and Organic Chemistry and Organic Chemistry and Organic Chemistry Laboratory I and Organic Chemistry Laboratory II

3 additional courses

- Physical science majors are advised to take:

Course	Title
CHEM 342-1 & CHEM 342-2 & CHEM 342-3	Thermodynamics and Quantum Mechanics and Spectroscopy and Kinetics and Statistical Thermodynamics

3 additional courses

- Students with interests in materials science, earth and planetary science, or environmental science should take:

Course	Title
CHEM 210-1 & CHEM 210-2 & CHEM 230-2 & CHEM 333-0	Organic Chemistry and Organic Chemistry and Organic Chemistry Lab I and Inorganic Chemistry

3 additional courses

- Other programs for the minor may be designed with departmental approval to suit individual needs; interested students should contact the director of undergraduate studies in chemistry.

Chemistry Second Major for ISP Students

The Integrated Science Program is a highly selective BA program in Weinberg College (see Integrated Science Program (p. 278)). Students majoring in ISP who wish to complete a second major in chemistry must take these courses:

Course	Title
Chemistry courses required for the ISP major	
Students doing the second major in chemistry may not make substitutions	
CHEM 212-1 & CHEM 232-1	Organic Chemistry and Organic Chemistry Laboratory I
CHEM 348-0	Physical Chemistry for ISP
Additional core courses required for the second major in chemistry:	
CHEM 212-2 & CHEM 212-3 & CHEM 232-2	Organic Chemistry and Organic Chemistry and Organic Chemistry Laboratory II
CHEM 220-0	Introductory Instrumental Analysis
CHEM 333-0	Inorganic Chemistry
CHEM 350-1 & CHEM 350-2 & CHEM 350-3	Advanced Laboratory 1 and Advanced Laboratory 2 and Advanced Laboratory 3
Concentration	
Two courses from a selected area ¹	

¹ See concentration areas and course lists on the Chemistry Major page (p. 215).

Chemistry BA/MS

Students who have done outstanding work during their first three years and have a professional interest in chemistry may apply for the BA/MS program when they are within 4 courses of completing undergraduate degree requirements. 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 and submit a senior thesis. Applicants should submit to the director of undergraduate studies in chemistry a course plan for the fourth year, a brief description of proposed research, an unofficial transcript, and a letter of support from the research adviser. For more information see Accelerated Master's Programs (p. 34).

Chicago Field Studies

internships.northwestern.edu

Chicago Field Studies (CFS) offers undergraduates a thoughtful view into life after college, in college. Through a combination of academic coursework, field trips, and internship experiences, students explore a range of subjects through the lenses of work and critical issues in their future fields. CFS offers a variety of courses - each quarter this includes some combination of law, civic engagement, humanities, public health, business, social justice, the environment, and the modern workplace.

A student takes a CFS course while interning, and the credit may in some cases count toward Weinberg College distribution requirements (a limit of one unit per internship experience) and toward select majors, minors, certificates, and programs, as well as general elective credit (see Internships (p. 178) for the policy limiting the number of internship credits that may be applied towards the Weinberg College degree).

CFS courses are open to students from every academic discipline who have completed one year of study. Admission is by application only, and students must complete an information session before applying. More information can be found on the CFS website.

Major/Minor Credit

A number of departments and programs allow students to use CFS courses to fulfill major or minor requirements. The type and number of credits applicable, if any, are determined by the student's department.

Other Programs

In addition to the courses listed here, CFS periodically develops new programs focusing on different fields and topics, for which credit is variable. These programs are described on the CFS website.

Chicago Field Studies Courses

Note that where a Weinberg College distribution area is listed, a student may use a maximum of one unit of credit towards that area (even if the student earns more than one unit for the course). Where more than one distribution area is listed for a course, the student may choose to where to apply that one unit of credit. More information about distribution

requirements and Interdisciplinary Studies distribution courses may be found on the page describing College Requirements (p. 175).

CFS 291-0 Analysis of Field Experience (0.25-1 Unit) This online course requires students to read, reflect upon and discuss work and workplace issues. Students examine the structure and purpose of organizations as well as workplace inclusion (race, age, ethnicity, nationality), teamwork and productivity, leadership styles and the ways that we influence each other. Students intern 10 to 40 hours a week in firms and organizations throughout the world.

CFS 387-0 Field Studies in Environment, Science, and Sustainability (1-4 Units) How conflicting political, economic, and social interests and values contend for influence and exert power in the realms of governance and urban landscapes. Students intern 10 to 40 hours a week. *Social Behavioral Sciences Distro Area*

CFS 388-0 Field Studies in Business Culture (1-4 Units) Online course focusing on critical issues shaping business culture, especially pertaining to interns and internships. Students intern 10 to 40 hours a week in firms and organizations throughout the world. *Course Meets Online*

CFS 391-0 Field Studies in Social Justice (1-4 Units) Issues vary by quarter (e.g., race, gender and sexuality, class, immigration, homelessness, poverty). Students intern 10 to 40 hours a week in advocacy, policy, and social justice organizations. *Social Behavioral Sciences Distro Area*

CFS 392-0 Field Studies in Public Health (1-4 Units) Critical issues in health; interplay between the public and academy. Students intern 10 to 40 hours a week in health- and medicine-related organizations. *Social Behavioral Sciences Distro Area*

CFS 393-1 Modern Workplace Culture (2 Units) Chicago history and workplace culture. Students intern 24 to 40 hours a week in a variety of professional fields. Taken with CFS 393-2. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

CFS 393-2 Contemporary Issues in the Workplace (2 Units) Chicago history and workplace culture. Students intern 24 to 40 hours a week in a variety of professional fields. Taken with CFS 393-1.

CFS 394-1 Legal Culture & Process (2 Units) Contemporary issues and workplace culture in the legal field. Students intern 24 to 40 hours a week in legal organizations. Taken with CFS 394-2. *Social Behavioral Sciences Distro Area*

CFS 394-2 Contemporary Issues in Law (2 Units) Contemporary issues and workplace culture in the legal field. Students intern 24 to 40 hours a week in legal organizations. Taken with CFS 394-1.

CFS 395-1 Business Workplace Culture (2 Units) Contemporary issues and workplace culture in business. Students intern 24 to 40 hours a week in business organizations (primarily finance, consulting, and marketing). Taken with CFS 395-2. *Social Behavioral Sciences Distro Area*

CFS 395-2 Contemporary Issues: Business Field Studies (2 Units) Contemporary issues and workplace culture in business. Students intern 24 to 40 hours a week in business organizations (primarily finance, consulting, and marketing). Taken with CFS 395-1.

CFS 396-0 Field Studies in Community Research (1-4 Units) Community development and research focusing on marginalized populations. Students intern 10 to 40 hours a week in community-based organizations.

CFS 397-0 Field Studies in Civic Engagement (1-4 Units) Forms of civic engagement in Chicago and Evanston during an era of renewal of citizenship and public work. Students intern 10 to 40 hours a week in civic, educational, legal, governmental, nonprofit, or community-based organizations. *Social Behavioral Sciences Distro Area*

CFS 398-0 Field Studies in Humanities (1-4 Units) Critical issues in the public humanities; interplay between the public and the humanities. Students intern 10 to 40 hours a week with museums and arts and public humanities organizations. *Literature Fine Arts Distro Area*

Chinese

See Asian Languages and Cultures (p. 199).

Classics

classics.northwestern.edu

Classics majors and minors study the language, literature, history, and culture of Greek and Roman antiquity. The department offers a wide range of topics and has strengths in Greek and Latin literature, mythology, Greek history, the ancient economy, and ancient philosophical writing. 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 languages. For a classics minor, students may choose a concentration with readings in Latin or in Greek or a classical studies concentration with sources in English translation only. Additional information about classics programs and courses is available on the department website or in the department office.

The Teaching of Latin

Weinberg College students pursuing a major in classics who also wish to be certified for secondary teaching (p. 106) of Latin are urged to contact the Office of Student Affairs in the School of Education and Social Policy as early as possible in their academic careers. For information about teaching careers in Latin and opportunities for mentoring and classroom observation, see the director of undergraduate studies in the Department of Classics.

Study Abroad

The department strongly encourages students to undertake study abroad for a summer, a term, or the academic year at, for example, the Intercollegiate Center for Classical Studies in Rome, Arcadia University in Athens, or the summer program at the American School of Classical Studies in Athens. Interested students should consult with the director of undergraduate studies in fall of the previous year to ensure sufficient time to prepare applications and plan for appropriate credit toward the major.

Language Placement

Students must either complete the 100-level language sequence before enrolling in GREEK 201-1 Introduction to Greek Literature or LATIN 201-1

Introduction to Latin Literature or test into the 200-level courses. Completion of the 200-level series or permission of the instructor is a prerequisite for enrollment in 300-level language courses. Placement results may not be counted for credit toward the total number of courses required, e.g., the 6 additional courses for the major. More advanced coursework must be completed instead.

Classical Traditions Courses

Offered in departments other than classics, classical traditions courses give significant attention to ancient Greece or Rome, or to the use of Greek or Roman culture in some later tradition. They may be used to satisfy certain major and minor requirements. To determine which current courses meet the criteria, students should consult the director of undergraduate studies. Courses that have recently met the criteria include:

Course	Title
ART_HIST 310-1	Ancient Art: Greece
ART_HIST 310-2	Ancient Art
ENGLISH 383-0	Special Topics in Theory
PHIL 210-1	History of Philosophy - Ancient
PHIL 310-0	Studies in Ancient Philosophy
POLI_SCI 301-0	Classical Political Theory
THEATRE 373-1	Acting II: Analysis and Performance

Programs of Study

- Classics Major (p. 221)
- Classics Minor Concentrations (p. 222)

See below for Courses with Readings in Greek (p. 220), and Courses with Readings in English (p. 220).

Courses with Readings in Latin

LATIN 101-1 Elementary Latin (1 Unit) Classical Latin vocabulary, grammar, and syntax with graded readings for translation. Course one of three.

LATIN 101-2 Elementary Latin (1 Unit) Classical Latin vocabulary, grammar, and syntax with graded readings for translation. Course two of three. Prerequisite: LATIN 101-1 or departmental placement.

LATIN 101-3 Elementary Latin (1 Unit) Classical Latin vocabulary, grammar, and syntax with graded readings for translation. Course three of three. Prerequisite: LATIN 101-2 or departmental placement.

LATIN 201-1 Introduction to Latin Literature (1 Unit) Grammar and vocabulary review. Readings in Cicero, Virgil, and Catullus; emphasis on literary analysis. Prerequisites: LATIN 101-3 or department placement.

LATIN 201-2 Introduction to Latin Literature (1 Unit) Grammar and vocabulary review. Readings in Cicero, Virgil, and Catullus; emphasis on literary analysis. Prerequisites: LATIN 201-1 or department placement.

LATIN 201-3 Introduction to Latin Literature (1 Unit) Grammar and vocabulary review. Readings in Cicero, Virgil, and Catullus; emphasis on literary analysis. Prerequisites: LATIN 201-2 or department placement.

LATIN 310-0 Readings in Latin Literature (1 Unit) Selected topics and authors including Virgil, Horace, Ovid, Cicero, Tacitus, and Seneca. May be repeated for credit with different topics. Prerequisites: LATIN 201-3 or consent of instructor. *Literature Fine Arts Distro Area*

LATIN 313-0 Latin Prose Composition: Advanced Syntax & Composition (1 Unit) Rapid review of Latin morphology and basic grammar, followed by careful study of the syntax of Latin prose and by practice in prose composition. Prerequisite: LATIN 201-3 or equivalent.

LATIN 399-0 Independent Study (1 Unit) Individual program of study under the direction of a faculty member. For advanced students only. Permission of department required.

Courses with Readings in Greek

GREEK 101-1 Elementary Greek (1 Unit) Vocabulary, forms, and syntax of Attic Greek. Course one of three.

GREEK 101-2 Elementary Greek (1 Unit) Vocabulary, forms, and syntax of Attic Greek. Course two of three. Prerequisite: GREEK 101-1 or departmental placement.

GREEK 101-3 Elementary Greek (1 Unit) Vocabulary, forms, and syntax of Attic Greek. Course three of three. Prerequisite: GREEK 101-2 or departmental placement.

GREEK 115-1 Accelerated Elementary Ancient and Biblical Greek (1 Unit) This is the first in an accelerated two-quarter series designed to teach students to read ancient Greek texts, from the biblical New Testament to Homeric poetry and Platonic philosophy. These two quarters will teach all the fundamentals of grammar and vocabulary and lead students directly into a course dedicated to reading the Greek New Testament, and classical Greek texts thereafter. Usually taught in the Winter.

GREEK 115-2 Accelerated Elementary Ancient and Biblical Greek (1 Unit) This is the second in an accelerated two-quarter series designed to teach students to read ancient Greek texts, from the biblical New Testament to Homeric poetry and Platonic philosophy. These two quarters will teach all the fundamentals of grammar and vocabulary and lead students directly into a course dedicated to reading the Greek New Testament, and classical Greek texts thereafter. Usually taught in the Spring. Prerequisite: GREEK 115-1 or departmental placement.

GREEK 201-1 Introduction to Greek Literature (1 Unit) Review of basic grammar and vocabulary. Representative selections from Greek authors in their historical and cultural contexts. Prerequisite: GREEK 101-3, GREEK 115-2, or departmental placement.

GREEK 201-2 Introduction to Greek Literature (1 Unit) Review of basic grammar and vocabulary. Representative selections from Greek authors in their historical and cultural contexts. Prerequisite: GREEK 201-1, or departmental placement.

GREEK 201-3 Introduction to Greek Literature (1 Unit) Review of basic grammar and vocabulary. Representative selections from Greek authors in their historical and cultural contexts. Prerequisite: GREEK 201-2, or departmental placement.

GREEK 201-4 Introduction to Greek Literature: Intensive (1 Unit) For students who have completed GREEK 201-1 or equivalent. Review of ancient Greek grammar and syntax and development of reading skills to prepare for third-year level. Four classes a week. May not receive credit for both GREEK 201-4 and GREEK 201-2, GREEK 201-3.

GREEK 301-0 Readings in Greek Literature (1 Unit) Selected authors and topics. Topics recently offered include Homer, Plato, Aeschylus, Herodotus, Sophocles, and Thucydides. May be repeated for credit with

different topics. Prerequisite: GREEK 201-3 or consent of instructor. *Literature Fine Arts Distro Area*

GREEK 399-0 Independent Study (1 Unit) 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 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

CLASSICS 110-0 A Study of Scientific Vocabulary Through Classical Roots (1 Unit) Greek and Latin etymology in the vocabulary of the sciences. Designed primarily for science or medical students. Self-paced independent study.

CLASSICS 210-0 The World of Homer (1 Unit) Introduction to the history and material culture of Iron Age Greece. Society, economy, art, and archaeology of the Greek world that gave rise to the Homeric epic. CLASSICS 210-0 and HUM 205-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

CLASSICS 211-0 Ancient Athens: Democracy, Drama, Civilization (1 Unit) History, literature, philosophy, and art in ancient Athens. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

CLASSICS 212-0 Rome: Culture and Empire (1 Unit) Development and character of the Roman Republic and Empire, emphasizing political and social institutions. Roman origins of Europe's politics, religion, literature, and ideas. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

CLASSICS 245-0 Classics and the Cinema (1 Unit) 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 20th century United States. *Literature Fine Arts Distro Area*

CLASSICS 250-0 Literatures of the Ancient World (1 Unit) Introduction to ancient Mediterranean literatures through study of thematically related texts from various cultures and periods and to interpretive techniques and debates about them. Content varies; may be repeated for credit with different topic. *Literature Fine Arts Distro Area*

CLASSICS 260-0 Classical Mythology (1 Unit) Introduction to Greek and Roman traditional narratives. Emphasis on the social, political, and religious values that they engage. *Ethics Values Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

CLASSICS 310-0 Archaeology of the Ancient Mediterranean (1 Unit) Content varies; may be repeated for credit with different topic. Recent topics include archaeology and nationalism, archaeology of the theater, and archaeology of empire. Prerequisite: Any CLASSICS 200-level course, selected courses in anthropology and art history, or permission of instructor. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

CLASSICS 320-0 Greek and Roman History (1 Unit) 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. *Historical Studies Distro Area*

CLASSICS 330-0 Ancient Economy (1 Unit) Introduction to the preindustrial economy of the Roman Empire, highlighting its difference from postindustrial economies. Farming, transportation, demography, urbanism, technology, trade, and economic growth. *Historical Studies Distro Area*

CLASSICS 340-0 Greek and Roman Drama (1 Unit) Analysis of key works of ancient drama, chiefly tragedy and comedy; their material setting in the Greco-Roman Mediterranean; ancient drama's literary and performance aspects and social, political, and economic contexts. *Literature Fine Arts Distro Area*

CLASSICS 350-0 Greek and Latin Literature (1 Unit) Content varies; may be repeated for credit with different topic. Recent topics include love in antiquity, Roman comedy, and Roman literature and imperialism. *Literature Fine Arts Distro Area*

CLASSICS 360-0 Origins of Greek Democracy (1 Unit) Emergence of the world's first democracies in archaic Greece, 750-460 BCE. 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. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Social Behavioral Sciences Distro Area*

CLASSICS 370-0 Greek and Roman Religion (1 Unit) History and analysis of pagan religions of Greece and Rome and religions of the Roman Empire. Literary and material evidence; ancient and modern theories about ancient religions. *Ethics Values Distro Area*

CLASSICS 390-0 Topics in Greco-Roman Civilization (1 Unit) Content varies; may be repeated for credit with different topic. Recent topics include stoicism and ancient Rome in Chicago.

CLASSICS 395-0 Research Seminar (1 Unit) Development of critical reading and writing skills and acquisition of information literacy as applied to resources in classics. Required for the major. Prerequisite: junior or senior standing, or permission of the instructor.

CLASSICS 397-0 Exhibiting Antiquity: The Culture and Politics of Display (1 Unit) Examination of the construction of Mediterranean antiquity through modes of reception since 1750. Analysis of programs of collecting and display and the intersection of institutional and scholarly agendas. ART_HIST 318-0, CLASSICS 397-0 and HUM 397-0 taught together; may receive credit for only 1 of these courses. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

CLASSICS 399-0 Independent Study (1 Unit) Individual program of study under the direction of a faculty member. For advanced students only. Permission of department required.

Classics Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

The major in classics offers students three paths of study. Although no previous knowledge of Latin or Greek is required, all students 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 languages, the major requirements allow some flexibility. Classics majors develop familiarity with the broad sweep of ancient history and literature and key analytical skills necessary to examine the record of Greek and Roman culture. They complete a demanding and distinctive course of study that stresses the development of important intellectual sensibilities—close reading, analytical clarity, thorough research, evaluation of evidence, logical analysis, effective writing, appreciation of nuance and subtleties, historical variability, and cultural differences. All majors complete a research project under the direction of a faculty member in a small 1-quarter seminar. Seniors pursuing honors will undertake an additional 2 quarters of research.

Each of the three tracks—Greek and Latin, Latin, or Greek—requires a minimum of 12 courses beyond the language prerequisites.

All majors are required to undertake a research project in connection with CLASSICS 395-0 Research Seminar. Topics vary from year to year. Instruction will be included in the use of traditional as well as digital research tools. Students may petition the director of undergraduate studies to substitute research conducted for a study abroad program.

Greek and Latin Concentration

Course	Title
Major Requirements: Greek and Latin Concentration (12 units)	
Prerequisites: ¹	
GREEK 201-2 & LATIN 101-3	Introduction to Greek Literature and Elementary Latin
or LATIN 201-2 & GREEK 101-3	Introduction to Latin Literature and Elementary Greek
3 foundation courses in the first language (Greek or Latin) at the 201-3 level or above	
3 foundation courses in the second language (Greek or Latin) at the 200 or 300 level	
6 additional courses:	
CLASSICS 211-0	Ancient Athens: Democracy, Drama, Civilization
CLASSICS 212-0	Rome: Culture and Empire
CLASSICS 395-0	Research Seminar
3 additional Greek, Latin, or classics courses, at least 2 of which must be at the 300 level or above (may include 1 classical traditions course with consent of the director of undergraduate studies) ²	

¹ Or equivalent placements—see Language Placement (p. 219)

² Excluding CLASSICS 110-0 A Study of Scientific Vocabulary Through Classical Roots

Latin Concentration

Course	Title
Major Requirements: Latin Concentration (12 units)	
Prerequisite:	
LATIN 201-2	Introduction to Latin Literature ¹
3 language foundation courses in Latin:	
LATIN 201-3	Introduction to Latin Literature
and/or courses at the 300 level, depending on placement	
9 additional courses:	
CLASSICS 211-0	Ancient Athens: Democracy, Drama, Civilization
CLASSICS 212-0	Rome: Culture and Empire
CLASSICS 395-0	Research Seminar

6 additional Latin, Greek, or classics courses, at least 3 of which must be at the 300 level or above (may include Greek language courses at any level and up to 2 classical traditions courses with consent of the director of undergraduate studies)²

¹ Or equivalent placement (see Language Placement (p. 219))
² Excluding CLASSICS 110-0 A Study of Scientific Vocabulary Through Classical Roots

Greek Concentration

Course	Title
Major Requirements: Greek Concentration (12 units)	
Prerequisites:	
GREEK 201-2	Introduction to Greek Literature ¹
3 language foundation courses in Greek:	
GREEK 201-3	Introduction to Greek Literature
and/or courses at the 300 level, depending on placement	
9 Additional Courses:	
CLASSICS 211-0	Ancient Athens: Democracy, Drama, Civilization
CLASSICS 212-0	Rome: Culture and Empire
CLASSICS 395-0	Research Seminar
6 additional Greek, Latin, or classics courses, at least 3 of which must be at the 300 level or above (may include Latin language courses at any level and up to 2 classical traditions courses with consent of the director of undergraduate studies) ²	

¹ Or equivalent placement (see Language Placement (p. 219))
² Excluding CLASSICS 110-0 A Study of Scientific Vocabulary Through Classical Roots

Honors in Classics

Majors with strong academic records and an interest in pursuing honors should speak with the department’s honors coordinator during spring quarter of junior year. They should come with ideas about a topic for honors work and the name of a faculty member with whom they propose to work. (Interested students completing a junior year abroad should be in contact with their intended faculty advisers during spring quarter of junior year.) By the end of reading week of spring quarter, they must submit to the honors coordinator a short research proposal supported by a preliminary bibliography. During senior year students should enroll in 2 quarters of CLASSICS 399-0 Independent Study, which may count toward the major, and complete a senior thesis.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information consult the department website (<https://www.classics.northwestern.edu/undergraduate/honors.html>) or the director of undergraduate studies, and see Honors in the Major (p. 178).

Classics Minor Concentrations

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, and they do not count toward the minor any courses in the language(s) of their major at or below the prerequisite level.

Minor requirements: Latin concentration (6 units)

Prerequisite: LATIN 101-3 Elementary Latin or equivalent placement (see Language Placement (p. 219))

- 3 Latin courses at the 200 or 300 level
- 3 additional Latin and/or classics courses (excluding CLASSICS 110-0), 1 of which must be LATIN 310-0 (may include 1 classical traditions course with consent of the director of undergraduate studies)

Minor requirements: Greek concentration (6 units)

Prerequisite: GREEK 101-3 Elementary Greek or equivalent placement (see Language Placement (p. 219))

- 3 Greek courses at the 200 or 300 level
- 3 additional Greek and/or classics courses (excluding CLASSICS 110-0), 1 of which must be at the 300 level (may include 1 classical traditions course with consent of the director of undergraduate studies)

Minor requirements: Classical studies (6 units)

Course	Title
2 courses from: ¹	
CLASSICS 210-0	The World of Homer
CLASSICS 211-0	Ancient Athens: Democracy, Drama, Civilization
CLASSICS 212-0	Rome: Culture and Empire
CLASSICS 260-0	Classical Mythology
4 additional classics, classical traditions, Greek, or Latin courses, at least 2 of which must be at the 300 level and none of which may be CLASSICS courses at the 100 level	

¹ Classics majors may substitute additional 200- or 300- level courses in classics, classical traditions, Greek, or Latin

Cognitive Science

cogsci.northwestern.edu

Cognitive science is the scientific study of the mind with the goal of understanding the nature of thought. Students learn the ways in which converging sources of evidence may be integrated to discover the mechanisms underlying the complex adaptive properties of human cognition. The major in cognitive science gives a broad foundation in this interdisciplinary field, encompassing cognitive psychology, linguistics, artificial intelligence, neuroscience, and related disciplines. Required introductory courses survey basic phenomena and approaches; basic methodology courses impart the 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 proseminar focuses on ongoing research in the field by Northwestern faculty.

For additional information about the Program in Cognitive Science see the program director.

Programs of Study

- Cognitive Science Major (p. 223)
- Cognitive Science Minor (p. 225)

COG_SCI 202-0 Evaluating Evidence (1 Unit) Introduction to evaluation of qualitative and quantitative evidence across science, politics, society, health, education, and industry. *Social Behavioral Sciences Distro Area*

COG_SCI 207-0 Introduction to Cognitive Modeling (1 Unit) Introduction to artificial intelligence and cognitive science from a nontechnical perspective. Fundamental questions concerning thinking, beliefs, language understanding, education, and creativity. *Formal Studies Distro Area*

COG_SCI 210-0 Language and the Brain (1 Unit) The study of language and its biological basis from linguistic, psychological, and neuroscientific perspectives. *Natural Sciences Distro Area*

COG_SCI 211-0 Learning, Representation & Reasoning (1 Unit) Interdisciplinary study of the nature of the mind with emphasis on learning, representation, and reasoning. *Social Behavioral Sciences Distro Area*

COG_SCI 220-0 Selected Topics in Cognitive Science (1 Unit) Topics in cognitive science. Content varies. May be repeated for credit with change of topic.

COG_SCI 245-0 Presenting Ideas & Data (1 Unit) Understanding principles of cognitive psychology, data visualization, and graphic design to present ideas and data in an engaging, clear, and memorable manner. PSYCH 245-0 and COG_SCI 245-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

COG_SCI 366-0 Cognitive Science Proseminar (1 Unit) New and ongoing research by Northwestern faculty. Prerequisite: consent of instructor.

COG_SCI 398-1 Senior Thesis Seminar (1 Unit) Independent research for a senior thesis under the direction of department faculty. By invitation only.

COG_SCI 398-2 Senior Thesis Seminar (1 Unit) Independent research for a senior thesis under the direction of department faculty. By invitation only.

COG_SCI 399-0 Independent Study (1 Unit) Faculty-directed research. Consent of instructor required.

Cognitive Science Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Major Requirements (16 units)	
3 introductory courses:	
COG_SCI 207-0	Introduction to Cognitive Modeling
COG_SCI 210-0	Language and the Brain
COG_SCI 211-0	Learning, Representation & Reasoning
3 basic methodology courses:	
EECS 110-0	Introduction to Computer Programming

or EECS 111-0	Fundamentals of Computer Programming
PSYCH 201-0	Statistical Methods in Psychology
COG_SCI 202-0	Evaluating Evidence (PSYCH 205-0 Research Methods in Psychology may be substituted for COG_SCI 202-0 Evaluating Evidence)

3 core courses: 1 course each from three of the following areas:

Artificial Intelligence

EECS 348-0	Introduction to Artificial Intelligence
------------	---

Cognitive Neuroscience

PSYCH 212-0	Introduction to Neuroscience
PSYCH 361-0	Brain Damage and the Mind
CSD 303-0	Brain and Cognition

Cognitive Psychology

PSYCH 228-0	Cognitive Psychology
-------------	----------------------

Learning Sciences

LOC 308-0	Redesigning Everyday Organizations
LOC 313-0	Learning and Thinking in Organizations

Linguistics

LING 250-0	Sound Patterns in Human Language
LING 260-0	Formal Analysis of Words & Sentences
LING 270-0	Meaning

Philosophy of Mind

PHIL 225-0	Minds and Machines
PHIL 325-0	Philosophy of Mind

Music Cognition

MUS_THRY 251-0	Music and Mind
----------------	----------------

1 advanced proseminar:

COG_SCI 366-0	Cognitive Science Proseminar (ideally should be taken in sophomore year)
---------------	--

6 advanced electives, at least 3 in a concentration listed below and at least 2 outside that area, chosen from:

Artificial Intelligence (p. 223)
Cognitive Neuroscience (p. 224)
Cognitive Psychology (p. 224)
Communication Science and Disorders (p. 224)
Culture and Cognition (p. 224)
Learning and Instruction (p. 224)
Linguistics (p. 224)
Music Cognition (p. 225)
Philosophy (p. 225)

Other 300- and 400-level courses may be counted as advanced electives with consent of the cognitive science adviser.

Independent study (399) in cognitive science or in one of the departments listed above, which is strongly recommended, may count as an advanced elective.
For students pursuing honors, the second quarter COG_SCI 398-2 Senior Thesis Seminar may count as an advanced elective.

- At most 5 courses counted toward the cognitive science major may be double-counted toward another major. Courses used to meet major requirements may not be double-counted toward a minor.

Advanced Elective Areas

Artificial Intelligence

Course	Title
EECS 325-1	Artificial Intelligence Programming
EECS 337-0	Natural Language Processing
EECS 338-0	Practicum in Intelligent Information Systems

EECS 344-0	Design of Computer Problem Solvers
EECS 348-0	Introduction to Artificial Intelligence
EECS 349-0	Machine Learning
EECS 371-0	Knowledge Representation and Reasoning
EECS 372-0/472-0	Designing & Constructing Models with Multi-Agent Language
EECS 432-0	Advanced Computer Vision
Relevant sections of:	
EECS 395-0	Special Topics in Electrical Engineering and Computer Science

Cognitive Neuroscience

Course	Title
PSYCH 249-0	Buddhist Psychology
BIOL_SCI 302-0	Fundamentals of Neurobiology
CSD 303-0	Brain and Cognition
CSD 310-0	Biological Foundations of Speech and Music
PSYCH 312-2	Selected Topics in Neuroscience and Psychophysiology
NEUROSCI 320-0	Animal Behavior
PSYCH 321-0	Neuroscience & Behavior Laboratory
PSYCH 324-0	Perception
PSYCH 336-0	Consciousness
NEUROSCI 360-0	Neuroscience of Brain Disorders
PSYCH 361-0	Brain Damage and the Mind
PSYCH 365-0	Brain and Cognition
PSYCH 368-0	Human Memory
NEUROSCI 377-0	Neurobiology of Sensation and Perception
Relevant sections of:	
PSYCH 358-0	Advanced Seminar in Cognition or Neuroscience
PSYCH 460-0	Special Topics in Cognition
PSYCH 470-0	Topics in Brain, Behavior, and Cognition

Cognitive Psychology

Course	Title
PSYCH 333-0	Psychology of Thinking
PSYCH 334-0	Language and Thought
PSYCH 335-0	Decision Making
PSYCH 336-0	Consciousness
PSYCH 344-0	Cultural Psychology
PSYCH 346-0	Psychology of Instructional Design and Technology
PSYCH 362-0	Cognitive Development
PSYCH 368-0	Human Memory
PSYCH 461-0	Reasoning and Representation
PSYCH 466-0	Analogy and Similarity
Relevant sections of:	
PSYCH 358-0	Advanced Seminar in Cognition or Neuroscience
PSYCH 460-0	Special Topics in Cognition

Communication Sciences and Disorders

Course	Title
CSD 301-0	Anatomy and Physiology of the Vocal Mechanism
CSD 303-0	Brain and Cognition
CSD 306-0	Psychoacoustics
CSD 309-0	Culture, Language and Learning
CSD 342-0	Language and Cognition in Atypical Development
CSD 392-0	Language Development and Usage

CSD 406-0	Medical Aspects of Audiology
CSD 453-0	Overview of Language Disorders
CSD 454-0	Language Disorders
Relevant sections of:	
CSD 457-0	Language Science

Culture and Cognition

Course	Title
LOC 214-0	Culture and Cognition
ECON 330-0	Behavioral Economics
PSYCH 334-0	Language and Thought
LING 341-0	Language Typology
PSYCH 344-0	Cultural Psychology
ANTHRO 389-0	Ethnographic Methods and Analysis
Relevant sections of:	
ANTHRO 390-0	Topics In Anthropology
ANTHRO 395-0	Field Study in Anthropology

Learning and Instruction

Course	Title
CSD 303-0	Brain and Cognition
CSD 306-0	Psychoacoustics
LOC 313-0	Learning and Thinking in Organizations (if not counted as a core course)
CSD 342-0	Language and Cognition in Atypical Development
CSD 373-0	Learning Disabilities
CSD 392-0	Language Development and Usage
LRN_SCI 401-0	Knowledge Representation for the Learning Sciences
LRN_SCI 425-0	Introduction to Design for the Learning Sciences
LRN_SCI 426-0	Design of Technological Tools for Thinking and Learning
LRN_SCI 429-0	Design of Learning Environments
Relevant sections of:	
LRN_SCI 451-0	Topics in Learning Sciences

Linguistics

Course	Title
LING 300-0	Topics in Linguistics
LING 311-0	Child Language
LING 315-0	Experimental Approaches to Word Form Processing
LING 316-0	Experimental Syntax
LING 317-0	Experimental Pragmatics
LING 321-0	Bilingualism
LING 330-0	Research Methods in Linguistics
LING 334-0	Introduction to Computational Linguistics
LING 341-0	Language Typology
LING 342-0	Structure of Various Languages
LING 350-0	Fundamentals of Laboratory Phonology
LING 360-0	Fundamentals of Syntax
LING 361-0	Morphology
LING 370-0	Fundamentals of Meaning
LING 371-0	Reference
LING 372-0	Pragmatics
LING 373-0	Implicature

Music Cognition

Course	Title
MUS_THRY 251-0	Music and Mind
MUSIC_ED 437-0	Psychology of Music Teaching & Learning
Relevant sections of:	
MUS_THRY 335-0	Selected Topics in Music Theory
MUS_THRY 336-0	Selected Topics in Music Cognition
MUS_THRY 435-0	Selected Topics in Music Theory
MUS_THRY 436-0	Selected Topics in Music Cognition

Philosophy

Course	Title
PHIL 250-0	Elementary Logic II
PHIL 325-0	Philosophy of Mind
PHIL 327-0	Philosophy of Psychology
PHIL 330-0	Practical Reasoning and Choice
PHIL 350-0	Advanced Logic
PHIL 351-0	Advanced Topics in Philosophical Logic
PHIL 353-0	Philosophy of Language
Relevant sections of:	
PHIL 410-0	Seminar: Special Topics in Philosophy
PHIL 426-0	Seminar in Philosophy of Mind

Honors in Cognitive Science

Majors with strong academic records and an interest in pursuing honors should contact the director of undergraduate studies in early spring of junior year. Qualifying students prepare a thesis proposal under the guidance of a faculty mentor and present the proposal, along with the names of the mentor and a second faculty reader, to the program committee for review. After committee approval of the proposal, students normally enroll in COG_SCI 398-1 Senior Thesis Seminar in fall and COG_SCI 398-2 Senior Thesis Seminar in winter of senior year. With the permission of the director of undergraduate studies, 1 quarter of COG_SCI 399-0 Independent Study may be substituted for one of either COG_SCI 398-1 Senior Thesis Seminar or COG_SCI 398-2 Senior Thesis Seminar.

Students whose projects, theses, and grades meet program criteria are recommended to the college for graduation with honors. For more information consult the director of undergraduate studies and see the section on *Honors in the Major* of the Weinberg Academic Options and Support (p. 178) Page.

Cognitive Science Minor

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.

Course	Title
Minor Requirements (8 units)	
2 introductory courses chosen from:	
COG_SCI 207-0	Introduction to Cognitive Modeling
COG_SCI 210-0	Language and the Brain
COG_SCI 211-0	Learning, Representation & Reasoning
2 basic methodology courses, at least 1 from outside the student's major, chosen from:	
PSYCH 201-0	Statistical Methods in Psychology

PSYCH 205-0	Research Methods in Psychology
EECS 110-0	Introduction to Computer Programming
EECS 111-0	Fundamentals of Computer Programming

4 additional courses:

Must be chosen from at least two areas. (For available areas, see the advanced electives for the major.)
At least 3 must be at the 300 level.
At least 3 must be outside the student's major department or program.
At least 1 must be chosen from the core courses listed in the cognitive science major requirements.

Comparative Literary Studies

complit.northwestern.edu

The Comparative Literary Studies 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 hold 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 disciplines such as art history, film studies, music, and philosophy, the CLS program examines literary texts 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 and methods that shape literary and other humanistic studies.

In contrast to studying one culture's literature over a specific time period, CLS juxtaposes literatures of different cultures and epochs, studying the themes, conventions, and movements shared by distinct literary traditions as well as those features that distinguish them from each other. Building on comparative literature's traditional basis in Euro/American and western classical literatures, Northwestern's CLS Program offers students the opportunity to pursue programs of study in the literatures of South and East Asia, the Middle East, Africa, and Latin America, as well as courses offered through Native American and indigenous studies. By engaging in cross-disciplinary scholarship across languages and historical eras, students encounter the literary achievements of people with vastly different histories, frames of cultural reference, and poetic traditions.

Their course of study provides CLS students with a range of innovative theoretical approaches to literary texts, movements, and genres, along with a strong commitment to traditional literary interpretation, philological methods, and critical analysis. In considering theoretical texts ranging from the classics of ancient Greece and Roman to contemporary critical theory, students not only learn to understand specific literary works but also raise questions about their relations to other forms of discourse and about the nature of literature itself. To this end, the CLS program emphasizes the study of a diverse body of literary theories (in domains ranging from poststructuralist, psychoanalytic, feminist, and historicist approaches, to world literature, translation studies, critical race theory, and the environmental humanities) alongside the theoretical and methodological concerns of related disciplines (such as anthropology, history, philosophy, gender and sexuality studies, and sociology).

Finally, the CLS Program considers literary texts in relation to other forms of creative and cultural production. The relationship of literature to cultural practices and the arts, among them music, visual culture, fashion, and new media, is an important focus of interest in many courses, and students are encouraged to take classes in other disciplines.

Study Abroad

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

Programs of Study

- Comparative Literary Studies Major (p. 227)
- World Literature Minor (p. 227)
- Comparative Literary Studies BA/MA (p. 228)

COMP_LIT 104-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

COMP_LIT 200-0 Introduction to Literary Theory (1 Unit) Key topics and debates in literary theory and criticism; how theory actively assists in building literary and cultural comparison across history, language, nation, genre, and medium. *Literature Fine Arts Distro Area*

COMP_LIT 201-0 Reading World Literature (1 Unit) Introduction to a diverse range of important works of world literature and central debates and questions about the idea of "world literature." Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

COMP_LIT 202-0 Interpreting Culture (1 Unit) 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. *Literature Fine Arts Distro Area*

COMP_LIT 205-0 Reading Difference (1 Unit) Introduction to representations of social difference in literature, criticism, film, and media. Selective emphasis on such topics as gender, sexuality, race, ethnicity, species, and ability. Content varies. *Literature Fine Arts Distro Area*

COMP_LIT 207-0 Introduction to Critical Theory (1 Unit) Crisis, criticism, and critique in philosophical, political, and cultural contexts. Focus on the philosophical aspects of critical theory with reference to social conditions and art, literary, and/ or political forms. COMP_LIT 207-0 and PHIL 220-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area*

COMP_LIT 211-0 Readings in Genre (1 Unit) Analysis of major literary and aesthetic genres, such as epic, sacred texts, drama, lyric, visual media, and narrative. Study of particular examples, with focus on historical development, formal features, and social context. May be repeated for credit with change of topic. *Literature Fine Arts Distro Area*

COMP_LIT 270-0 Literatures in Translation (1 Unit) Focused study of literatures from around the world offered in English translation. *Literature Fine Arts Distro Area*

COMP_LIT 300-0 Theories and Practices of Reading (1 Unit) Theories and methods of literary and cultural interpretation. Discussion and readings will prepare students to undertake theoretically grounded projects comparing literature and other forms of cultural expression. Content varies. *Literature Fine Arts Distro Area*

COMP_LIT 301-0 Studies in World Literature (1 Unit) Exploration of a specific body of literature, criticism, or film that cuts across conventional national or literary historical boundaries. Attention given to critical debates about "world literature." Content varies. *Literature Fine Arts Distro Area*

COMP_LIT 302-0 Reading Across Disciplines (1 Unit) Comparative cultural studies across varied media and methodologies. May address

literature in relationship to environmental, legal, or public humanities; visual culture and curatorial practice; and music. Content varies.

Literature Fine Arts Distro Area

COMP_LIT 303-0 Movements and Periods (1 Unit) Focused study of intellectual formations belonging to a movement or period, such as Tang Dynasty, Age of Enlightenment, realism, the avant-garde, or post-WWII. Content varies. *Literature Fine Arts Distro Area*

COMP_LIT 305-0 Studies in Film, Media, and Visual Culture (1 Unit) Focused studies in international cinema or visual and other media (e.g. Brazilian documentary, Middle East visual culture, or Bollywood film). Major theoretical issues in film and media studies. Content varies. *Literature Fine Arts Distro Area*

COMP_LIT 306-0 Studies in Race & Ethnicity (1 Unit) Representations of comparative race and ethnicity in world literature, criticism, and film. Discussion and theoretical readings address racial and ethnic identity formation, intersection, and difference. Content varies. *Literature Fine Arts Distro Area*

COMP_LIT 307-0 Studies in Gender, Sexuality & Representation (1 Unit) Representations of gender and sexuality in literature, film, and criticism. Global and comparative topics situated in historical, social and political contexts. Content varies. *Literature Fine Arts Distro Area*

COMP_LIT 311-0 Theory and Practice of Translation (1 Unit) Introduction to theoretical approaches to literary translation and to the practice of poetry translation.

COMP_LIT 312-0 Major Authors and Texts (1 Unit) Study of a major author, text, or body of work in terms of its cultural context and critical reception. Content varies. *Literature Fine Arts Distro Area*

COMP_LIT 320-SA Critical Theory and Literary Studies (1 Unit) Crisis and critique as they figure in literary and cultural production. This course will examine philosophical texts on critical theory and use them to read literature and the media. This is a Study Abroad course offered through the Paris Program in Critical Theory, Literature, and Media.

COMP_LIT 383-0 Special Topics in Theory: Critical Theory (1 Unit) For students with previous study of criticism and literary theory. Content varies. May be repeated for credit with different topic.

COMP_LIT 383-SA Special Topics in Theory: Critical Theory (1 Unit) For students with previous study of criticism and literary theory. Content varies. May be repeated for credit with different topic.

COMP_LIT 390-0 Special Topics in Comparative Literature (1 Unit) Content varies-for example, problems of literary translation, literature and psychoanalysis. May be repeated for credit with different topic.

COMP_LIT 390-SA Special Topics in Comparative Literature (1 Unit) 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 (1 Unit) Tools and techniques 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 Unit)

Comparative Literary Studies Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Students pursuing a program of study in comparative literature need to be acquainted with at least two literary traditions. They choose a first literature, normally that written in their native tongue, and a second literature written in another language. They take at least 2 courses in each. They also take at least 2 courses in non-Euro/American literature, either in translation or in the original language.

The core 200-level CLS courses provide students with a range of theoretical approaches to literary texts in particular and the study of culture in general. Advanced or 300-level CLS courses build on these core courses, allowing students to use their linguistic skills to further explore literary themes, movements, genres, and periods on a comparative basis.

During their junior year, majors in CLS should meet with the director of undergraduate studies (DUS) to ensure they are on track to complete requirements for the major, including literature courses taken in different *genres, periods* and *regions*, as specified by the major description. By spring of their junior year, students must choose a faculty advisor and begin to outline a senior research project.

All majors are required to take COMP_LIT 398-0 Senior Seminar in fall quarter of senior year, during which they write a substantial senior paper (which may be based on a previous paper written for another course). Students meeting the necessary requirements may opt to pursue honors in the major, by enrolling in COMP_LIT 399-0 Independent Study in the winter quarter of their senior year, and expanding their senior essay into an Honors Thesis.

Major Requirements (12 units)

2 courses required for all majors:

- COMP_LIT 200-0 Introduction to Literary Theory
- COMP_LIT 398-0 Senior Seminar (taken during Fall quarter of senior year)

10 literature courses, which must encompass the following categories (*a single course may fill multiple requirements*):

- **200-level COMP_LIT courses:** 2 core courses in comparative literary studies, chosen from:

Course	Title
COMP_LIT 201-0	Reading World Literature
COMP_LIT 202-0	Interpreting Culture
COMP_LIT 205-0	Reading Difference
COMP_LIT 207-0	Introduction to Critical Theory
COMP_LIT 211-0	Readings in Genre

- **300-level COMP_LIT courses:** 3 advanced courses in comparative literary studies (chosen from any COMP_LIT 300-level course, except 398 or 399)
- **Language:** 4 courses
 1. 2 courses in first language, at least one 300-level
 2. 2 courses in second language, at least one 300-level (modification by consent of director of undergraduate studies)

- **Genre:** One course each devoted to three of the following four genre categories:

1. Poetry
2. Drama & Performance
3. Narrative
4. Film & Visual Studies

- **Period:** Two courses in each of two broad periods:

1. Pre-1830
2. 1830-present

- **Region:** Two non-Euro/American courses (can be in translation)

If the above category requirements are not fulfilled by the minimum of 10 literature courses, additional courses may be required. At most 2 courses counted toward the Comparative Literary Studies major may be double-counted toward another major.

Honors in Comparative Literary Studies

Majors with strong academic records may be recommended to pursue honors based on the strength of their senior essays. Recommended students expand their senior essay into a senior thesis (at least 30 pages long) during 1 quarter of independent study (COMP_LIT 399-0 Independent Study), preferably in winter quarter. The COMP_LIT 399-0 Independent Study enrollment does not count toward the 12 courses required for the major. Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information consult the program website and Honors in the Major (p. 178).

World Literature Minor

The minor in world literature, like the major in comparative literary studies, examines literary, aesthetic and cultural production beyond the boundaries of one national or linguistic tradition. It is designed for students who are interested in the global and comparative dimensions of literary study, but unable for whatever reason to complete the comparative literary studies major requirements, for example, because they may not have the language skills necessary for the major. Unlike the major, the minor in world literature does not have a language requirement. Students are encouraged to read literary texts in the original language but can also take courses where literature is read in English translation.

The minor allows students to study literatures from different parts of the world as well as different periods. Students take courses from at least two different cultural traditions and are encouraged to examine the relations between them—particularly between Euro/American traditions and those of the Middle East, Asia, Africa, and South America. In so doing students discover how literary texts circulate transnationally and thus become part of “world literature.” This crossing often involves some kind of translation, so the minor, while allowing students to read literary texts in English translation, also makes translation a primary object of investigation.

Minor Requirements (7 units)

- At least 2 COMP_LIT courses, of which 1 is COMP_LIT 201-0 Reading World Literature and the other is a 300-level course.
- 5 additional literature courses from at least two different cultural and linguistic traditions.

- Courses may be from CLS, English, or any of the foreign language departments or area-studies programs.
- At least 2 courses must be at the 300-level.

Comparative Literary Studies BA/MA

Students with a strong record in their major courses and an interest in graduate study are eligible to apply for the BA/MA program in comparative literary studies once they are within 4 courses of completing their undergraduate degrees. The application requires a statement of purpose, a plan of study, and two letters of recommendation from department faculty.

BA/MA students fulfill MA requirements by choosing 9 graduate courses in consultation with the director of graduate studies. These may be from CLS, the student’s first and/or second literature, and/or another discipline of interest (such as philosophy or film studies). They must include COMP_LIT 410-0 Theories of Literature and, during the final quarter, COMP_LIT 590-0 Research, in which the MA thesis is written. Three of the 9 units may count toward the undergraduate major.

Computer Science

The Program in Computer Science offers students the opportunity to study computer science within the context of Weinberg College’s focus on liberal arts and sciences, as distinct from the engineering context in the McCormick School’s Department of Electrical Engineering and Computer Science. The computer science requirements are identical in the two programs. Faculty and courses for the program are drawn from the McCormick EECS department, which has extensive computing facilities for student use.

Computer science is a highly interdisciplinary field. The department maintains links with other programs at Northwestern, including cognitive science, psychology, learning sciences, communication studies, radio/television/film, computer engineering, and the Transportation Center.

The computer science requirements include the following five parts. Undergraduates are encouraged to participate in research projects and to take advanced courses.

- Background or related courses: fulfill the general requirements of the University and school and provide the necessary background for study in computer science
- Core courses: basic introduction to computer science
- Breadth requirements: areas of computer science to which every CS graduate should be exposed
- Technical electives: opportunities to explore selected computer science topics in detail
- Project: exposure to significant development and/or research work

For more information on the EECS department and its course offerings, see the McCormick School chapter of this catalog (p. 137), or the EECS web site (<http://www.mccormick.northwestern.edu/eeecs>). Students are urged to speak regularly with advisers and to consult the EECS website for a detailed curriculum document.

Programs of Study

- Computer Science Major (p. 228)
- Computer Science Minor (Weinberg College) (p. 230)
- Computer Science Second Major for ISP Students (p. 230)

These courses are offered by the Robert R. McCormick School of Engineering and Applied Sciences. See Electrical Engineering and Computer Science (p. 138).

Computer Science Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Program Courses (19 units)	
<i>6 core courses:</i>	
EECS 101-0	Computer Science: Concepts, Philosophy, and Connections (recommended)
Or an additional breadth course from the breadth course lists.	
EECS 111-0	Fundamentals of Computer Programming ¹
EECS 211-0	Fundamentals of Computer Programming II
EECS 212-0	Mathematical Foundations of Comp Science
EECS 213-0	Introduction to Computer Systems
EECS 214-0	Data Structures & Algorithms
<i>5 breadth courses, 1 from each of the following five areas (see the EECS website for changes to this list):</i>	
Theory (p. 228)	
Systems (p. 228)	
Artificial Intelligence (p. 229)	
Interfaces (p. 229)	
Software Development (p. 229)	
<i>6 technical electives from the list below</i>	
Technical elective course list (p. 229)	
<i>2 project courses:</i>	
Project course list (p. 230)	
Related Courses (Units depend on mathematics sequence taken.)	
Mathematics (p. 230)	
Probability and Statistics (p. 230)	
Physics or biological sciences courses are recommended to satisfy the Weinberg College natural sciences distribution requirement.	

¹ Students without programming experience may want to first take EECS 110-0 Introduction to Computer Programming, ideally in the Python programming language

Breadth Courses

Theory

Course	Title
EECS 335-0	Introduction to the Theory of Computation
EECS 336-0	Design & Analysis of Algorithms

Systems

Course	Title
EECS 303-0	Advanced Digital Design
EECS 321-0	Programming Languages
EECS 322-0	Compiler Construction
EECS 339-0	Introduction to Database Systems
EECS 340-0	Introduction to Networking
EECS 343-0	Operating Systems
EECS 345-0	Distributed Systems
EECS 346-0	Microprocessor System Design
EECS 350-0	Introduction to Computer Security

EECS 354-0	Network Penetration & Security
EECS 358-0	Introduction to Parallel Computing
EECS 361-0	Computer Architecture I
EECS 440-0	Advanced Networking
EECS 441-0	Resource Virtualization
EECS 443-0	Advanced Operating Systems
EECS 450-0	Internet Security

Artificial Intelligence

Course	Title
EECS 325-1	Artificial Intelligence Programming
EECS 337-0	Natural Language Processing
EECS 344-0	Design of Computer Problem Solvers
EECS 348-0	Introduction to Artificial Intelligence
EECS 349-0	Machine Learning
EECS 360-0	Introduction to Feedback Systems
EECS 371-0	Knowledge Representation and Reasoning
EECS 372-0	Designing & Constructing Models with Multi-Agent Language

Interfaces

Course	Title
EECS 313-0	Tangible Interaction Design and Learning
EECS 315-0	Design, Technology, and Research
EECS 330-0	Human Computer Interaction
EECS 331-0	Introduction to Computational Photography
EECS 332-0	Introduction to Computer Vision
EECS 351-1	Introduction to Computer Graphics
EECS 352-0	Machine Perception of Music & Audio
EECS 370-0	Computer Game Design
EECS 376-0	Computer Game Design and Development
EECS 377-0	Game Design Studio

Software Development

Course	Title
EECS 338-0	Practicum in Intelligent Information Systems
EECS 377-0	Game Design Studio
EECS 394-0	Agile Software Development
EECS 473-1 & EECS 473-2	NUvention: Web - Part 1 and NUvention: Web - Part 2 ¹

¹ Must complete both quarters; EECS 473-1 NUvention: Web - Part 1 may then count toward the software development breadth requirement and EECS 473-2 NUvention: Web - Part 2 as a project course

Technical electives

Technical elective list

Course	Title
EECS 301-0	Introduction to Robotics Laboratory
EECS 303-0	Advanced Digital Design
EECS 313-0	Tangible Interaction Design and Learning
EECS 314-0	Technology and Human Interaction
EECS 315-0	Design, Technology, and Research
EECS 321-0	Programming Languages
EECS 322-0	Compiler Construction
EECS 323-0	Code Analysis and Transformation

EECS 325-1	Artificial Intelligence Programming
EECS 330-0	Human Computer Interaction
EECS 331-0	Introduction to Computational Photography
EECS 332-0	Introduction to Computer Vision
EECS 335-0	Introduction to the Theory of Computation
EECS 336-0	Design & Analysis of Algorithms
EECS 337-0	Natural Language Processing
EECS 338-0	Practicum in Intelligent Information Systems
EECS 339-0	Introduction to Database Systems
EECS 340-0	Introduction to Networking
EECS 343-0	Operating Systems
EECS 344-0	Design of Computer Problem Solvers
EECS 345-0	Distributed Systems
EECS 346-0	Microprocessor System Design
EECS 348-0	Introduction to Artificial Intelligence
EECS 349-0	Machine Learning
EECS 350-0	Introduction to Computer Security
EECS 351-1	Introduction to Computer Graphics
EECS 351-2	Intermediate Computer Graphics
EECS 352-0	Machine Perception of Music & Audio
EECS 354-0	Network Penetration & Security
EECS 361-0	Computer Architecture I
EECS 368-0	Programming Massively Parallel Processors with CUDA
EECS 369-0	Introduction to Sensor Networks
EECS 370-0	Computer Game Design
EECS 371-0	Knowledge Representation and Reasoning
EECS 372-0	Designing & Constructing Models with Multi-Agent Language
EECS 376-0	Computer Game Design and Development
EECS 377-0	Game Design Studio
EECS 396-0	Special Topics in Computer Science
EECS 397-0	Special Projects in Computer Science
EECS 433-0	Statistical Pattern Recognition
EECS 440-0	Advanced Networking
EECS 441-0	Resource Virtualization
EECS 443-0	Advanced Operating Systems
EECS 445-0	Internet-scale Experimentation
EECS 446-0	Kernel and Other Low-level Software Development
EECS 450-0	Internet Security
EECS 367-0	Wireless and Mobile Health: Passive Sensing Data Analytics
EECS 468-0	Programming Massively Parallel Processors with CUDA
EECS 472-0	Designing & Constructing Models with Multi-Agent Language
EECS 473-1	NUvention: Web - Part 1
EECS 473-2	NUvention: Web - Part 2
EECS 474-0	Probabilistic Graphical Models
EECS 496-0	Special Topics in Computer Science
EECS 497-0	Special Projects in Computer Science
EECS 367-0	Wireless and Mobile Health: Passive Sensing Data Analytics

Project Courses

Project course list

Course	Title
EECS 315-0	Design, Technology, and Research
EECS 322-0	Compiler Construction
EECS 330-0	Human Computer Interaction
EECS 332-0	Introduction to Computer Vision
EECS 337-0	Natural Language Processing
EECS 338-0	Practicum in Intelligent Information Systems
EECS 339-0	Introduction to Database Systems
EECS 340-0	Introduction to Networking
EECS 343-0	Operating Systems
EECS 344-0	Design of Computer Problem Solvers
EECS 345-0	Distributed Systems
EECS 351-1	Introduction to Computer Graphics
EECS 351-2	Intermediate Computer Graphics
EECS 354-0	Network Penetration & Security
EECS 367-0	Wireless and Mobile Health: Passive Sensing Data Analytics
EECS 370-0	Computer Game Design
EECS 371-0	Knowledge Representation and Reasoning
EECS 377-0	Game Design Studio
EECS 394-0	Agile Software Development
EECS 397-0	Special Projects in Computer Science
EECS 441-0	Resource Virtualization
EECS 450-0	Internet Security
EECS 473-2	NUvention: Web - Part 2
EECS 497-0	Special Projects in Computer Science

Related Courses

Mathematics

Course	Title
MATH 220-0 & MATH 224-0 or MATH 212-0 & MATH 213-0 & MATH 214-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
MATH 230-0	Differential Calculus of Multivariable Functions
MATH 240-0	Linear Algebra

Probability and Statistics¹

Course	Title
IEMS 201-0 or STAT 210-0 or MATH 310-1	Introduction to Statistics Introductory Statistics for the Social Sciences Probability and Stochastic Processes
Or a score of 5 on the AP Statistics Exam	

¹ STAT 202-0 Introduction to Statistics is not accepted.

NOTE

A few courses appear on more than one of the course lists above, and a student who completes such a course must choose which area to apply that course. A single course does not satisfy more than one requirement at a time.

Honors in Computer Science

Outstanding students majoring in computer science may be considered for program honors. For information on criteria and procedures, contact the program director and see Honors in the Major (p. 178).

Computer Science Minor (Weinberg College)

The program offers a minor in computer science for students who wish to develop a strong competence in computer science while majoring in another area.

Course	Title
Prerequisites	
MATH 220-0 & MATH 224-0 or MATH 212-0 & MATH 213-0 & MATH 214-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
MATH 230-0	Differential Calculus of Multivariable Functions
MATH 240-0	Linear Algebra
Minor Requirements (9 units)	
<i>6 core courses</i>	
EECS 101-0	Computer Science: Concepts, Philosophy, and Connections (recommended)
Or an additional course from the breadth course lists.	
EECS 111-0	Fundamentals of Computer Programming ¹
EECS 211-0	Fundamentals of Computer Programming II
EECS 212-0	Mathematical Foundations of Comp Science
EECS 213-0	Introduction to Computer Systems
EECS 214-0	Data Structures & Algorithms
<i>3 breadth courses in 3 separate breadth areas</i>	
Breadth courses (p. 228)	

¹ Students without programming experience may want to first take EECS 110-0 Introduction to Computer Programming, ideally in the Python programming language.

Students should begin the minor before the end of the first quarter of their junior year.

Computer Science Second Major for ISP Students

The Integrated Science Program is a highly selective program in Weinberg College. Weinberg College students, but not McCormick students, majoring in ISP may complete a limited, second major in computer science through a curriculum tailored specifically to their needs:

Course	Title
Core courses (same as for stand-alone major)	
EECS 101-0	Computer Science: Concepts, Philosophy, and Connections (recommended)
Or an additional course from the breadth course lists.	
EECS 111-0	Fundamentals of Computer Programming
EECS 211-0	Fundamentals of Computer Programming II
EECS 212-0	Mathematical Foundations of Comp Science
EECS 213-0	Introduction to Computer Systems
EECS 214-0	Data Structures & Algorithms

Breadth courses (same as for stand-alone major: 5 courses, one from each area)

Breadth courses (p. 228)

Project courses (2 units; projects must be approved by both ISP and CS advisers)

EECS 399-0

Projects

or INTG_SCI 398-0

Undergraduate Research

Critical Theory

criticaltheory.northwestern.edu

Critical theory involves the attempt to better understand power and conflict and to achieve change in or distance from the unexamined beliefs, forces, conventions, ways of thought, institutions, and routines that determine much of human life. Students will develop their ability to question the world in which they live and to formulate theoretically nuanced responses to the problems that define our historical moment.

The minor is an interdisciplinary program of study enabling undergraduates to acquire understanding of critical theory's many dimensions and fields of application. It fosters dialogue between students with shared interests in such areas as continental philosophy, comparative literature, media and communication, film studies, the social sciences, and political theory, among others. Through the undergraduate-initiated and organized Critical Theory Research Workshop (<http://www.criticaltheory.northwestern.edu/graduate/workshops/research-workshop.html>), students pursuing the minor benefit from an active undergraduate research culture. The minor is associated with Northwestern's Critical Theory Cluster (<http://www.criticaltheory.northwestern.edu/graduate/cluster.html>), a research network of over 100 faculty and graduates responsible for a vibrant program of interdisciplinary events, workshops, visiting professors, and lectures. The minor is also associated with the undergraduate Paris program in Art, Literature, and Contemporary European Thought (<http://www.ipd.northwestern.edu/study-abroad/explore/europe/critical-theory-literature-media.html>).

Program of Study

- Critical Theory Minor (p. 231)

Critical Theory Minor

Course Title

Minor Requirements (6 units)

COMP_LIT 207-0/PHIL 220-0 Introduction to Critical Theory

5 interdisciplinary 300-level courses approved by the program, including at least 1 course in each of three generally defined fields:

literary theory

political theory

philosophy

- A list of approved courses may be obtained from the program director or on the program website; students may petition the director of undergraduate studies to count courses not listed or to substitute 1 200-level course for a 300-level course.

Earth and Planetary Sciences

earth.northwestern.edu

The Earth and Planetary Sciences study the past, present, and future of the Earth and other planets. Our scientists address fundamental

scientific questions important for understanding the Earth and society's connection to it. Courses in the degree program focus on physical, chemical, and biological processes affecting the Earth system spanning vast spatial and temporal scales, from the atomic to the interplanetary and from the origin of the solar system to the modern day.

The Earth major prepares students for a range of future career trajectories including: graduate study, environmental consulting, energy exploration and production, natural resources management, law, and medicine. It is ideal for the undergraduate who is interested in the big picture of science and the world around them.

Earth majors are involved in the full spectrum of departmental activities beyond coursework, 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.

Programs of Study

- Earth and Planetary Sciences Major (p. 233)
- Earth and Planetary Sciences Minor (p. 235)
- Earth and Planetary Sciences Second Major for ISP Students (p. 235)

EARTH 101-0 Earth Science for the 21st Century (1 Unit) Introduction to earth science through topical issues facing contemporary society. Evolution of the earth, geologic hazards, natural resources, peak oil, climate change, the water cycle, nuclear fuel cycle, geology of US national parks. *Natural Sciences Distro Area*

EARTH 102-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

EARTH 103-0 Geologic Hazards (1 Unit) Examination of the principal sources of natural hazards (earthquakes, volcanoes, tsunamis, hurricanes, tornadoes) in the framework of modern geological theories. *Natural Sciences Distro Area*

EARTH 105-0 Climate Catastrophes in Earth History (1 Unit) Introduction to fundamental components of the earth system that control climate. Exploration of present-day climate change and how climate has changed (sometimes catastrophically) in the geologic past. *Natural Sciences Distro Area*

EARTH 106-0 The Ocean, the Atmosphere & Our Climate (1 Unit) 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. *Natural Sciences Distro Area*

EARTH 108-0 Geological Impacts on Civilization (1 Unit) 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. *Natural Sciences Distro Area*

EARTH 110-0 Exploration of the Solar System (1 Unit) Origin of the solar system; accretion and differentiation of planets and satellites; missions and discoveries; exoplanets and the search for life in our solar system and beyond. *Natural Sciences Distro Area*

EARTH 114-0 Evolution and the Scientific Method (1 Unit) Review of evolutionary theory and its scientific, philosophical, social, and religious impacts. *Natural Sciences Distro Area*

EARTH 201-0 Earth Systems Revealed (1 Unit) Rocks, minerals, earth surface and interior processes, basic field methods. Required weekend

field trip. Recommended Background: At least one credit in math, chemistry, biology or physics. *Natural Sciences Distro Area*

EARTH 202-0 Earth's Interior (1 Unit) The earth as a planet: origin, composition, and evolution of the solar system and the earth; internal structure of the earth; plate tectonics. Recommended Background: At least one credit in math, chemistry, biology or physics. *Natural Sciences Distro Area*

EARTH 203-0 Earth System History (1 Unit) Evolution of the earth system and its record through geological time. Interactions among the atmosphere, hydrosphere, sediments, and life on earth. Recommended Background: At least one credit in math, chemistry, biology or physics. *Natural Sciences Distro Area*

EARTH 204-0 Communication for Geoscientists (1 Unit) Science writing and presentation skills necessary for careers in the earth sciences. Topics include science writing as a language, scientific manuscript components, abstracts, poster presentations, formal talks, and informal presentations. Registration is reserved for Earth & Planetary Sciences majors and minors.

EARTH 300-0 Earth and Planetary Materials (1 Unit) Mineralogy of the earth and planets from atomic to continental scales, focusing on structure, composition, identification, and physical properties of minerals as they pertain to geological and societal applications. Recommended Background: At least one course in each of chemistry, physics, and math. *Natural Sciences Distro Area*

EARTH 301-0 Petrology: Evolution of Crustal and Mantle Rocks (1 Unit) Origin, composition, and classification of igneous, metamorphic, and sedimentary rocks. Application of laboratory characterization and basic thermodynamics to interpreting observed rock textures and mineral assemblages in terms of geological processes. Prerequisite: EARTH 300-0 or consent of instructor. *Natural Sciences Distro Area*

EARTH 302-0 Geological Thermodynamics (1 Unit) Finite strain theory, solid solution thermodynamics, phase transitions, subduction zone processes, seismic velocity structures, mineral equations of state. Prerequisite: EARTH 301-0 or consent of instructor. *Natural Sciences Distro Area*

EARTH 310-0 Aqueous Geochemistry (1 Unit) The geochemistry of rivers, groundwater, lakes, and seawater. Topics include thermodynamics, kinetics, acids and bases, pH and alkalinity, carbonate equilibria, chemical weathering, and numerical modeling. Recommended Background: At least one year of chemistry coursework. *Natural Sciences Distro Area*

EARTH 312-0 Stable Isotope Geochemistry (1 Unit) 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. Recommended Background: EARTH 201-0 and EARTH 203-0, or equivalent.

EARTH 313-0 Radiogenic Isotope Geochemistry (1 Unit) Application of radiogenic isotopes to problems in geochemistry, petrology, hydrology, oceanography, ecology, and environmental science. Includes radioactive decay, nucleosynthesis, cosmochemistry, geochronology, mixing processes, and numerical modeling. Recommended Background: At least one year of chemistry coursework.

EARTH 314-0 Organic Geochemistry (1 Unit) The sources and fates of organic matter in the natural environment; global cycling of organic carbon; applications to the study of modern and ancient

environments. Recommended Background: at least one quarter of earth or environmental science, and one quarter of chemistry. Taught with CIV_ENV 314-0; may not receive credit for both courses. *Natural Sciences Distro Area*

EARTH 323-0 Seismology and Earth Structure (1 Unit) Elastic theory, seismic waves, seismometers and seismograms, ray paths, travel times; internal structure of the earth; field seismology. Recommended Background: EARTH 202-0, calculus, ordinary differential equations, and some exposure to complex numbers. No prior earth science experience required. *Natural Sciences Distro Area*

EARTH 324-0 Earthquakes and Tectonics (1 Unit) Earthquakes: location, characteristics, origin, mechanism, and relation to plate motions; seismic hazard. Recommended Background: Calculus, ordinary differential equations, and some exposure to complex numbers. No prior earth science experience required. *Natural Sciences Distro Area*

EARTH 327-0 Geophysical Time Series Analysis (1 Unit) Analysis of seismic and other geophysical data. Sampling, windowing, discrete and fast Fourier transforms, z-transforms, deconvolution, and filtering. Recommended Background: EARTH 202-0 and calculus differential equations; or consent of instructor.

EARTH 330-0 Sedimentary Geology (1 Unit) Sedimentary rocks; stratigraphy; local, regional, and global correlation. Ancient depositional systems; facies analysis in context of tectonic, eustatic, and climatic controls on deposition. Recommended Background: EARTH 201-0 or consent of instructor.

EARTH 331-0 Field Problems in Sedimentary Geology (1 Unit) Field methods in stratigraphy and sedimentology; interpretation of depositional systems, facies models, and sequence stratigraphy based on field observations. Includes 3½-week late-summer field trip to Colorado and Utah. Prerequisite: EARTH 330-0.

EARTH 335-0 Tectonics and Structural Geology (1 Unit) 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. Recommended Background: EARTH 201-0, and at least one credit of physics; or consent of instructor.

EARTH 340-0 Atmospheric Physics & Weather (1 Unit) An investigation of atmospheric processes and the physical laws that govern them. Topics covered include atmospheric composition and structure, radiative transfer, thermodynamics, convection, precipitation, and the general circulation of the three-dimensional atmosphere. When possible, course content will engage with contemporaneous atmospheric conditions, and provide students with a better understanding of their meteorological and climatic environments. Recommended Background: Completion of full year of calculus Math and Physics. *Natural Sciences Distro Area*

EARTH 341-0 Quaternary Climate Change: Ice Ages to the Age of Oil (1 Unit) Methods for reconstructing and dating past environmental changes, causes of natural climate change, and major climate events of the Quaternary through the present. Their relevance for understanding current climate change. Prerequisite: At least one 200-level EARTH course; or consent of instructor. *Natural Sciences Distro Area*

EARTH 342-0 Contemporary Energy and Climate Change (1 Unit) Interdisciplinary course examining global energy use and associated challenges, including the history of energy use, the science of climate change, and technological, economic, and environmental aspects of

various energy sources. Registration reserved for seniors majoring in math, science, or engineering, and graduate students in all disciplines. Taught with ISEN 410-0; may not receive credit for both courses. *Natural Sciences Distro Area*

EARTH 343-0 Earth System Modeling (1 Unit) Introduction to the art and science of reducing Earth's complex systems into simple numerical models to build a better understanding of how components interact and evolve. Recommended Background: At least one 200-level course in Earth or Environmental Science, one course in each of calculus and physics. *Natural Sciences Distro Area*

EARTH 350-0 Physics of the Earth (1 Unit) Solid-earth geophysics: the earth's gravity field, the earth's magnetic field, interior of the earth, heat flow, elementary wave propagation, plate tectonics. Prerequisites: second-year standing in ISP; or comparable background in mathematics and physics and consent of both instructor and ISP director.

EARTH 352-0 Global Tectonics (1 Unit) 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. Recommended Background: EARTH 202-0, and completion of first-year calculus and physics.

EARTH 353-0 Mathematical Inverse Methods in Earth and Environmental Sciences (1 Unit) Theory and application of inverse methods to gravity, magnetotelluric, seismic, and other data. Nonlinear, linearized, underdetermined, and mixed-determined problems and solution methods, including regularized least-squares and neighborhood algorithms. Recommended Background: Linear algebra and differential calculus of multivariable functions.

EARTH 360-0 Instrumentation and Field Methods (1 Unit) Theory and practicum on electronic instrumentation for monitoring and measurement in earth sciences, including data loggers, conceptual design and construction of electronic sensors, signal processing, data management, and network design. Recommended Background: 3 EARTH courses.

EARTH 361-0 Introduction to Scientific Programming in Python (1 Unit) Introduction to coding, scientific computing, and visualization for analyzing data in the physical sciences. Emphasis on Python, but Unix, shell scripting, and Generic Mapping Tools are also introduced. Students undertake a significant final coding project individually or in pairs. *Formal Studies Distro Area*

EARTH 362-0 Data Analysis for Earth and Planetary Sciences (1 Unit) 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. Recommended Background: EARTH 201-0 and EARTH 202-0, or equivalent. *Formal Studies Distro Area*

EARTH 370-0 Geobiology (1 Unit) A technical overview of the major topics of geo(micro)biology highlighting the fossil record, biogeochemical cycling, biomineralization, key tools of the field, historical geobiology, and astrobiology. *Natural Sciences Distro Area*

EARTH 371-0 Biogeochemistry (1 Unit) The cycling of biogenic elements (C, N, S, Fe, Mn) in surficial environments. Emphasis on microbial processes and isotopic signatures. Recommended Background: At least one course in biology, chemistry, and earth or environmental science.

Taught with CIV_ENV 317-0; may not receive credit for both courses. *Natural Sciences Distro Area*

EARTH 373-0 Microbial Ecology (1 Unit) This course will provide a framework for understanding the role of microbes in natural environments in terms of cell numbers, metabolisms, and interactions with geochemical cycles. We will delve deeply into the interactions between microbial populations, higher organisms, and even our own bodies. The course will finish on a survey of microbial composition and dynamics in key settings across the planet. Recommended Background: Basic understanding of chemistry, biology, and earth science.

EARTH 380-0 Forming a Habitable Planet (1 Unit) Formation and evolution of planets permitting life; global geophysical and geochemical processes critical in our planet's development; prospects for life within our solar system and beyond; exoplanet discovery and characteristics. Recommended Background: At least one course in chemistry, and physics. *Natural Sciences Distro Area*

EARTH 381-0 Planet Formation and Evolution (1 Unit) Survey of planet formation processes including growth from the first solids to the giant planets as well as the internal evolution of planetary bodies. *Natural Sciences Distro Area*

EARTH 382-0 Cosmochemistry (1 Unit) Examine the chemical composition of the universe, the Sun, the planets, and their building blocks. Learn the origin of the elements and their evolution through Solar System history. Use isotopic data to trace cosmic genetic relationships and date important events like the birth of the first solids in the Solar System. Understand the chemical processes that segregate elements into different astrophysical and planetary reservoirs. Observe primitive and evolved meteoritic and planetary materials in the laboratory. Recommended Background: Completion of a full year of chemistry and calculus, and the earth science 200-level courses. *Natural Sciences Distro Area*

EARTH 383-0 Planetary Physics (1 Unit) Quantitative survey of planetary science including dynamics, atmospheres, surfaces, interiors, magnetospheres, rings, and small bodies. *Natural Sciences Distro Area*

EARTH 390-0 Special Topics in Earth and Planetary Science (1 Unit) Topics of current interest to students and faculty. Prerequisites vary. May be repeated for credit with different topic.

EARTH 399-0 Independent Study (1 Unit) Special problems under direct faculty supervision. Comprehensive report required. Consent of instructor required.

Earth and Planetary Sciences Major

The academic program aims to cover the breadth of geologic sub-disciplines, hone the skills necessary to succeed in Earth Science careers, and allow for choice based on student interests. Courses may include theory, descriptive studies, data analysis, computer modeling, laboratory exercises, and field training.

Students are encouraged to take the 200-level foundation courses as early as possible, but they need not be taken in sequence.

Students planning to attend graduate school are strongly encouraged to conduct independent study (EARTH 399-0 Independent Study).

Major Requirements: Department Courses (12 Units)

4 200-level Core Courses (4 units)

Course	Title
EARTH 201-0	Earth Systems Revealed
EARTH 202-0	Earth's Interior
EARTH 203-0	Earth System History
EARTH 204-0	Communication for Geoscientists

8 300-level Advanced Studies Courses (8 units)

At least one course must be from 4 of the 8 Sub-Discipline Requirement lists (see list below), and at least one course must be from each of the 3 Skills Requirement lists (see list below). Additional Advanced Studies courses to the required total of 8 may be any EARTH 300 or 400 level, but only one EARTH 399-0 Independent Study may be counted toward the major.

Sub-Discipline Requirement (4 courses)

At least one course from 4 of the 8 sub-disciplines.

Earth Materials

Course	Title
EARTH 300-0	Earth and Planetary Materials
EARTH 301-0	Petrology: Evolution of Crustal and Mantle Rocks
EARTH 302-0	Geological Thermodynamics

Geochemistry

Course	Title
EARTH 310-0	Aqueous Geochemistry
EARTH 312-0	Stable Isotope Geochemistry
EARTH 313-0	Radiogenic Isotope Geochemistry
EARTH 314-0	Organic Geochemistry

Seismology

Course	Title
EARTH 323-0	Seismology and Earth Structure
EARTH 324-0	Earthquakes and Tectonics
EARTH 327-0	Geophysical Time Series Analysis

Geology

Course	Title
EARTH 330-0	Sedimentary Geology
EARTH 331-0	Field Problems in Sedimentary Geology
EARTH 335-0	Tectonics and Structural Geology

Climate/Paleoclimate

Course	Title
EARTH 340-0	Atmospheric Physics & Weather
EARTH 341-0	Quaternary Climate Change: Ice Ages to the Age of Oil
EARTH 342-0	Contemporary Energy and Climate Change
EARTH 343-0	Earth System Modeling

Geophysics

Course	Title
EARTH 350-0	Physics of the Earth
EARTH 352-0	Global Tectonics
EARTH 353-0	Mathematical Inverse Methods in Earth and Environmental Sciences

Geobiology

Course	Title
EARTH 370-0	Geobiology
EARTH 371-0	Biogeochemistry
EARTH 373-0	Microbial Ecology

Planetary

Course	Title
EARTH 380-0	Forming a Habitable Planet
EARTH 381-0	Planet Formation and Evolution
EARTH 382-0	Cosmochemistry
EARTH 383-0	Planetary Physics

Skills Requirement (3 courses)

At least one course from each of the 3 categories. No course may be counted in more than one skills category.

Quantitative

Course	Title
EARTH 302-0	Geological Thermodynamics
EARTH 310-0	Aqueous Geochemistry
EARTH 327-0	Geophysical Time Series Analysis
EARTH 343-0	Earth System Modeling
EARTH 353-0	Mathematical Inverse Methods in Earth and Environmental Sciences
EARTH 362-0	Data Analysis for Earth and Planetary Sciences

Spatial Reasoning

Course	Title
EARTH 300-0	Earth and Planetary Materials
EARTH 330-0	Sedimentary Geology
EARTH 335-0	Tectonics and Structural Geology
EARTH 361-0	Introduction to Scientific Programming in Python

Analytical/Instrumentation/Field

Course	Title
EARTH 331-0	Field Problems in Sedimentary Geology
EARTH 343-0	Earth System Modeling
EARTH 360-0	Instrumentation and Field Methods
EARTH 361-0	Introduction to Scientific Programming in Python

In certain cases, the Director of Undergraduate Studies may approve additional eligible courses for the Sub-Discipline and Skills Requirement course lists.

Major Requirements: Related Courses (9.34-12.04 Units)

Math Courses (3-4 depending on sequence)

Course	Title
MATH 220-0 & MATH 224-0 or MATH 212-0 & MATH 213-0 & MATH 214-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
MATH 230-0 or equivalent	Differential Calculus of Multivariable Functions

6 Additional Related Math and Science Courses

Any 6 of the following math and science lectures or lecture/lab combinations may count toward this requirement.¹

Course	Title
CHEM 131-0 & CHEM 141-0	General Chemistry 1 and General Chemistry Laboratory 1
CHEM 132-0 & CHEM 142-0	General Chemistry 2 and General Chemistry Laboratory 2
CHEM 151-0 & CHEM 161-0	Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1
CHEM 152-0 & CHEM 162-0	Accelerated General Chemistry 2 and Accelerated General Chemistry Laboratory 2
CHEM 171-0 & CHEM 181-0	Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory
CHEM 172-0 & CHEM 182-0	Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory
PHYSICS 135-1 & PHYSICS 136-1	General Physics and General Physics Laboratory
PHYSICS 135-2 & PHYSICS 136-2	General Physics and General Physics Laboratory
PHYSICS 135-3 & PHYSICS 136-3	General Physics and General Physics Laboratory
BIOL_SCI 215-0 & BIOL_SCI 220-0	Genetics and Molecular Biology and Genetics and Molecular Processes Laboratory ²
BIOL_SCI 219-0 & BIOL_SCI 221-0	Cell Biology and Cellular Processes Laboratory ²
MATH 234-0	Multiple Integration and Vector Calculus
MATH 240-0	Linear Algebra
MATH 250-0	Elementary Differential Equations

¹ Note: Introductory Chemistry, Physics, Biology, and Math courses may be offered in parallel tracks. Consistent with restrictions at the University level, a student cannot receive credit for some course sequences if credit has already been awarded for an equivalent course. See Chemistry, Physics, Biology, and Math sections of this Catalog for details.

² Though the courses may be completed separately (they are not co-requisites for enrollment) BIOL_SCI 215-0 counts as a related course only if BIOL_SCI 220-0 is also completed; BIOL_SCI 219-0 counts as a related course only if BIOL_SCI 221-0 is also completed.

Honors in Earth and Planetary Sciences

Majors with strong academic records and an interest in pursuing honors should discuss possible projects with an appropriate faculty member or the director of undergraduate studies as early as possible, but no later than fall of senior year. After a proposed project is approved by the undergraduate adviser, the research is conducted as 2 quarters of EARTH 399-0 Independent Study or as 1 quarter of EARTH 399-0 and 1 quarter of a 400-level course; the student prepares a thesis based on this research. One quarter of EARTH 399-0 counts toward the major requirements; the second quarter of thesis work (EARTH 399-0 or a 400-level course) does not.

Students whose projects and grades meet department criteria are recommended to the college for graduation with honors. For more information, students should contact the director of undergraduate studies or their research advisers and see Honors in the Major (p. 178).

Earth and Planetary Sciences Minor

The minor offers students in any major outside the department a flexible path to knowledge of Earth and Planetary Sciences.

Minor Requirements (6 units)

- 2 courses from EARTH 201-0 Earth Systems Revealed, EARTH 202-0 Earth's Interior, or EARTH 203-0 Earth System History.
- 4 300-level EARTH courses (with the exception of EARTH 350-0 Physics of the Earth), of which only 1 EARTH 399-0 Independent Study or 400-level course may be substituted with permission.

Earth and Planetary Sciences Second Major for ISP Students

Second Major for ISP Student Requirements (5 units beyond ISP requirements):

- Completion of the ISP Program requirements fulfills the Related Course Requirements for the dual Earth+ISP major.
- EARTH 350-0 Physics of the Earth must be completed as a course in the ISP major (no substitutions).
- EARTH 201-0 Earth Systems Revealed
- 1 300-level course must be from the Skills Requirement Spatial Reasoning list, or the Skills Requirement Analytical/Instrumentation/Field list. See Earth and Planetary Sciences Major page (p. 233).
- 2 additional 300-level EARTH courses (excluding EARTH 399-0 Independent Study)
- 1 additional 300-level or 400-level EARTH course, or EARTH 399-0 Independent Study

Economics

economics.northwestern.edu

The program in economics enables students to understand the basic concepts, theories, and techniques of economics as they apply to economic problems and policies. These may focus on macroeconomics, applied microeconomics, quantitative economics, or economic history. Whatever courses students take, they will become familiar with the way economists think about problems and devise solutions to them. Although the program does not offer specialized professional training in economics, it provides excellent preparation for graduate work in economics, the study of law, and careers in business or government. Students should consult a department adviser about field courses that fit their needs.

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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Programs of Study

- Economics Major (p. 238)
- Economics Minor (p. 239)
- Economics BA/MA (p. 239)

ECON 100-BR Introduction to Problem-Solving in Economics (1 Unit)

For participants in Bridge I summer program. Developing facility with quantitative tools to solve problems in economics. Taken with MATH 100-BR.

ECON 101-6 First-Year Seminar (1 Unit) Open to first-year students in Weinberg College; does not satisfy major/minor requirements in Economics. *WCAS First-Year Seminar*

ECON 201-0 Introduction to Macroeconomics (1 Unit) An introduction to economics with emphasis on macroeconomics. Topics include: scarcity and choice, elements of supply and demand, inflation, unemployment, recessions, booms, fiscal and monetary policy, international balance of payments, and budget deficits. Prerequisite: basic algebra and graphing. *Social Behavioral Sciences Distro Area*

ECON 202-0 Introduction to Microeconomics (1 Unit) An introductory course on the fundamentals of microeconomics. The behavior of individuals and firms in deciding on prices and allocation of scarce resources. Topics include: consumer preferences, costs of production, equilibrium prices and output, different market types, potential market failures, and the role of government interventions and public policy. Prerequisite: ECON 201-0. *Social Behavioral Sciences Distro Area*

ECON 249-0 Business Strategy (1 Unit) Firms' choices of prices, capacity, location, quality, variety, investment and product innovation when navigating complex economic environments shaped by government policy and inter-firm rivalries. (Majors and Minors should not take this course, but should take ECON 349-0 instead. Students may not receive credit if they have completed ECON 349-0). Prerequisites: ECON 202-0; MATH 220-0.

ECON 281-0 Introduction to Applied Econometrics (1 Unit) An introduction to econometrics. The underlying theory of regression and the practical application of these techniques to data sets. Understanding and diagnosing common statistical problems encountered during estimation. All other substitutions (including AP Statistics) must be cleared through the Director of Undergraduate Studies for Economics. Prerequisite: ECON 201-0, ECON 202-0, MATH 220-0, STAT 210-0 or higher level statistics class.

ECON 299-BR Foundations of Intermediate Microeconomics (1 Unit) For participants in Bridge II summer program. Exploring foundations and mathematical tools for intermediate microeconomics.

ECON 307-0 Economics of Medical Care (1 Unit) Application of microeconomics to the study of health insurance and the health care sector. Topics include: design and financing of health insurance, public and private demand for medical care, role of competition, regulation of hospitals and physicians, roles of nonprofit and for-profit organizations, and technological change. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 308-0 Money and Banking (1 Unit) The role of money, banking, and financial markets in the modern economy. Topics include: function and history of money, financial flows, evolving nature of banks and their regulation, monetary policy, modern central bank practices, effect of

monetary policy on economic outcomes, and the response to financial crises. Prerequisites: ECON 281-0, ECON 310-1, ECON 311-0.

ECON 309-0 Public Finance (1 Unit) Understanding the role of government in the economy in theory and practice. Topics include: structure and implications of various tax instruments, role of public debt, and methods for evaluating government expenditures and programs. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 310-1 Microeconomics (1 Unit) A more mathematically formal and rigorous treatment of the core concepts of microeconomics introduced in ECON 202-0. Topics include: consumer behavior and the theory of demand, costs of production and the nature of equilibrium in competitive and monopolistic markets. Prerequisites: ECON 201-0, ECON 202-0, MATH 220-0. *Social Behavioral Sciences Distro Area*

ECON 310-2 Microeconomics (1 Unit) The continuation of the intermediate microeconomics sequence provides tools to analyze social wellbeing, social choice, risk and uncertainty, information asymmetries, competitive independencies between firms (game theory), market spillovers and general equilibrium. Prerequisite: ECON 310-1.

ECON 311-0 Macroeconomics (1 Unit) A more mathematically formal and rigorous treatment of the core concepts of macroeconomics introduced in ECON 201-0. Topics include: aggregate consumption, inflation, unemployment, growth, international balances between countries, and the role of monetary and fiscal policy. Prerequisites: ECON 201-0, ECON 202-0, MATH 220-0. *Social Behavioral Sciences Distro Area*

ECON 315-0 Topics in Economic History (1 Unit) Topics vary and may cover the economic history of a particular country or region, or a specific issue in economic history. May be taken twice for credit with different topics. Prerequisites: ECON 281-0, ECON 310-1, ECON 311-0.

ECON 316-0 Advanced Topics in Macroeconomics (1 Unit) This course is for students looking for advanced and rigorous analysis in macroeconomics. Topics vary and may include: growth, business cycles, unemployment and search, monetary economics, macroeconomic policy, inter-temporal choice, and general equilibrium. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2, ECON 311-0, MATH 224-0, MATH 230-0.

ECON 318-0 History of Economic Thought (1 Unit) Development of economic thought from the advent of the mercantilists to the formation of current schools of economics. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2, ECON 311-0.

ECON 323-1 Economic History of the United States Before 1865 (1 Unit) Economic development of the United States with emphasis on changing structure and performance of the economy: Colonial period to 1865. Prerequisites: ECON 281-0, ECON 310-1, ECON 311-0.

ECON 323-2 Economic History of the United States 1865 to Present (1 Unit) Economic development of the United States with emphasis on changing structure and performance of the economy: 1865 to the present. ECON 323-1 is not a prerequisite. Prerequisites: ECON 281-0, ECON 310-1, ECON 311-0.

ECON 324-0 Western Economic History (1 Unit) Western European developments from 1750 to the present. Topics include: demographic, technical, social, and economic change. Prerequisites: ECON 281-0, ECON 310-1, ECON 311-0.

ECON 325-0 Economic Growth & Development (1 Unit) Macroeconomic aspects of long-term patterns of economic development, and the

examination of differences in the income levels and growth performances across countries. The role of investment, education, population, and technological change in economic growth. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2, ECON 311-0.

ECON 326-0 The Economics of Developing Countries (1 Unit)

Microeconomic issues in underdeveloped countries. Topics include: land use, labor, migration, credit and microfinance, informal and formal insurance, famine, education and health. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 327-0 Economic Development in Africa (1 Unit) Economic change in sub-Saharan Africa, emphasizing current issues and policies in their historical contexts. Agriculture and rural development, industrialization, and international economic relations. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2, ECON 326-0.

ECON 329-0 Experimental Economics (1 Unit) Application of experimental methods to study economic questions. Students will learn about, participate in, and potentially design, experiments to gain insight into economic theories about decision-making, games, and markets. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 330-0 Behavioral Economics (1 Unit) Understanding of how humans make choices in economic situations. The incorporation of psychology and/or sociology into economics to gain deeper insight into economic behavior, to make better predictions, and to generate improved policy prescriptions. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 331-0 Economics of Risk and Uncertainty (1 Unit) Models of decision making under uncertainty. Use of these models to understand economic phenomena such as investments in financial assets, insurance, contracting, and auctions. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2, MATH 300-0 or equivalent.

ECON 335-0 Political Economics (1 Unit) The analysis of political motivations and policy outcomes using economic models of social choice theory and voting theory. Application of formal theory to contemporary and historical public policy decisions. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 336-0 Analytic Methods for Public Policy Analysis (1 Unit) Study of methodological problems in public policy analysis and an examination of how economists perform policy analysis in practice. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 337-0 Economics of State and Local Governments (1 Unit)

Economic functions and financing of state and local governments in theory and practice, costs and demands for local public services, and the role of government finance in urban and regional growth. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 339-0 Labor Economics (1 Unit) The theory and empirical analysis of employment relationships. Topics include: decision to participate in the labor market, tradeoff between labor and leisure, demand for labor by firms, matching of workers and jobs, role and effect of trade unions, minimum wage legislation, labor mobility, and human capital acquisition. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2, ECON 311-0.

ECON 340-0 Economics of the Family (1 Unit) Application of microeconomic theory to the analysis of family issues. Topics include: marriage, cohabitation, decision to have children, divorce, credit and insurance, legacies, bargaining within the household, and division of household labor. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 341-0 Economics of Education (1 Unit) The economic analysis of education. Topics include: returns to schooling, individual decisions to invest in education, the production of education, markets for schools and teachers, financing, and public policy. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 342-0 Economics of Gender (1 Unit) Analysis of gender differences in employment, earnings and division of labor in the household. Topics include: the status of women around the world, education, marriage, fertility, labor supply, household decision-making, and discrimination. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 349-0 Industrial Economics (1 Unit) Examination of the competitive and cooperative strategies employed by profit-maximizing firms in a wide range of market structures. Topics include: the setting of prices and outputs, product quality and variety, competitive responses, entry barriers, mergers and acquisitions, and relationships with suppliers and distributors. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 350-0 Monopoly Competition & Public Policy (1 Unit) Application of microeconomic tools to the problems and issues caused by monopoly power in the context of antitrust law, public utility regulation, and intellectual property. Use of economic theory and landmark legal cases to study the purpose and development of policies to mitigate anti-competitive practices, and highlight currently unresolved public policy debates. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 351-0 Law and Economics (1 Unit) Use of economic analysis to understand the incentives, workings and efficiency of the legal system. Topics include: torts, contracts, property, criminal law, corporate law, and antitrust and regulation statutes. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 354-0 Issues in Urban and Regional Economics (1 Unit) Factors affecting the spatial distribution of economic activity within cities and between different regions of a country. Choice of residential and workplace location. Applications of economic analysis to problems of urban areas such as housing markets, zoning restrictions, and racial and social patterns of employment and housing. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 355-0 Transportation Economics and Public Policy (1 Unit) Economics of all forms of transportation and the regulatory and public policy environment in which they operate. Topics include: demand by passengers and freight shippers, costs of production, optimal pricing, regulatory interventions, subsidies, evaluation of investment, and dealing with congestion. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 359-0 Economics of Nonprofit Organizations (1 Unit) The economic rationale for the non-profit sector in a mixed economy. Topics include: objectives and behavior of non-profit organizations, competition with commercial firms, volunteerism, and charitable donations. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 360-1 Foundations of Corporate Finance Theory (1 Unit) How corporations allocate resources over time as facilitated by capital markets. Topics include: discounting techniques and applications, stock and bond valuation, asset pricing models, diversification and portfolio choice, capital budgeting, and basic option theory. (Should not be taken by students who have taken KELLG_FE 310-0 or BUS_INST 304-0). Prerequisites: ECON 281-0, ECON 310-1, ECON 311-0.

ECON 360-2 Investments (1 Unit) Analysis of the issues and tradeoffs involved in forming a portfolio of financial instruments from the

perspectives of individual and institutional investors. (Should not be taken by students who have taken KELLG_FE 312-0). Prerequisite: ECON 360-1

ECON 361-0 International Trade (1 Unit) Factors influencing trade in goods and services between countries and the implication of globalization. The reasons for, and the effects of, trade policy instruments such as tariffs, quotas, and voluntary export restrictions. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2, ECON 311-0.

ECON 362-0 International Finance (1 Unit) The determination of exchange rates, international asset prices and flows, currency crises, and the international transmission of macroeconomic disturbances. Prerequisites: ECON 281-0, ECON 310-1, ECON 311-0.

ECON 370-0 Environmental & Natural Resource Economics (1 Unit) 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. (Students may not receive credit for both ECON 370-0 and ECON 372-0 or ECON 373-0). Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 371-0 Economics of Energy (1 Unit) Analysis of the functioning and regulation of electricity, oil and natural gas markets. Topics include: the role of competition and environmental concerns. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 372-0 Environmental Economics (1 Unit) Economic analysis of scarcity and incentives explaining environmental issues such as pollution and climate change. Modeling and evaluation of public policy. (Students may not receive credit for both ECON 370-0 and ECON 372-0). Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 373-0 Natural Resource Economics (1 Unit) Evaluation of economics models and public policy concerning natural resources such as farming, fisheries, forests, minerals, ores and fossil fuels. (Students may not receive credit for both ECON 370-0 and ECON 373-0). Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2.

ECON 380-1 Game Theory (1 Unit) Game theory is a collection of mathematical models of interaction among decision makers. It is used widely in understanding economic phenomena. This course will present some of the basic ideas of game theory. (Should not be taken by students who have completed MMSS 211-2). Prerequisites: ECON 310-1, ECON 310-2, MATH 224-0, MATH 230-0.

ECON 380-2 Game Theory (1 Unit) This course extends the material presented in ECON 380-1 to explore more advanced models in game theory. Prerequisite: ECON 380-1 or consent of instructor.

ECON 381-1 Econometrics (1 Unit) First part of the specialized sequence in econometrics. A more rigorous and higher level alternative to ECON 281-0. Economics majors completing ECON 381-1 will have the ECON 281-0 requirement waived. Prerequisites: ECON 310-1, (ECON 310-2, ECON 311-0 recommended), MATH 230-0, MATH 234-0, MATH 240-0 and MATH 314-0 (or equivalent).

ECON 381-2 Econometrics (1 Unit) Second part of the upper-level econometrics sequence. The course introduces additional econometrics tools beyond those introduced in ECON 381-1. The course also explores the empirical application of these tools, and how to evaluate critically econometric and statistical methods used in policy analysis. Prerequisite: ECON 381-1, (ECON 310-2, ECON 311-0 recommended).

ECON 383-0 Applied Econometrics (1 Unit) Methods for using actual data together with modern software to build, assess critically, and interpret econometric models of real world phenomena and policy issues. Prerequisites: ECON 281-0, ECON 310-1.

ECON 398-1 Senior Seminar (1 Unit) For students of superior ability. Original research on a topic of interest to the student, culminating in a senior thesis. By department invitation only. Grade of K given in 398-1. Prerequisites: ECON 281-0, ECON 310-1, ECON 310-2, ECON 311-0, MATH 224-0, MATH 230-0; at least four 300-level economics electives.

ECON 398-2 Senior Seminar (1 Unit) For students of superior ability. Original research on a topic of interest to the student, culminating in a senior thesis. By department invitation only. Prerequisite: ECON 398-1.

ECON 399-0 Independent Study (1 Unit) Advanced work through reading, research, and discussion to build on economics coursework taken by the student. Project to be decided by mutual agreement with a faculty member.

Economics Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

The introductory courses ECON 201-0 Introduction to Macroeconomics and ECON 202-0 Introduction to Microeconomics must be taken first and in that order. STAT 210-0 Introductory Statistics for the Social Sciences and MATH 220-0 Differential Calculus of One-Variable Functions should also be taken early in the program; the former is a prerequisite for ECON 281-0 Introduction to Applied Econometrics and the latter for ECON 310-1 Microeconomics. ECON 281-0 and the intermediate theory courses should be completed before 300-level field courses are taken. Although only MATH 220-0 is required, majors are strongly urged to take MATH 224-0 Integral Calculus of One-Variable Functions, MATH 230-0 Differential Calculus of Multivariable Functions, and MATH 240-0 Linear Algebra. Majors considering graduate work in economics are strongly advised to take additional mathematics courses and perhaps a second major in mathematics. Students wishing to pursue in-depth study of econometrics may take the advanced econometrics courses ECON 381-1 and ECON 381-2 without taking introductory econometrics ECON 281-0 first. For students who complete ECON 381-1, ECON 281-0 will be waived.

Course	Title
Department Courses (12 units)	
3 introductory courses:	
ECON 201-0	Introduction to Macroeconomics
ECON 202-0	Introduction to Microeconomics
ECON 281-0	Introduction to Applied Econometrics
3 intermediate theory courses:	
ECON 310-1	Microeconomics
ECON 310-2	Microeconomics
ECON 311-0	Macroeconomics
6 additional field courses at the 300 level	
Related Courses (Units depend on mathematics sequence taken.)	
MATH 220-0	Differential Calculus of One-Variable Functions
or MATH 212-0 & MATH 213-0	Single Variable Calculus I and Single Variable Calculus II
STAT 210-0	Introductory Statistics for the Social Sciences
or MATH 314-0	Probability and Statistics for Econometrics

3 additional courses in the social sciences, mathematics, history, or statistics, no more than 1 at the 100 level

Honors in Economics

By invitation only, majors with strong academic records may pursue departmental honors by completing one of the following three options in addition to the regular requirements of the major: ECON 398-1 Senior Seminar and ECON 398-2 Senior Seminar, 2 quarters of ECON 399-0 Independent Study, or 2 400-level field courses in economics. None of these courses counts toward the major requirements. Under each option, candidates must submit a thesis presenting original research.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. Interested students should consult with the director of undergraduate studies and see Honors in the Major (p. 178).

Economics Minor

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 (ECON 310-1 Microeconomics and either ECON 310-2 Microeconomics or ECON 311-0 Macroeconomics). As in the major, MATH 220-0 Differential Calculus of One-Variable Functions and STAT 210-0 Introductory Statistics for the Social Sciences 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 advanced econometrics ECON 381-1 and ECON 381-2 without taking introductory econometrics ECON 281-0 first. For students who complete ECON 381-1, ECON 281-0 will be waived.

Course	Title
Minor Requirements (8 units)	
3 introductory courses:	
ECON 201-0	Introduction to Macroeconomics
ECON 202-0	Introduction to Microeconomics
ECON 281-0	Introduction to Applied Econometrics
2 intermediate theory courses:	
ECON 310-1	Microeconomics
ECON 310-2 or ECON 311-0	Microeconomics Macroeconomics
3 additional field courses at the 300 level	

Economics BA/MA

The department offers a BA/MA for outstanding students in economics. Graduate-level courses in economic theory are required. Interested students should consult the director of undergraduate studies during their sophomore year. For more information see Accelerated Master's Programs (p. 34).

English

english.northwestern.edu

The Department of English values various kinds of critical inquiry and creativity. While some courses emphasize the formal qualities of literary works, others address such questions as what counts as "literary," or how

to characterize the relationships among literature, culture, and politics. Classes might discuss psychoanalysis, race and gender, or the history of the book. While courses have different approaches, methods, and emphases and the texts examined vary, all courses stress close reading and careful analysis of texts, whether written or visual. Reflecting both range and specificity, the curriculum enables students to pursue their areas of interest within a broader understanding of literary history and the range of literary study. In its creative writing courses the department offers training in verse, fiction, and creative nonfiction. Virtually all courses also include practice in writing clear, concise, and persuasive expository prose.

Rigorous training in thinking and writing is valuable for any career, including law, IT, communications, marketing, consulting, finance, and business as well as writing, publishing, and the teaching of English at all levels. Courses in English and American literature also help students to hone their skills as critical citizens of global communities.

The department takes pride in its diversity of perspectives. In addition to teaching classes in the department, English faculty contribute substantially to the course offerings in theater, drama, and comparative literature, as well as American, African American, Asian American, Latina and Latino, and gender and sexuality studies. 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 website. Detailed descriptions of courses to be offered for the year are posted the preceding spring in English Course Listings (<https://www.english.northwestern.edu/courses>) on the department website.

English majors may ask any member of the department to serve as an academic adviser. A quarterly meeting with the adviser to discuss course selection and progress is strongly recommended.

Minors in English

The department offers a minor in literature and two minor tracks in creative writing; all offer experience in reading literary texts and writing critical analysis.

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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Related Programs

Literature courses appear in the curricula of other Weinberg College departments, including African American studies, American studies, Asian American studies, comparative literary studies, drama, and gender and sexuality studies. See also the Writing Program (p. 358) for a list of composition (expository writing) courses.

Programs of Study

- English and American Literature Major (p. 243)
- Creative Writing Major (p. 243)

- English and American Literature Minor (p. 244)
- Creative Writing Sequence-Based Minor (p. 244)
- Creative Writing Cross-Genre Minor (p. 244)

ENGLISH 100-SW Summer Academic Workshop in Writing (1 Unit) An introduction to college writing. Students learn how to use a process of planning, drafting, revising, and editing to write papers that are clear, concise, interesting, and persuasive.

ENGLISH 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

ENGLISH 105-0 Expository Writing (1 Unit) Emphasizes all phases of the composition process, research methods, and critical thinking. Careful review of student papers and reports. May be repeated for credit with different topic.

ENGLISH 105-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

ENGLISH 106-1 Writing in Special Contexts (0.5 Unit) Introduction to expository writing similar to ENGLISH 105-0 but paired with a course in another discipline.

ENGLISH 106-2 Writing in Special Contexts (0.5 Unit) Introduction to expository writing similar to ENGLISH 105-0 but paired with a course in another discipline.

ENGLISH 202-0 Introduction to Creative Writing (1 Unit) Forms and techniques of poetry, fiction, and creative nonfiction.

ENGLISH 205-0 Intermediate Composition (1 Unit) Expository writing at an intermediate level. Emphasis on techniques for writing clearly, precisely, and persuasively. May be repeated for credit with different topic.

ENGLISH 206-0 Reading & Writing Poetry (1 Unit) Forms and techniques of verse. May not be taken earlier than winter quarter of the first year. Seniors may enroll only with department consent.

ENGLISH 207-0 Reading and Writing Fiction (1 Unit) Forms and techniques of fiction. Prerequisite: ENGLISH 206-0.

ENGLISH 208-0 Reading & Writing Creative Non-Fiction (1 Unit) Forms and techniques of creative nonfiction. Prerequisite: ENGLISH 206-0.

ENGLISH 209-0 Topics in Genre Writing (1 Unit) Forms and techniques of genre writing (e.g., screenwriting, young adult fiction, adaptation, memoir). May be repeated for credit with different topic.

ENGLISH 210-1 British Literary Traditions (1 Unit) Chronological survey of British literature in its cultural contexts from Beowulf to the 20th century. Beowulf to the late 18th century. *Literature Fine Arts Distro Area*

ENGLISH 210-2 British Literary Traditions (1 Unit) Chronological survey of British literature in its cultural contexts from Beowulf to the 20th century. Late 18th century to the 20th century. *Literature Fine Arts Distro Area*

ENGLISH 211-0 Introduction to Poetry (1 Unit) Elements of lyric and narrative poetry, with emphasis on the ways these can create meaning and elicit response. *Literature Fine Arts Distro Area*

ENGLISH 212-0 Introduction to Drama (1 Unit) Fundamental elements of drama as perceived in performance. How a play communicates from text to stage to audience. *Literature Fine Arts Distro Area*

ENGLISH 213-0 Introduction to Fiction (1 Unit) How prose fiction, as practiced by various British and American authors from the 18th century to today, creates and communicates meaning. *Literature Fine Arts Distro Area*

ENGLISH 214-0 Introduction to Film and Its Literatures (1 Unit) Skills of formal film analysis. Critical overview of multiple forms of film related writing, including historical scholarship, film theory, popular reviews, legal documents, manifestos, and movie-inspired fiction. *Literature Fine Arts Distro Area*

ENGLISH 220-0 The Bible as Literature (1 Unit) 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. Students may not receive credit if they took the same class as COMP_LIT 210-0. *Ethics Values Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

ENGLISH 234-0 Introduction to Shakespeare (1 Unit) Representative Shakespearean plays. *Literature Fine Arts Distro Area*

ENGLISH 270-1 American Literary Traditions (1 Unit) Representative writers and works of American literature in cultural context. Puritans to Moby-Dick. *Literature Fine Arts Distro Area*

ENGLISH 270-2 American Literary Traditions (1 Unit) Representative writers and works of American literature in cultural context. Mid-19th century to World War I. *Literature Fine Arts Distro Area*

ENGLISH 273-0 Introduction to 20th-Century American Literature (1 Unit) Principal writers and works since World War I. *Literature Fine Arts Distro Area*

ENGLISH 274-0 Introduction to Native American and Indigenous Literatures (1 Unit) Key texts and themes from pre-contact periods to the present. *Literature Fine Arts Distro Area*

ENGLISH 275-0 Introduction to Asian American Literature (1 Unit) From the early 20th century to the present, covering a range of genres and ethnicities. Taught with ASIAN_AM 275-0; may not receive credit for both courses. *Literature Fine Arts Distro Area*

ENGLISH 277-0 Introduction to Latina and Latino Literature (1 Unit) Survey of major writers and movements from the Spanish colonial era to the present, covering a range of genres and ethnicities. Taught with LATINO 277-0 and SPANISH 277-0; may receive credit for only 1 of these courses. *Literature Fine Arts Distro Area*

ENGLISH 282-0 Writing and Speaking in Business (1 Unit) Emphasizes writing and speaking to inform and persuade audiences in business contexts to achieve business goals. Attention to clear, compelling, and well-organized written and oral communication.

ENGLISH 300-0 Seminar in Reading and Interpretation (1 Unit) Close reading of literary works in the light of various perspectives in literary study.

ENGLISH 302-0 History of the English Language (1 Unit) The English language from the earliest times to today. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

ENGLISH 304-0 Practical Rhetoric (1 Unit) The theory of writing and skills that underlie good writing; primarily for teachers in secondary schools and universities.

ENGLISH 305-0 Advanced Composition (1 Unit) For students with previous formal training in composition. Admission by consent of department. May be repeated for credit with different topic.

ENGLISH 306-0 Advanced Poetry Writing (1 Unit) Content varies. May be repeated for credit with different topic. Prerequisite: ENGLISH 206-0 or department consent.

ENGLISH 307-0 Advanced Creative Writing (1 Unit) Content varies. May be repeated for credit with different topic. Prerequisite: ENGLISH 206-0 or department consent.

ENGLISH 308-0 Advanced Creative Nonfiction Writing (1 Unit) Content varies. May be repeated for credit with different topic. Prerequisite: ENGLISH 206-0 or department consent.

ENGLISH 309-0 Advanced Creative Cross-Genre Writing (1 Unit) Content varies. May be repeated twice for credit with a different topic. Prerequisite: ENGLISH 206-0 or department consent.

ENGLISH 310-0 Studies in Literary Genres (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 311-0 Studies in Poetry (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 312-0 Studies in Drama (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 313-0 Studies in Fiction (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 320-0 Medieval English Literature (1 Unit) Representative works in their intellectual and cultural contexts. *Literature Fine Arts Distro Area*

ENGLISH 322-0 Medieval Drama (1 Unit) Study of 15th century English mystery cycles, miracle plays, and morality plays in their cultural context. *Literature Fine Arts Distro Area*

ENGLISH 323-1 Chaucer (1 Unit) "The Canterbury Tales." *Literature Fine Arts Distro Area*

ENGLISH 323-2 Chaucer (1 Unit) "Troilus and Criseyde" and other works. *Literature Fine Arts Distro Area*

ENGLISH 324-0 Studies in Medieval Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 331-0 Renaissance Poetry (1 Unit) English poetry from the Elizabethan period to 1660. *Literature Fine Arts Distro Area*

ENGLISH 332-0 Renaissance Drama (1 Unit) A survey of English drama (1590-1630) and its cultural contexts. *Literature Fine Arts Distro Area*

ENGLISH 333-0 Spenser (1 Unit) Spenser's major poetry, with emphasis on "The Faerie Queene." *Literature Fine Arts Distro Area*

ENGLISH 334-1 Shakespeare (1 Unit) Principal plays up to 1600. *Literature Fine Arts Distro Area*

ENGLISH 334-2 Shakespeare (1 Unit) Principal plays after 1600. *Literature Fine Arts Distro Area*

ENGLISH 335-0 Milton (1 Unit) Milton's poetry, with those parts of his prose that illuminate his poetical and intellectual development. *Literature Fine Arts Distro Area*

ENGLISH 338-0 Studies in Renaissance Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 339-0 Special Topics in Shakespeare (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 340-0 Restoration and 18th Century Literature (1 Unit) Representative works in their intellectual and cultural contexts. *Literature Fine Arts Distro Area*

ENGLISH 341-0 Restoration and 18th Century Poetry (1 Unit) Dryden, Pope, and other poets of the period 1660-1744. *Literature Fine Arts Distro Area*

ENGLISH 342-0 Restoration and 18th-Century Drama (1 Unit) English drama from 1660 to the end of the 18th century. *Literature Fine Arts Distro Area*

ENGLISH 344-0 18th-Century Fiction (1 Unit) Writers such as Defoe, Richardson, Smollett, Fielding, Sterne, Burney, Radcliffe, and Austen. Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 348-0 Studies in Restoration and 18th-Century Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 350-0 19th-Century British Literature (1 Unit) Representative works in their intellectual and cultural contexts. *Literature Fine Arts Distro Area*

ENGLISH 351-0 Romantic Poetry (1 Unit) Writers such as Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. *Literature Fine Arts Distro Area*

ENGLISH 353-0 Studies in Romantic Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 356-0 Victorian Poetry (1 Unit) The principal British poets from Tennyson to Hopkins. *Literature Fine Arts Distro Area*

ENGLISH 357-0 19th-Century British Fiction (1 Unit) Representative novels written between 1800 and 1900. *Literature Fine Arts Distro Area*

ENGLISH 358-0 Dickens (1 Unit) Representative works of Charles Dickens. *Literature Fine Arts Distro Area*

ENGLISH 359-0 Studies in Victorian Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 360-0 20th-Century British and American Literature (1 Unit) Representative works in their intellectual and cultural contexts. *Literature Fine Arts Distro Area*

ENGLISH 361-1 20th-Century Poetry (1 Unit) First Quarter. Major British poets such as Yeats, Eliot, and Auden. *Literature Fine Arts Distro Area*

ENGLISH 361-2 20th-Century Poetry (1 Unit) Second Quarter: Major American poets from Frost and Robinson to Crane. *Literature Fine Arts Distro Area*

ENGLISH 361-3 20th Century Poetry (1 Unit) Third Quarter: British and American poetry since World War II.

ENGLISH 363-1 20th-Century Fiction (1 Unit) Major British novelists from Conrad to World War II. *Literature Fine Arts Distro Area*

ENGLISH 363-2 20th Century Fiction (1 Unit) Major American novelists from James to World War II. *Literature Fine Arts Distro Area*

ENGLISH 365-0 Studies in Postcolonial Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 366-0 Studies in African American Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 367-0 Postwar British Fiction (1 Unit) Representative British novels since 1945. *Literature Fine Arts Distro Area*

ENGLISH 368-0 Studies in 20th-Century Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 368-SA Studies in 20th-Century Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 369-0 Studies in African Literature (1 Unit) 20th century African literature in English. Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 370-0 American Literature Before 1914 (1 Unit) Representative works in their intellectual and cultural contexts. *Literature Fine Arts Distro Area*

ENGLISH 371-0 American Novel (1 Unit) Writers such as Cooper, Alcott, Chopin, Hawthorne, Melville, Poe, Twain, James, Howells, Crane, Dreiser, and Wharton. Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 372-0 American Poetry (1 Unit) Writers such as Freneau, Bradstreet, Bryant, Poe, Whitman, Dickinson, Robinson, and Frost. Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 374-0 Topics in Native American and Indigenous Literatures (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 375-0 Topics in Asian American Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 377-0 Topics in Latina and Latino Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 378-0 Studies in American Literature (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 383-0 Special Topics in Theory (1 Unit) Topics in theory and criticism related to the study of literature and culture. Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 385-0 Topics in Combined Studies (1 Unit) Special topics in literature and related disciplines. Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 386-0 Studies in Literature and Film (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 387-0 Studies in Literature and Commerce (1 Unit) Content varies. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

ENGLISH 388-0 Studies in Literature and Religion (1 Unit) Intersection between religious ideas and a particular literary genre or movement. Content varies. May be repeated for credit with different topic. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Literature Fine Arts Distro Area*

ENGLISH 392-0 The Situation of Writing (1 Unit) The sociology of writers, writing, publication, dissemination of literature, and reading. Prerequisite: admission to writing major.

ENGLISH 393-1 Theory and Practice of Poetry (1 Unit) Tenets of poetry in English, including prosody, form, metaphor, voice, experimentation; involves intensive writing practice and culminates in the production of a long poem. Prerequisite: admission to creative writing sequence.

ENGLISH 393-2 Theory and Practice of Poetry (1 Unit) Tenets of poetry in English, including prosody, form, metaphor, voice, experimentation; involves intensive writing practice and culminates in the production of a long poem. Prerequisite: admission to creative writing sequence.

ENGLISH 393-3 Theory and Practice of Poetry (1 Unit) Tenets of poetry in English, including prosody, form, metaphor, voice, experimentation; involves intensive writing practice and culminates in the production of a long poem. Prerequisite: admission to creative writing sequence.

ENGLISH 394-1 Theory & Practice of Fiction (1 Unit) Tenets of fictional realism and its substitutes; practice in different applications of plot, narrative technique, point of view; culminates in the writing of a novella. Prerequisite: admission to creative writing sequence.

ENGLISH 394-2 Theory & Practice of Fiction (1 Unit) Tenets of fictional realism and its substitutes; practice in different applications of plot, narrative technique, point of view; culminates in the writing of a novella. Prerequisite: admission to creative writing sequence.

ENGLISH 394-3 Theory & Practice of Fiction (1 Unit) Tenets of fictional realism and its substitutes; practice in different applications of plot, narrative technique, point of view; culminates in the writing of a novella. Prerequisite: admission to creative writing sequence.

ENGLISH 395-1 Theory and Practice of Creative Nonfiction (1 Unit) Tenets of creative nonfiction; practice in different styles, form, and modes; culminates in the writing of a long creative nonfiction project. Prerequisite: admission to creative writing sequence.

ENGLISH 395-2 Theory and Practice of Creative Nonfiction (1 Unit) Tenets of creative nonfiction; practice in different styles, form, and modes; culminates in the writing of a long creative nonfiction project. Prerequisite: admission to creative writing sequence.

ENGLISH 395-3 Theory and Practice of Creative Nonfiction (1 Unit)

Tenets of creative nonfiction; practice in different styles, form, and modes; culminates in the writing of a long creative nonfiction project. Prerequisite: admission to creative writing sequence.

ENGLISH 397-0 Research Seminar for Literature Majors (1 Unit) For juniors and seniors. Topics vary. Students research and complete an independent term paper related to the topic of the seminar.

ENGLISH 398-1 Senior Sequence (1 Unit) 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 398-2 Senior Sequence (1 Unit) 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 (1 Unit) Individual projects with faculty guidance. Open to majors with junior or senior standing and to senior minors. May be elected two times, but only 1 unit at a time. Prerequisite: consent of department.

English and American Literature Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Department Courses (13 units)	
2 introductory courses:	
ENGLISH 210-1 or ENGLISH 270-1	British Literary Traditions American Literary Traditions
And 1 other from the following:	
ENGLISH 210-1	British Literary Traditions
ENGLISH 210-2	British Literary Traditions
ENGLISH 270-1	American Literary Traditions
ENGLISH 270-2	American Literary Traditions
2 required seminars	
ENGLISH 300-0	Seminar in Reading and Interpretation
ENGLISH 397-0	Research Seminar for Literature Majors
9 additional literature courses	
At least 7 at the 300 level or above	
At most 2 at the 200 level ¹	
At least 3 on works written before 1830	
At least 3 on works written after 1830	
At least 1 in American literature	
At least 1 exploring transnationalism and textual circulation	
At least 1 exploring identities, communities, and social practice	
At most 1 taken in another department or program; must be at the 300 level or above	

¹ ENGLISH 206-0 Reading & Writing Poetry may count toward this requirement.

Honors in Literature

To prepare to apply to the honors program, all literature majors take ENGLISH 397-0 Research Seminar for Literature Majors, which provides an opportunity to complete a 15-page research paper. Literature majors with strong academic records may then apply during spring of junior year for admission to the 2-quarter senior thesis sequence (ENGLISH 398-1 & ENGLISH 398-2), which meets the following fall and winter quarters (ENGLISH 398-1 & ENGLISH 398-2 do not count toward the English major). Accepted students are expected to produce a senior thesis of about 40 pages. Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information, including funding opportunities, visit the department website and see Honors in the Major. (p. 178)

Creative Writing Major

Students may apply to major in creative writing. Admission to the creative writing major is competitive, based on a manuscript of creative work from ENGLISH 206-0 Reading & Writing Poetry, ENGLISH 207-0 Reading and Writing Fiction, or ENGLISH 208-0 Reading & Writing Creative Non-Fiction. The major offers an apprenticeship in the writing of poetry, fiction, and creative nonfiction. A strong literature component and a course in the history and culture of literary production anchor the writing within a context of general literacy.

The department accepts applications to the creative writing major early each spring. First year students may not apply.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Department Courses (13 units)	
3 introductory courses:	
ENGLISH 206-0	Reading & Writing Poetry
ENGLISH 207-0	Reading and Writing Fiction
ENGLISH 208-0	Reading & Writing Creative Non-Fiction
10 additional courses:	
1 yearlong theory and practice sequence:	
ENGLISH 393-1 & ENGLISH 393-2 & ENGLISH 393-3 or ENGLISH 394-1 & ENGLISH 394-2 & ENGLISH 394-3 or ENGLISH 395-1 & ENGLISH 395-2 & ENGLISH 395-3	Theory and Practice of Poetry and Theory and Practice of Poetry and Theory and Practice of Poetry Theory & Practice of Fiction and Theory & Practice of Fiction and Theory & Practice of Fiction Theory and Practice of Creative Nonfiction and Theory and Practice of Creative Nonfiction and Theory and Practice of Creative Nonfiction
ENGLISH 392-0	The Situation of Writing
6 300-level English department literature courses	
At least 2 on works written before 1830	
At least 2 on works written after 1830	
Related Courses (2 units)	
Chosen from fields outside of literature but still related to the student's demonstrated interests within the major	
Selected with the advice and consent of the student's writing major adviser	

Honors in Creative Writing

Creative writing majors who are completing the yearlong theory and practice sequence in poetry, fiction, or creative nonfiction and who have

kept up with their other writing major requirements may apply to the honors program. Applications are submitted early in spring quarter of junior year. Over fall and winter of the senior year, admitted students enroll in ENGLISH 399-0 Independent Study and work one on one with a faculty mentor to complete a significant writing, creative media, or literary translation work (ENGLISH 399-0 does not count toward requirements for the major). Students whose projects and grades meet department criteria are recommended to the college for graduation with honors. For more information see the director of creative writing or a creative writing adviser, visit the department website, and see Honors in the Major (p. 178).

English and American Literature Minor

Course	Title
Requirements: minor in English and American literature (7 units)	
2 introductory courses:	
ENGLISH 210-1	British Literary Traditions
or ENGLISH 270-1	American Literary Traditions
And 1 other from the following:	
ENGLISH 210-1	British Literary Traditions
ENGLISH 210-2	British Literary Traditions
ENGLISH 270-1	American Literary Traditions
ENGLISH 270-2	American Literary Traditions
One required seminar:	
ENGLISH 300-0	Seminar in Reading and Interpretation
4 additional literature courses:	
At least 3 at the 300 level or above	
At most 1 at the 200 level	
2 on works written before 1830	
2 on works written after 1830	
At most 1 may be in comparative literary studies; must be at the 300 level.	

Creative Writing Sequence-Based Minor

Course	Title
Requirements: Sequence-based Minor in Creative Writing (7 units)	
2 introductory courses:	
ENGLISH 206-0	Reading & Writing Poetry
ENGLISH 207-0	Reading and Writing Fiction
or ENGLISH 208-0	Reading & Writing Creative Non-Fiction
1 yearlong theory and practice sequence:	
ENGLISH 393-1	Theory and Practice of Poetry
& ENGLISH 393-2	and Theory and Practice of Poetry
& ENGLISH 393-3	and Theory and Practice of Poetry
or ENGLISH 394-1	Theory & Practice of Fiction
& ENGLISH 394-2	and Theory & Practice of Fiction
& ENGLISH 394-3	and Theory & Practice of Fiction
or ENGLISH 395-1	Theory and Practice of Creative Nonfiction
& ENGLISH 395-2	and Theory and Practice of Creative Nonfiction
& ENGLISH 395-3	and Theory and Practice of Creative Nonfiction
2 300-level English-department literature courses:	
1 on works written before 1830	
1 on works written after 1830	

Creative Writing Cross-Genre Minor

Course	Title
Requirements: Cross-genre Minor in Creative Writing (7 units)	
2 introductory courses:	
ENGLISH 206-0	Reading & Writing Poetry
ENGLISH 207-0	Reading and Writing Fiction
or ENGLISH 208-0	Reading & Writing Creative Non-Fiction
3 courses (2 from one genre and 1 in a cross-genre) chosen from:	
ENGLISH 306-0	Advanced Poetry Writing
ENGLISH 307-0	Advanced Creative Writing
ENGLISH 308-0	Advanced Creative Nonfiction Writing
2 300-level English-department literature courses:	
1 on works written before 1830	
1 on works written after 1830	

Environmental Policy and Culture

epc.northwestern.edu

The Environmental Policy and Culture Program offers students an interdisciplinary approach to environmental studies, focusing on the social sciences and humanities. Environmental issues and conflicts are among the most important concerns of the 21st century. The minor in environmental policy and culture provides opportunities to engage in scholarly inquiry about managing the natural environment. Courses address issues such as global climate change, efforts to maintain and restore biodiversity, and the reconciliation of development with environmental protection. Courses that fulfill the minor requirements include both those offered by EPC (identified as ENVR_POL) and courses from different departments and programs. They fall into three categories: the humanities (largely courses in history, philosophy, and religion), policy (largely courses in the social sciences), and the natural sciences. Although all students who minor in environmental policy and culture take at least 1 relevant course in the natural sciences, the emphasis is on courses in the humanities and social sciences.

Students are encouraged to participate in environmental research at Northwestern. They may take EPC research seminar ENVR_POL 395-0 and/or pursue independent research projects in ENVR_POL 399-0 Independent Study under the supervision of faculty affiliated with the program.

Program of Study

- Environmental Policy and Culture Minor (p. 245)

ENVR_POL 211-0 Food and Society: An Introduction (1 Unit) Overview of past and present food systems from a sociological perspective, examining the roles of culture, government policy, and social movements in shaping such systems and future alternatives. ENVR_POL 211-0 and SOCIOL 211-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

ENVR_POL 212-0 Environment and Society (1 Unit) Key environmental problems, such as climate change and oil spills; how they are shaped by the market, government regulations, and social movements; possible solutions. SOCIOL 212-0 and ENVR_POL 212-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

ENVR_POL 261-0 American Religion, Ecology and Culture (1 Unit) The historical rise of environmentalism in American culture and its impact on

religious thought and practice. ENVR_POL 261-0 and RELIGION 261-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area*

ENVR_POL 309-0 American Environmental History (1 Unit) American history from precontact to the present, focusing on the role of the natural world in human history and the role of human thought and action in natural history. ENVR_POL 309-0 and HISTORY 309-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

ENVR_POL 311-0 Food, Politics and Society (1 Unit) Social groups, institutions, and policies shaping food production, distribution, and consumption around the world; their social and environmental consequences. Alternatives to existing food systems. SOCIOL 311-0 and ENVR_POL 311-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

ENVR_POL 312-0 Social Change and the Environment (1 Unit) The ways social patterns of production and consumption affect the natural environment, such as climate and biodiversity. Roles of social actors and structures in shaping environmental problems and policies. SOCIOL 312-0 and ENVR_POL 312-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

ENVR_POL 332-0 Native Americans and Environmental Decision Making (1 Unit) Focus on Native Americans, culture and cultural processes, and environmental decision making. Emphasis on contemporary Native American cultures and relevant research. ENVR_POL 332-0 and PSYCH 332-0 are taught together; may not receive credit for both courses. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

ENVR_POL 336-0 Climate Change, Policy, and Society (1 Unit) Examination of main impacts of climate change and of different perspectives toward mitigation and adaptation: market-based, institutionalist, bio-environmentalist, social movement, and climate justice. SOCIOL 336-0 and ENVR_POL 336-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

ENVR_POL 340-0 Global Environments and World History (1 Unit) Introduction to the recent histories of environmental issues around the world, including urbanization, industrialization, population growth, commodification, empire building, intercontinental welfare, energy extraction, and new technologies. ENVR_POL 340-0 and HISTORY 376-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

ENVR_POL 390-0 Special Topics in Environmental Policy and Culture (1 Unit) Lecture course on environmental issues of current interest to students and faculty. May be repeated for credit with different topic. *Social Behavioral Sciences Distro Area*

ENVR_POL 395-0 Special Topics Seminar (1 Unit) Seminar on current environmental issues and problems. Topics vary. May be repeated for credit with different topic.

ENVR_POL 399-0 Independent Study (1 Unit) Independent project in student's area of interest. Readings and conferences. Comprehensive term paper required. Prerequisite: consent of program director.

Environmental Policy and Culture Minor

Minors in environmental policy and culture may choose to concentrate in the humanities or social sciences or to take courses in both areas. A list of courses counting toward the minor is available from the program office and the website.

Course	Title
Minor Requirements (7 units)	
2 humanities or social science courses chosen from the following core courses:	
ENVR_POL 211-0	Food and Society: An Introduction
ENVR_POL 212-0	Environment and Society
ENVR_POL 261-0	American Religion, Ecology and Culture
ENVR_POL 309-0	American Environmental History
ENVR_POL 340-0	Global Environments and World History
ENVR_POL 390-0	Special Topics in Environmental Policy and Culture (relevant sections; see website for details)
GEOG 211-0	World Biogeography
HISTORY 300-0	New Lectures in History (relevant sections; see EPC website for details)
ISEN 230-0	Climate Change and Sustainability: Ethical Dimensions
POLI_SCI 329-0	U.S. Environmental Politics
At least 1 natural sciences course chosen from the following (no more than 2 natural sciences courses will be automatically approved for the minor):	
BIOL_SCI 346-0	Field Ecology
BIOL_SCI 347-0	Conservation Biology
EARTH 105-0	Climate Catastrophes in Earth History
EARTH 106-0	The Ocean, the Atmosphere & Our Climate
ENVR_SCI 201-0	Earth: A Habitable Planet
ENVR_SCI 202-0	The Health of the Biosphere
ENVR_SCI 203-0	Humans and the Environment

4 elective courses, including at least 1 from each of these categories: culture, policy, and natural sciences (see website for lists of eligible courses)

- At least 4 of the 7 courses must be at the 300 level.
- Only 1 quarter of ENVR_POL 399-0 Independent Study may count toward the requirements.
- Exceptions must be approved by the program director.

Environmental Sciences

envsci.northwestern.edu

The environmental sciences program prepares students to address one of society's greatest challenges: preservation and stewardship of the natural world.

The curriculum synthesizes the natural sciences, engineering, and the social sciences, all of which are important for understanding the environment, the impact human activities have on it, and ways to mitigate and manage such impacts. In the interdisciplinary curriculum, majors learn integrative and quantitative approaches to local and global environmental issues, such as air and water pollution, biodiversity, climate change, energy, human health, and sustainability. The program provides preparation for employment in environmentally oriented firms, companies, and organizations; training for graduate study in diverse

environmental disciplines; and preprofessional development for careers in civil service, law, business, and medicine.

Programs of Study

- Environmental Sciences Major (p. 246)
- Environmental Sciences Second Major for ISP Students (p. 248)

ENVR_SCI 101-6 First-Year Seminar (1 Unit) Open to first-year students in Weinberg College; does not satisfy major requirements in Environmental Science.

ENVR_SCI 201-0 Earth: A Habitable Planet (1 Unit) Overview of the physical processes governing environmental systems, from lithosphere to hydrosphere to atmosphere. Physical science perspectives on current debates, such as those over water resources, energy, and climate change. *Natural Sciences Distro Area*

ENVR_SCI 202-0 The Health of the Biosphere (1 Unit) Dimensions of the ecological niche; growth and regulation of populations; interactions among populations; community structure and diversity; conservation. Prerequisite: CHEM 152-0 or equivalent. *Natural Sciences Distro Area*

ENVR_SCI 203-0 Humans and the Environment (1 Unit) Introduction to human interactions with the environment. Topics may include but are not limited to energy, sustainability, pollution, and climate change. *Natural Sciences Distro Area*

ENVR_SCI 390-0 Special Topics in Environmental Sciences (1 Unit) Lecture course on environmental science topics of interest to students and faculty. May be repeated for credit with different topic.

ENVR_SCI 399-0 Independent Study (1 Unit) Independent research on special problems under direct supervision of a faculty adviser. Comprehensive report required. Prerequisite: consent of program director.

Environmental Sciences Major

The major in environmental sciences has two tracks: one in science and one in economic policy. The tracks share foundation courses in science and math and the core curriculum. Advanced coursework differs by track.

Students should plan their academic paths with an environmental sciences adviser soon after identifying their interests in the major. Foundation courses, many of which are prerequisites for advanced courses, should be completed as soon as possible. Students are encouraged (but not required) to take MATH 230-0 Differential Calculus of Multivariable Functions or the General Physics sequence PHYSICS 135-1, PHYSICS 135-2, PHYSICS 135-3, especially if they envision graduate training. Premedical students and students interested in advanced study in environmental biology are advised to take the full 200-level sequence in biological sciences and 2 additional quarters of organic chemistry.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Program Courses (11 units)	
3 core courses:	
ENVR_SCI 201-0	Earth: A Habitable Planet
ENVR_SCI 202-0	The Health of the Biosphere
ENVR_SCI 203-0	Humans and the Environment
8 advanced studies courses (see below) (p. 246)	

Foundations in Science and Math (Units depend on chemistry and mathematics sequences taken; courses may double-count with another major or a minor)

Students should complete all of the following courses in their first two years:	
MATH 220-0 & MATH 224-0 or MATH 212-0 & MATH 213-0 & MATH 214-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
CHEM 110-0 & CHEM 131-0 & CHEM 141-0 & CHEM 132-0 & CHEM 142-0 or CHEM 151-0 & CHEM 161-0 & CHEM 152-0 & CHEM 162-0 or CHEM 171-0 & CHEM 181-0 & CHEM 172-0 & CHEM 182-0	Quantitative Problem Solving in Chemistry and General Chemistry 1 and General Chemistry Laboratory 1 and General Chemistry 2 and General Chemistry Laboratory 2 Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1 and Accelerated General Chemistry 2 and Accelerated General Chemistry Laboratory 2 Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory and Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory
5 courses chosen from the following, with at least 2 from the same group. (Chemistry and physics labs do not count toward the 5-course total.) ¹	
BIOL_SCI 215-0	Genetics and Molecular Biology
BIOL_SCI 217-0	Physiology
BIOL_SCI 219-0	Cell Biology
BIOL_SCI 220-0 & BIOL_SCI 221-0 & BIOL_SCI 222-0	Genetics and Molecular Processes Laboratory and Cellular Processes Laboratory and Investigative Laboratory
CHEM 210-1	Organic Chemistry
CHEM 210-2 & CHEM 230-2	Organic Chemistry and Organic Chemistry Lab I
ECON 201-0	Introduction to Macroeconomics
ECON 202-0	Introduction to Microeconomics
PHYSICS 135-1 & PHYSICS 136-1	General Physics and General Physics Laboratory
PHYSICS 135-2 & PHYSICS 136-2	General Physics and General Physics Laboratory
PHYSICS 135-3 & PHYSICS 136-3	General Physics and General Physics Laboratory
STAT 210-0	Introductory Statistics for the Social Sciences
MATH 230-0	Differential Calculus of Multivariable Functions
MATH 240-0	Linear Algebra
MATH 250-0	Elementary Differential Equations

¹ The lab courses BIOL_SCI 220-0 Genetics and Molecular Processes Laboratory, BIOL_SCI 221-0 Cellular Processes Laboratory, BIOL_SCI 222-0 Investigative Laboratory may together count as 1 course toward this requirement

Advanced Studies Courses

See below for lists of approved science courses (p. 247) and environment and society courses (p. 247). See Environmental Sciences webpage (<https://www.envsci.northwestern.edu/undergraduate/major-requirements.html>) for updates to these lists.

- At least 6 must be at the 300 level.
- Students in the science track choose 6 from the science list and 2 from the environment and society list.
- Students in the policy track take:

Course	Title
ECON 281-0	Introduction to Applied Econometrics
ECON 310-1	Microeconomics
ECON 371-0	Economics of Energy
or ECON 372-0	Environmental Economics
or ECON 373-0	Natural Resource Economics
5 additional courses, including 4 from the science list	

- Up to 2 ENVR_SCI 399-0 Independent Study research courses may be substituted for courses on the science list.
- Students who wish to double-major in Economics and Environmental Sciences are encouraged to do the science track in Environmental Science. Students doing the policy track must take extra 300-level economics classes to fulfill the requirements for both majors.

Science List

Course	Title
ANTHRO 306-0	Evolution of Life Histories
ANTHRO 312-0	Human Population Biology
ANTHRO 314-0	Human Growth & Development
ANTHRO 390-0	Topics In Anthropology ¹
BIOL_SCI 301-0	Principles of Biochemistry
BIOL_SCI 330-0	Plant Biology
BIOL_SCI 332-0	Conservation Genetics
BIOL_SCI 334-0	Soils and the Environment: The Earth's Critical Zone
BIOL_SCI 336-0	Spring Flora
BIOL_SCI 337-0	Quantitative Methods for Ecology and Conservation
BIOL_SCI 341-0	Population Genetics
BIOL_SCI 346-0	Field Ecology
BIOL_SCI 347-0	Conservation Biology
BIOL_SCI 349-0	Plant Community Ecology
BIOL_SCI 350-0	Plant Evolution and Diversity Lab
CHEM 306-0	Environmental Chemistry
CHEM 329-0	Analytical Chemistry
CHEM 342-1	Thermodynamics
CHEM 342-2	Quantum Mechanics and Spectroscopy
CHEM 393-0	Green Chemistry
CHEM_ENG 365-0	Sustainability, Technology, and Society
CIV_ENV 260-0	Environmental Systems and Processes
CIV_ENV 340-0	Hydraulics and Hydrology
CIV_ENV 358-0	Airphoto Interpretation
CIV_ENV 361-1	Environmental Microbiology
CIV_ENV 361-2	Public & Environmental Health
CIV_ENV 363-0	Environmental Engineering Applications 1: Air and Land
CIV_ENV 364-0	Sustainable Water Systems
CIV_ENV 365-0	Environmental Laboratory
CIV_ENV 367-0	Chemical Processes in Aquatic Systems
CIV_ENV 371-0	Introduction to Transportation Planning and Analysis
CIV_ENV 376-0	Transportation System Operations
EARTH 201-0	Earth Systems Revealed
EARTH 300-0	Earth and Planetary Materials
EARTH 301-0	Petrology: Evolution of Crustal and Mantle Rocks

EARTH 310-0	Aqueous Geochemistry
EARTH 312-0	Stable Isotope Geochemistry
EARTH 313-0	Radiogenic Isotope Geochemistry
EARTH 314-0	Organic Geochemistry
EARTH 330-0	Sedimentary Geology
EARTH 331-0	Field Problems in Sedimentary Geology
EARTH 341-0	Quaternary Climate Change: Ice Ages to the Age of Oil
EARTH 342-0	Contemporary Energy and Climate Change
EARTH 343-0	Earth System Modeling
EARTH 353-0	Mathematical Inverse Methods in Earth and Environmental Sciences (formerly Earth 329)
EARTH 360-0	Instrumentation and Field Methods
EARTH 361-0	Introduction to Scientific Programming in Python (formerly Earth 322)
EARTH 362-0	Data Analysis for Earth and Planetary Sciences (formerly Earth 326)
EARTH 371-0	Biogeochemistry (formerly Earth 317)
EARTH 373-0	Microbial Ecology
EARTH 380-0	Forming a Habitable Planet (formerly Earth 351)
EARTH 390-0	Special Topics in Earth and Planetary Science ¹
ENVR_SCI 390-0	Special Topics in Environmental Sciences
GEOG 211-0	World Biogeography
GEOG 240-0	Economic Geography
GEOG 341-0	Principles of Cartography
GEOG 343-0	Geographic Information Systems
ISEN 210-0	Introduction to Sustainability: Challenges and Solutions
ISEN 220-0	Introduction to Energy Systems for the 21st Century
MECH_ENG 241-0	Fluid Mechanics I
MECH_ENG 395-0	Special Topics in Mechanical Engineering ¹

¹ Approved sections only.

Environment and Society List

Course	Title
ANTHRO 310-0	Evolution and Culture
ANTHRO 383-0	Environmental Anthropology
CIV_ENV 303-0	Environmental Law and Policy
CIV_ENV 349-0	Environmental Management
CIV_ENV 368-0	Sustainability: The City
CIV_ENV 395-0	Special Topics in Civil and Environmental Engrg ¹
ECON 371-0	Economics of Energy
ECON 372-0	Environmental Economics
ECON 373-0	Natural Resource Economics
ENVR_POL 390-0	Special Topics in Environmental Policy and Culture
ENVR_POL 395-0	Special Topics Seminar
GEOG 328-0	The Human Use of the Earth
GBL_HLTH 302-0	Global Bioethics
HISTORY 200-0	New Introductory Courses in History ¹
HISTORY 300-0	New Lectures in History ¹
HISTORY 309-0	American Environmental History
HISTORY 376-0	Global Environments and World History
HISTORY 392-0	Topics In History ¹
HISTORY 395-0	Research Seminar ¹
ISEN 230-0	Climate Change and Sustainability: Ethical Dimensions
ISEN 390-0	Special Topics in Energy & Sustainability
PHIL 254-0	Introduction to Philosophy of the Natural Sciences

PHIL 268-0	Ethics and the Environment
PHIL 269-0	Bioethics
PHIL 270-0	Climate Change and Sustainability: Economic and Ethical Dimensions
POLI_SCI 329-0	U.S. Environmental Politics
POLI_SCI 349-0	International Environmental Politics
RELIGION 261-0	American Religion, Ecology and Culture
SOCIOLOGY 212-0	Environment and Society
SOCIOLOGY 276-0	Introductory Topics in Sociology
SOCIOLOGY 305-0	Population Dynamics
SOCIOLOGY 311-0	Food, Politics and Society
SOCIOLOGY 312-0	Social Change and the Environment

¹ Approved sections only.

Honors in Environmental Sciences

Students with strong academic records and an interest in pursuing honors should approach a faculty member by the end of junior year to discuss possible projects; these may involve field, experimental, or computational research. Research is completed during 2 quarters of ENVR_SCI 399-0 Independent Study, which may count toward major requirements. Students then prepare a written thesis. Those whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information consult the program director and see Honors in the Major (p. 178).

Environmental Sciences Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

The Integrated Science Program is a highly selective BA program in Weinberg College (see Integrated Science Program (p. 279)). Students majoring in ISP who wish to complete a second major in environmental sciences should fulfill the following requirements instead of those listed for the stand-alone Environmental Sciences major (p. 246).

Course	Title
ENVR_SCI 201-0	Earth: A Habitable Planet
ENVR_SCI 202-0	The Health of the Biosphere
ENVR_SCI 203-0	Humans and the Environment
4 advanced studies courses from the lists of approved courses on the stand-alone major page:	
3 from the science list ¹	
1 from the environment and society list	
All must be at the 300 level.	

¹ May substitute 1 quarter of ENVR_SCI 399-0 Independent Study for 1 of these

Ethics and Civic Life

bradyprogram.northwestern.edu

The interdisciplinary Brady Scholars Program in Ethics and Civic Life provides students with the opportunity to examine and practice the ethics of citizenship and leadership. The three-year program includes academic,

international, and service components. Brady Scholars are selected in the spring of the first year.

Program of Study

- Brady Scholars Program (p. 248)

Brady Scholars Program

As sophomores, Brady Scholars enroll each quarter in a seminar investigating what a good human life is, what a good person is, and what a good society is and asking how we can make our cities, nation, and world better places. Each group of Brady Scholars selects one local community challenge for further study.

In junior year, Brady Scholars participate in a study abroad program and, in addition to their regular coursework, learn how the foreign country addresses the challenge selected by their group.

Moral philosophy, global citizenship, and community engagement are integrated for Brady Program seniors when their 16-student class works collectively to provide concrete solutions to a social challenge in Evanston, drawing on their three years of rigorous research and academic study of the challenge. Seniors receive 1 unit of academic credit for the pair of courses: PHIL 373-1, and PHIL 373-2.

Courses

Specific topics in the sophomore-year seminars PHIL 273-1, PHIL 273-2, PHIL 273-3 will vary as different professors participate. The senior year community engagement sequence PHIL 373-1, PHIL 373-2 will relate to the community challenge.

First-Year Seminars

First-year seminars, offered by nearly all departments and programs in Weinberg College, are small, discussion- oriented classes designed to develop students' basic intellectual skills: reading critically, thinking logically, and communicating effectively. Expository writing is an important activity in each seminar.

Most Weinberg College students are required to complete two first-year seminars. For more information, see the section on the first-year seminar requirement under Requirements for the Degree of Bachelor of Arts (p. 175).

French and Italian

frenchanditalian.northwestern.edu

Studies in French and Italian provide unique insights into the language, thought, and character of cultures different from our own. Such knowledge builds an awareness of our own society's diversity and the ways it resembles and differs from others. Proficiency in language and knowledge of culture are keys to careers in communication, media, business, the arts, and academia and are valuable components of any university education.

The department's programs are varied. Language courses, from the elementary through the graduate levels, develop communication skills for functioning at ease with foreign texts or in a foreign environment. Courses in literature and culture not only broaden and deepen insights into the thought and writing of other societies 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.

French Study Abroad

Students studying abroad in France or other francophone countries may receive up to 7 credits (depending on program length) if the content of courses taken abroad relates in a substantive way to some aspect of French or francophone culture or society.

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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Programs of Study

- French Major (p. 253)
- French Minor (p. 255)
- Italian Literature and Culture Major (p. 255)
- Italian Minor (p. 256)
- French BA/MA (p. 256)

See below for Italian Courses (p. 251).

French Courses

FRENCH 105-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

FRENCH 106-0 French for Research (0 Unit)

FRENCH 111-1 Elementary French (1 Unit) Conversation, grammar, reading, and writing for beginners. Four class meetings a week.

FRENCH 111-2 Elementary French (1 Unit) Conversation, grammar, reading, and writing for beginners. Four class meetings a week.
Prerequisite: FRENCH 111-1

FRENCH 111-3 Elementary French (1 Unit) Conversation, grammar, reading, and writing for beginners. Four class meetings a week.
Prerequisite: FRENCH 111-2

FRENCH 115-1 Intensive Elementary French (1 Unit) 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 115-2 Intensive Elementary French (1 Unit) 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: FRENCH 115-1 or department placement.

FRENCH 121-1 Intermediate French (1 Unit) Grammar review, conversation, reading, and writing. Four class meetings a week.
Prerequisite: FRENCH 111-3 or department placement.

FRENCH 121-2 Intermediate French (1 Unit) Grammar review, conversation, reading, and writing. Four class meetings a week.
Prerequisite: FRENCH 121-1 or department placement.

FRENCH 121-3 Intermediate French (1 Unit) Grammar review, conversation, reading, and writing. Four class meetings a week.
Prerequisite: FRENCH 121-2 or department placement.

FRENCH 125-1 Intensive Intermediate French (1 Unit) French language and culture: conversation, composition, reading of cultural and literary texts, and grammar review. Three class meetings a week. Prerequisite: FRENCH 115-2 or department placement.

FRENCH 125-2 Intensive Intermediate French (1 Unit) French language and culture: conversation, composition, reading of cultural and literary texts, and grammar review. Three class meetings a week. Prerequisite: FRENCH 125-1 or department placement.

FRENCH 125-3 Intensive Intermediate French (1 Unit) French language and culture: conversation, composition, reading of cultural and literary texts, and grammar review. Three class meetings a week. Prerequisite: FRENCH 125-2 or department placement.

FRENCH 198-0 Independent Study (1 Unit) Credit for 1 quarter only.
Prerequisite: department approval.

FRENCH 199-SA Language and Culture (2 Units) Grammar, conversation, reading, writing, and culture study. Restricted to students in Northwestern's Paris programs. Students completing this course must take a placement exam before continuing French at Northwestern.

FRENCH 201-0 Culture and Society (1 Unit) Development of fluency, accuracy, and creativity in speaking, comprehension, reading, and writing French; introduction to social, cultural, and literary topics. Prerequisite: FRENCH 121-3 or department placement.

FRENCH 202-0 Writing Workshop: Cultural Encounters in Contemporary France (1 Unit) Practical study of French grammar and structure; students develop and improve writing skills through practice in preparing short compositions. Prerequisite: FRENCH 125-3, FRENCH 201-0, or department placement.

FRENCH 203-0 Oral Workshop: Individual and Society in France Today (1 Unit) Practical course to increase listening comprehension, build vocabulary and idiom use, and enhance communication skills. Prerequisite: FRENCH 125-3, FRENCH 201-0 or department placement.

FRENCH 210-0 Reading Literatures in French (1 Unit) Introduction to texts in various genres such as essay, poetry, drama, novel, and autobiography, from at least two periods from the Middle Ages to the present. Prerequisite: FRENCH 202-0, AP score of 5, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 211-0 Reading Cultures in French (1 Unit) Introduction to French and/or francophone cultures through texts and media from at least two periods; major themes, issues, and debates. Prerequisite: FRENCH 202-0, AP score of 5, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 271-0 Introducing the Novel (1 Unit) Textual interpretation and analysis of short French novels from different periods, with special attention to formal issues. Prerequisite: FRENCH 210-0 or FRENCH 211-0, AP score of 5 in literature, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 272-0 Introducing Theatre (1 Unit) Textual interpretation and analysis of French plays from different periods, with special attention to formal issues. Principles of tragedy and comedy; contemporary developments. Credit not allowed for both FRENCH 272-0 and FRENCH 279-0. Prerequisite: FRENCH 210-0 or FRENCH 211-0, AP score of 5 in literature, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 273-0 Introducing Poetry (1 Unit) Textual interpretation and analysis of French poetry from different periods, with special attention to formal issues. Overview of major poetic movements. Prerequisites: FRENCH 210-0 or FRENCH 211-0, AP score of 5 in literature, or consent of instructor.

FRENCH 277-0 French Existentialism (1 Unit) Existentialism in its literary, philosophical, and cultural manifestations. *Ethics Values Distro Area Interdisciplinary Distro* - See Rules (p. 175) *Literature Fine Arts Distro Area*

FRENCH 279-0 Theater in Translation (1 Unit) Representative French plays from the 17th through 20th centuries; basic concepts of genre; social and historical context. Credit not allowed for both FRENCH 279-0 and FRENCH 272-0. *Literature Fine Arts Distro Area*

FRENCH 299-SA Language and Culture (2 Units) Study of French language and culture in Paris. Restricted to students in Northwestern's Paris programs. Students completing this course must take a placement exam before continuing French at Northwestern. Prerequisite: Weinberg College French language proficiency.

FRENCH 300-0 French Phonetics (1 Unit) Development of near-native spoken French through practice in correct pronunciation. Phonetic system of contemporary French; introduction to basic issues of theoretical phonetics. Prerequisite: FRENCH 202-0, FRENCH 203-0, or consent of instructor.

FRENCH 301-0 Advanced Language in Context: Society and Popular Culture (1 Unit) Practical study of structure, syntax, and usage of French through contemporary media, cinema, theater, and popular culture. Prerequisite: FRENCH 202-0 or consent of instructor.

FRENCH 302-0 Advanced Writing (1 Unit) Development of written expression for different communicative needs and functions based on the study of French writing styles and techniques. Prerequisite: FRENCH 202-0 or consent of instructor

FRENCH 303-0 Advanced Conversation (1 Unit) Development of advanced proficiency and confidence in spoken French through practice of speech and discussion of issues in current French media and culture. Emphasis on culturally appropriate usage. Prerequisite: FRENCH 202-0, FRENCH 203-0, or consent of instructor.

FRENCH 309-0 French For Professions (1 Unit) French language as used in professional contexts. May include study of a specific field and differences from its American counterpart. May be repeated for credit with change of topic. Prerequisite: FRENCH 202-0 or consent of instructor.

FRENCH 310-0 The Middle Ages & Renaissance (1 Unit) Study of literary texts of the French Middle Ages and Renaissance with emphasis on their

historical and literary-historical contexts. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 322-0 Medieval French Narratives (1 Unit) Major narrative works of the French Middle Ages in historical context. Content varies; may include epics such as the Song of Roland, romances such as Chrétien de Troyes's Perceval, and narratives of childhood. Texts read in modern French versions. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 333-0 Topics in Renaissance Literature (1 Unit) Study of literary and other texts of the French Renaissance with emphasis on their literary, historical, and political contexts. May be repeated for credit with change of topic. Prerequisites: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor.

FRENCH 334-0 Montaigne and Modernity (1 Unit) In-depth study of the work of Michel de Montaigne and his models within the context of Renaissance history, politics and philosophy. All readings and discussion in French. Prerequisites: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 335-0 17th Century Literature (1 Unit) 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. May be repeated for credit with change of topic. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 340-0 Sexual Politics and the Ancien Regime (1 Unit) 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 the French Revolution. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 344-0 Rousseau and the French Revolution (1 Unit) Analysis of Rousseau's political thought and major literary works and their impact on Revolutionary ideology and culture. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 346-0 Studies in the Enlightenment (1 Unit) Authors such as Rousseau, Diderot, Montesquieu, Voltaire, and Graffigny in relation to Enlightenment debates about science, religion, political authority, human nature, colonialism, gender, and slavery. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 350-0 The Novel in French (1 Unit) Content varies; may include the novel of the ancien régime, the psychological novel, and the Bildungsroman in France. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 355-0 The Invention of Modernity (1 Unit) 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: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 360-0 From Modernism to Postmodernism (1 Unit) 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: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 362-0 African Literatures and Cultures (1 Unit) Major issues, trends, and authors from francophone Africa. Content varies; may include Shahrazade, narratives of gender relations, law and literature, violence, and writing. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 364-0 Caribbean Literatures and Cultures (1 Unit) Major issues, trends, and authors from the francophone Caribbean and its diasporas. Content varies; may include Caribbean women writers; slavery, history, and memory; Caribbean identities. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 365-0 The Maghreb and the Middle East (1 Unit) Major issues in the literatures and cultures of North Africa and the Middle East. Content varies. May include exile in writing; politics of language and translation. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor.

FRENCH 366-0 France and East Asia (1 Unit) Interdisciplinary approaches to the history of French-East Asian relations, including French representations of East Asia. May include translation, japonisme, cinema, literary and philosophical avant-gardes, and culture and globalization. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor.

FRENCH 367-0 Transnational Francophone Studies (1 Unit) Exploration of cultural production in various genres from the French-speaking world, with an emphasis on themes, ideas, and/or forms that traverse national and/or cultural boundaries. May be repeated for credit when content changes. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 371-0 Giants, Cannibals, and Critique (1 Unit) Analysis of works of Rabelais and Montaigne and their techniques of satire and social critique. Readings include related selections from Erasmus, More, La Boétie, and others.

FRENCH 374-0 Proust (1 Unit) Introduces the works of Marcel Proust, a central figure of European literature and thought. *Literature Fine Arts Distro Area*

FRENCH 375-0 French Film (1 Unit) Topics in French cinema: for example, French classical cinema, the New Wave, postcolonial French film, the cinema of Marguerite Duras. *Literature Fine Arts Distro Area*

FRENCH 376-0 Gender & Sexuality (1 Unit) Major trends and perspectives in gender and sexuality studies such as first and second wave feminisms, lesbian writers, AIDS literature, queer theory, gender and orientalism, cross-cultural feminism. *Literature Fine Arts Distro Area*

FRENCH 378-0 Contemporary Theory (1 Unit) Introduction to some major trends in contemporary French theory and the way they have influenced literary studies in the United States. *Literature Fine Arts Distro Area*

FRENCH 379-0 Topics in French Literature and Culture (1 Unit) Advanced exploration of special topics in French studies. May be repeated for credit with change of topic. Prerequisite: consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 380-0 Political & Social Thought in France (1 Unit) Major political and social trends in France from the ancien régime to the 20th century. Content varies. May be repeated for credit with change of topic. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 384-0 Women Writing in French (1 Unit) Analysis of texts by women authors with regard to their respective social, cultural, political, and historical contexts. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 386-0 Gender & Writing (1 Unit) Issues of gender and sexuality in the production of literary and other creative texts in various historical periods. May be repeated for credit with change of topic. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 390-0 Topics in Literature and Culture (1 Unit) Topics, issues, and questions in French and francophone culture. Content varies; may include French and francophone cinema, the intellectual in France. May be repeated for credit with change of topic. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 390-SA Topics in Literature and Culture (1 Unit) Topics, issues, and questions in French and francophone culture. Content varies; may include French and francophone cinema, the intellectual in France. May be repeated for credit with change of topic. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. *Literature Fine Arts Distro Area*

FRENCH 391-0 Theory and Practice of Translation (1 Unit) Intercultural communication through analysis of translation theories and translated works; translation exercises. Content varies; genres may include prose, poetry, graphic novels, and theater. Prerequisite: FRENCH 301-0, FRENCH 302-0, study abroad, or consent of instructor.

FRENCH 393-0 Foreign Language Teaching: Theory and Practice (1 Unit) Theoretical foundation and practical applications of second-language acquisition and applied linguistics. Analysis and design of pedagogical materials. Self-reflection and analysis of teaching style and teaching philosophy. Prerequisite: senior status or consent of instructor.

FRENCH 395-0 Advanced Studies in Culture and Thought (1 Unit) Theoretical perspectives and paradigms for understanding culture through in-depth study of a historical, cultural, or theoretical issue or of a literary or artistic work. Independent term paper. Prerequisite: senior status or consent of undergraduate advisor. *Literature Fine Arts Distro Area*

FRENCH 399-0 Independent Study (1 Unit) Independent reading and research. Topics arranged through consultation with an instructor and approval of the department.

Italian Courses

ITALIAN 101-1 Elementary Italian (1 Unit) Emphasis on oral communication, supported by grammar, writing, reading, and listening. Four class meetings a week. Prerequisite: none.

ITALIAN 101-2 Elementary Italian (1 Unit) Emphasis on oral communication, supported by grammar, writing, reading, and listening. Four class meetings a week. Prerequisite: ITALIAN 101-1

ITALIAN 101-3 Elementary Italian (1 Unit) Emphasis on oral communication, supported by grammar, writing, reading, and listening. Four class meetings a week. Prerequisite: ITALIAN 101-2

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

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

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

ITALIAN 103-1 Italian for Musicians (1 Unit) Italian language course for musicians, focusing on developing comprehension and pronunciation skills for operatic performance. Analysis of libretti and scores of Italian operas. Prerequisite: ITALIAN 101-2 or equivalent proficiency.

ITALIAN 105-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

ITALIAN 106-0 Italian for Research (0 Unit)

ITALIAN 133-1 Intensive Italian (1 Unit) Intensive double course covers two years of Italian language, the equivalent of Italian 101 and Italian 102, in a single academic year. Students enroll concurrently in ITALIAN 133-1 and ITALIAN 134-1 and receive 2 credits a quarter. Four two-hour class meetings a week. Prerequisite: none.

ITALIAN 133-2 Intensive Italian (1 Unit) Intensive double course covers two years of Italian language, the equivalent of Italian 101 and Italian 102, in a single academic year. Students enroll concurrently in ITALIAN 133-2 and ITALIAN 134-2 and receive 2 credits a quarter. Four two-hour class meetings a week. Prerequisite: none.

ITALIAN 133-3 Intensive Italian (1 Unit) Intensive double course covers two years of Italian language, the equivalent of Italian 101 and Italian 102, in a single academic year. Students enroll concurrently in ITALIAN 133-3 and ITALIAN 134-3 and receive 2 credits a quarter. Four two-hour class meetings a week. Prerequisite: none.

ITALIAN 134-1 Intensive Italian (1 Unit) Intensive double course covers two years of Italian language, the equivalent of Italian 101 and Italian 102, in a single academic year. Students enroll concurrently in ITALIAN 133-1 and ITALIAN 134-1 and receive 2 credits per quarter. Four two-hour class meetings per week. Prerequisite: none.

ITALIAN 134-2 Intensive Italian (1 Unit) Intensive double course covers two years of Italian language, the equivalent of Italian 101 and Italian 102, in a single academic year. Students enroll concurrently in ITALIAN 133-2 and ITALIAN 134-2 and receive 2 credits per quarter. Four two-hour class meetings per week. Prerequisite: none.

ITALIAN 134-3 Intensive Italian (1 Unit) Intensive double course covers two years of Italian language, the equivalent of Italian 101 and Italian 102, in a single academic year. Students enroll concurrently in ITALIAN 133-3 and ITALIAN 134-3 and receive 2 credits per quarter. Four two-hour class meetings per week. Prerequisite: none.

ITALIAN 201-0 Italian Through Media (1 Unit) 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: ITALIAN 102-3 or ITALIAN 133-3 / ITALIAN 134-3 or equivalent.

ITALIAN 202-0 Italian Through Performance (1 Unit) Students develop and perform original material on video or live. Content may derive from television, theater, opera, and commedia dell'arte. Prerequisite: ITALIAN 102-3 or ITALIAN 133-3 / ITALIAN 134-3 or equivalent. *Literature Fine Arts Distro Area*

ITALIAN 203-0 Creative Writing in Italian (1 Unit) A course meant to improve written Italian through exercises and experiments in a variety of genres and styles. Prerequisite: ITALIAN 102-3 or ITALIAN 133-3 / ITALIAN 134-3 or equivalent.

ITALIAN 204-0 Introduction to Italian Literature (1 Unit) Introduction to the history, genres, and themes of Italian literature. Course content may vary, focusing on reading, comprehension, and interpretive skills. Prerequisite: ITALIAN 102-3 or equivalent proficiency. *Literature Fine Arts Distro Area*

ITALIAN 205-0 Voyage to Italy (1 Unit) An approach to Italian culture and civilization through exploration of representative Italian cities. Prerequisite: ITALIAN 102-3 or ITALIAN 133-3 / ITALIAN 134-3 or equivalent proficiency.

ITALIAN 206-0 Business Italian (1 Unit) Introduction to the business and economic environment in Italy. Study of business practice and development of linguistic skills necessary for professional communication.

ITALIAN 207-0 Conversation in Italian (1 Unit) Introduction to Italian culture. Emphasizes group activities and focuses on listening comprehension and speaking skills. Prerequisite: ITALIAN 102-3 or ITALIAN 133-3 / ITALIAN 134-3 or equivalent proficiency.

ITALIAN 230-0 Italian Theatre and Performance (1 Unit) Introduction to drama and performance in Italy. *Literature Fine Arts Distro Area*

ITALIAN 250-0 Topics in Italian Culture and Literature (1 Unit) Cross-disciplinary exploration of a defined topic in Italian studies as it interacts with other cultural and literary traditions—for example, aspects of love. May be repeated for credit with change of topic. *Literature Fine Arts Distro Area*

ITALIAN 251-0 Introduction to Italian Cinema (1 Unit) Focus on filmmakers fundamental to the development of modern cinema (including Rossellini, Fellini, and Antonioni) from 1942 to the present. Emphasis on formal analysis and film criticism. *Literature Fine Arts Distro Area*

ITALIAN 265-0 Body and Soul from Rome to the Renaissance (1 Unit) Comprehension of the human body and soul in Italy from Augustan Rome to the Renaissance, as seen in literary and religious authors. Readings include Ovid, St. Paul, Gnostics, St. Francis, "dolce stil novo," Boccaccio. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Literature Fine Arts Distro Area*

ITALIAN 270-0 Michelangelo and the Italian Renaissance (1 Unit) Close examination of Michelangelo's life and work in the broader context of Italian Renaissance culture. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Literature Fine Arts Distro Area*

ITALIAN 275-0 Dante's Divine Comedy (1 Unit) Introduction to the Divine Comedy, its artistic and intellectual achievement, and its cultural and historical context. *Literature Fine Arts Distro Area*

ITALIAN 277-0 Global Neorealism (1 Unit) Exploration of Italian neorealism and its influence on European (especially the French New Wave), New Latin American, West African, and Indian cinema. *Literature Fine Arts Distro Area*

ITALIAN 304-0 Politics and Mass Culture (1 Unit) Culture of Italy from World War II to the present. Novels, films, popular culture.

ITALIAN 306-0 Migrations (1 Unit) Italian literary practice in contact with groups that Italy has defined as other-either beyond or within its geographical boundaries. *Literature Fine Arts Distro Area*

ITALIAN 310-0 Reading Italian Literature (in Italian) (1 Unit) Introduction to principal genres of Italian literature in historical and cultural context from the Middle Ages to the present. Authors include Dante, Boccaccio, Goldoni, Leopardi, Verga, Pirandello, Levi, and Montale. Prerequisite: One 200-level course in Italian or equivalent proficiency. *Literature Fine Arts Distro Area*

ITALIAN 347-0 Italy in Art and Literature (1 Unit) Interdisciplinary course on Italian culture from the Middle Ages to the present. Each week pairs an artist with an author-for instance, Giotto/Dante, Michelangelo/Vittoria Colonna, Caravaggio/Galilei, De Chirico/Pirandello, Fellini/Flaiano. *Literature Fine Arts Distro Area*

ITALIAN 348-0 The Italian Novella (1 Unit) Exploration of Italian culture through the form of the novella from the Middle Ages to the present. Each week is devoted to a groundbreaking author, such as Boccaccio, Sacchetti, Basile, Pirandello, Flaiano, and Calvino. *Literature Fine Arts Distro Area*

ITALIAN 349-0 Topics in Italian Culture and Literature (1 Unit) Advanced exploration of special topics in Italian studies.

ITALIAN 350-0 Advanced Topics in Italian Culture and Literature (1 Unit) Advanced exploration of special topics in Italian studies determined by the research interests of a visiting scholar. May be repeated for credit with change of topic. Prerequisite: consent of instructor. *Literature Fine Arts Distro Area*

ITALIAN 351-0 Italian Film and Transnational Cinema (1 Unit) In-depth exploration of key Italian filmmakers in the context of transnational cinema. Focus on relation between filmmakers (including Visconti/Renoir, Rossellini/Godard, and Antonioni/Wenders) and dynamics of cinematic style and cultural influence.

ITALIAN 360-0 From the Avant-Garde to the Post-Modern (1 Unit) Major authors and movements animating the modern and contemporary literary scene. Content varies-for example, futurism, feminist Italian fiction, and intellectuals and politics from D'Annunzio to Pasolini, Calvino, Eco, and the postmodern. *Literature Fine Arts Distro Area*

ITALIAN 370-0 Major Figures in Italian History and Culture (1 Unit) Investigation of the strategic roles played by Italian artists (da Vinci), scientists (Galileo), and political philosophers (Machiavelli, Vico) in forming the canon of modern thought.

ITALIAN 374-0 Love and Sexuality in the Early Modern Period (1 Unit) Analysis of how love and sexuality work as generalized symbolic media of communication in early modern Italian society and culture. *Literature Fine Arts Distro Area*

ITALIAN 377-0 Gender and Sexuality in Italian Culture (1 Unit) Interdisciplinary course on gender and visual practices in Italy

(photography, film, television, and video). Prerequisite: ITALIAN 251-0 or consent of instructor. *Literature Fine Arts Distro Area*

ITALIAN 378-0 Against Acting: Spectacle and Performance in Italy (1 Unit) Contemporary theater and performance in Italy from the '70s to the present, with attention to sociopolitical context and trends in European art. Prerequisite: consent of instructor. *Literature Fine Arts Distro Area*

ITALIAN 398-0 Undergraduate Seminar (1 Unit) Advanced analysis and research of a topic in Italian culture. History of culture, literature, philosophy, the visual arts, film studies and theory of the image, gender and sexuality in contemporary Italy.

ITALIAN 399-0 Independent Study (1 Unit) Supervised independent reading. Consult the director of undergraduate studies.

French Major

The major in French provides rigorous interdisciplinary training in the French language and the literary, cultural, and intellectual traditions of France and the French-speaking world.

Extensive coursework at all levels of language study prepares students to engage critically with a rich array of texts, images, and ideas from francophone cultures. Ranging in scope from the medieval period to the present, course content extends across regions and incorporates many genres, media, and historical documents, placing them in their social and political contexts. Majors acquire the tools for literary and cultural analysis, learn about the distinctive contributions of French critical thought, and complete an independent research paper. Students are thus prepared to be linguistically adept, global citizens who are attuned to the complexities of language and culture.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Prerequisite	
FRENCH 201-0	Culture and Society (or equivalent proficiency)
Major Requirements (14 units)	
At most 5 200-level courses taught in French, including:	
FRENCH 202-0	Writing Workshop: Cultural Encounters in Contemporary France
FRENCH 210-0 or FRENCH 211-0	Reading Literatures in French Reading Cultures in French
At least 1 but at most 2 of:	
FRENCH 271-0	Introducing the Novel
FRENCH 272-0	Introducing Theatre
FRENCH 273-0	Introducing Poetry
At least 9 courses must be at the 300 level, including:	
At least 1 advanced language course chosen from:	
FRENCH 300-0	French Phonetics
FRENCH 301-0	Advanced Language in Context: Society and Popular Culture
FRENCH 302-0	Advanced Writing
FRENCH 303-0	Advanced Conversation
FRENCH 309-0	French For Professions
FRENCH 391-0	Theory and Practice of Translation
FRENCH 393-0	Foreign Language Teaching: Theory and Practice
At least 4 literature and culture courses selected from FRENCH 310 through FRENCH 390. At least 2 must cover the period prior to 1800.	
1 senior seminar:	

FRENCH 395-0	Advanced Studies in Culture and Thought
--------------	---

At most 2 300-level courses taught in English may be counted toward the major. Of these, 1 may be a course with at least 50 percent French content offered outside the department; the course will count as an elective.

Courses with the requisite French content include: ¹	
ART_HIST 350-1 & ART_HIST 350-2	19th Century Art 1: Late 18th Century-1848 and 19Th Century Art 2: 1848-1900
HISTORY 341-0	Paris: World City, 1700 to the Present
HISTORY 342-1 & HISTORY 342-2	History of Modern France: Ancien Regime and the French Revolution and History of Modern France : 19th c. to present
PHIL 315-0	Studies in French Philosophy

No more than 1 399 may count toward the major unless the student is completing an honors thesis.

At least 2 300-level courses must be completed at Northwestern

- ¹ Other courses may be approved at the discretion of the director of undergraduate studies.

Exceptions and Waivers

- Majors who begin French studies in FRENCH 111-1 Elementary French, FRENCH 115-1 Intensive Elementary French, or FRENCH 121-1 Intermediate French may count FRENCH 201-0 Culture and Society as 1 elective course at the 200 level.
- Majors with an AP score of 5 or with advanced department placement may waive FRENCH 202-0 Writing Workshop: Cultural Encounters in Contemporary France. In this case total course requirements for the major will be 13 courses, with a maximum of 4 200-level courses and at least 9 300-level courses.

Honors in French

Majors with strong academic records and an interest in pursuing honors should contact the director of undergraduate studies no later than spring quarter of junior year. The honors thesis is produced through 2 quarters of FRENCH 399-0 Independent Study; these FRENCH 399-0 enrollments will count toward the 14 required units for the major. The thesis may build on previous work done in a 300-level course.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information see the department website or consult with the director of undergraduate studies and see Honors in the Major (p. 178).

Courses

Introductory and Intermediate Language Courses

Course	Title
FRENCH 111-1 & FRENCH 111-2 & FRENCH 111-3	Elementary French and Elementary French and Elementary French
FRENCH 115-1 & FRENCH 115-2	Intensive Elementary French and Intensive Elementary French
FRENCH 121-1 & FRENCH 121-2 & FRENCH 121-3	Intermediate French and Intermediate French and Intermediate French
FRENCH 125-1 & FRENCH 125-2 & FRENCH 125-3	Intensive Intermediate French and Intensive Intermediate French and Intensive Intermediate French
FRENCH 198-0	Independent Study
FRENCH 199-SA & FRENCH 299-SA	Language and Culture and Language and Culture

FRENCH 201-0	Culture and Society
FRENCH 202-0	Writing Workshop: Cultural Encounters in Contemporary France
FRENCH 203-0	Oral Workshop: Individual and Society in France Today

Introductory Literature and Culture Courses

Introduction to texts in various genres such as essay, poetry, drama, novel, and autobiography, from at least two periods from the Middle Ages to the present. Prerequisite: FRENCH 202-0 Writing Workshop: Cultural Encounters in Contemporary France, AP score of 5, or consent of instructor.

Course	Title
FRENCH 210-0	Reading Literatures in French
FRENCH 211-0	Reading Cultures in French
FRENCH 271-0	Introducing the Novel
FRENCH 272-0	Introducing Theatre
FRENCH 273-0	Introducing Poetry

Courses with Readings and Discussion in English

No prerequisite in French; readings, discussions, papers, and examinations in English.

Course	Title
FRENCH 277-0	French Existentialism
FRENCH 279-0	Theater in Translation
FRENCH 371-0	Giants, Cannibals, and Critique
FRENCH 374-0	Proust
FRENCH 375-0	French Film
FRENCH 376-0	Gender & Sexuality
FRENCH 378-0	Contemporary Theory
FRENCH 379-0	Topics in French Literature and Culture

Courses with Prerequisites in French

Course	Title
FRENCH 300-0	French Phonetics
FRENCH 301-0	Advanced Language in Context: Society and Popular Culture
FRENCH 302-0	Advanced Writing
FRENCH 303-0	Advanced Conversation
FRENCH 309-0	French For Professions
FRENCH 310-0	The Middle Ages & Renaissance
FRENCH 322-0	Medieval French Narratives
FRENCH 333-0	Topics in Renaissance Literature
FRENCH 335-0	17th Century Literature
FRENCH 340-0	Sexual Politics and the Ancien Regime
FRENCH 344-0	Rousseau and the French Revolution
FRENCH 346-0	Studies in the Enlightenment
FRENCH 355-0	The Invention of Modernity
FRENCH 360-0	From Modernism to Postmodernism
FRENCH 362-0	African Literatures and Cultures
FRENCH 364-0	Caribbean Literatures and Cultures
FRENCH 365-0	The Maghreb and the Middle East
FRENCH 366-0	France and East Asia
FRENCH 380-0	Political & Social Thought in France
FRENCH 384-0	Women Writing in French
FRENCH 386-0	Gender & Writing
FRENCH 390-0	Topics in Literature and Culture

FRENCH 391-0	Theory and Practice of Translation
FRENCH 393-0	Foreign Language Teaching: Theory and Practice
FRENCH 395-0	Advanced Studies in Culture and Thought
FRENCH 399-0	Independent Study

French Minor

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, enabling them 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.

Course	Title
Prerequisite	
FRENCH 201-0	Culture and Society (or equivalent proficiency)
Minor Requirements (8 units)	
At least 2 courses in language, including:	
FRENCH 202-0	Writing Workshop: Cultural Encounters in Contemporary France
1 advanced language course chosen from:	
FRENCH 300-0	French Phonetics
FRENCH 301-0	Advanced Language in Context: Society and Popular Culture
FRENCH 302-0	Advanced Writing
FRENCH 303-0	Advanced Conversation
FRENCH 309-0	French For Professions
FRENCH 391-0	Theory and Practice of Translation
FRENCH 393-0	Foreign Language Teaching: Theory and Practice
At least 3 courses in literature and culture, including:	
FRENCH 210-0	Reading Literatures in French
or FRENCH 211-0	Reading Cultures in French
FRENCH 271-0	Introducing the Novel
or FRENCH 272-0	Introducing Theatre
or FRENCH 273-0	Introducing Poetry
1 course selected from 310 through 390	
1 additional course in literature and culture selected from 310 through 390, or 1 of the language courses 309 or 391 that is not being applied toward the advanced-language course requirement	
2 elective courses in language or literature and culture at the 200 or 300 level	

- No more than 1 300-level French department course offered in English may be counted toward the minor. Courses in English at the 200 level may not count toward the minor.
- At least 2 courses must be completed at Northwestern.

Exceptions and Waivers

- Minors who begin French studies in FRENCH 111-1 Elementary French, FRENCH 115-1 Intensive Elementary French, or FRENCH 121-1 Intermediate French may count FRENCH 201-0 Culture and Society as 1 of the 2 elective courses in language or literature and culture in French.
- Majors with an AP score of 5 or with advanced department placement may waive FRENCH 202-0 Writing Workshop: Cultural Encounters in Contemporary France. In this case total course requirements for the minor will be 7 courses.

Italian Literature and Culture Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Major Requirements (13 units)

- At least 10 courses offered by the Italian department
 - At most 6 courses taught in English
 - At most 3 200-level courses taught in Italian
- At most 3 courses dealing with Italian culture offered by other departments
 - 1 or more courses on theory and methodology may be counted.
 - Subject to approval of director of undergraduate studies
- At least 8 300-level courses
- 100-level courses do not count toward the major.
- Students studying abroad may substitute for department courses 4 courses whose content relates in a substantive way to some aspect of Italian culture; 4 additional courses taken abroad dealing with Italian culture may be credited as courses offered by other departments. Returning students must take 2 300-level courses in Italian in senior year.

Honors in Italian

Majors with strong academic records and an interest in pursuing honors should contact the director of undergraduate studies no later than spring quarter of junior year. The honors thesis is produced through 1 or 2 quarters of ITALIAN 399-0 Independent Study; these ITALIAN 399-0 enrollments will count toward the 14 required units for the major. The thesis may build on previous work done in a 300-level course or, with consent of the instructor, in a graduate seminar.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information see the department website (<https://www.frenchanditalian.northwestern.edu/undergraduate/french/honors-awards/departmental-honors.html>), consult with the director of undergraduate studies, and see Honors in the Major (p. 178).

Courses

Courses Taught in Italian

Prerequisites for all 300-level courses taught in Italian: 2 200-level courses in Italian or consent of instructor.

Course	Title
ITALIAN 101-1 & ITALIAN 101-2 & ITALIAN 101-3	Elementary Italian and Elementary Italian and Elementary Italian
ITALIAN 102-1 & ITALIAN 102-2 & ITALIAN 102-3	Intermediate Italian and Intermediate Italian and Intermediate Italian
ITALIAN 103-1	Italian for Musicians
ITALIAN 133-1 & ITALIAN 133-2 & ITALIAN 133-3 or ITALIAN 134-1 & ITALIAN 134-2 & ITALIAN 134-3	Intensive Italian and Intensive Italian and Intensive Italian Intensive Italian and Intensive Italian and Intensive Italian
ITALIAN 201-0	Italian Through Media
ITALIAN 202-0	Italian Through Performance

ITALIAN 203-0	Creative Writing in Italian
ITALIAN 204-0	Introduction to Italian Literature
ITALIAN 205-0	Voyage to Italy
ITALIAN 206-0	Business Italian
ITALIAN 207-0	Conversation in Italian
ITALIAN 304-0	Politics and Mass Culture
ITALIAN 306-0	Migrations
ITALIAN 310-0	Reading Italian Literature (in Italian)
ITALIAN 347-0	Italy in Art and Literature
ITALIAN 348-0	The Italian Novella
ITALIAN 349-0	Topics in Italian Culture and Literature
ITALIAN 399-0	Independent Study

Courses with Readings and Discussion in English

No prerequisites in Italian.

Course	Title
ITALIAN 230-0	Italian Theatre and Performance
ITALIAN 250-0	Topics in Italian Culture and Literature
ITALIAN 251-0	Introduction to Italian Cinema
ITALIAN 265-0	Body and Soul from Rome to the Renaissance
ITALIAN 270-0	Michelangelo and the Italian Renaissance
ITALIAN 275-0	Dante's Divine Comedy
ITALIAN 277-0	Global Neorealism
ITALIAN 350-0	Advanced Topics in Italian Culture and Literature
ITALIAN 351-0	Italian Film and Transnational Cinema
ITALIAN 360-0	From the Avant-Garde to the Post-Modern
ITALIAN 370-0	Major Figures in Italian History and Culture
ITALIAN 374-0	Love and Sexuality in the Early Modern Period
ITALIAN 377-0	Gender and Sexuality in Italian Culture
ITALIAN 378-0	Against Acting: Spectacle and Performance in Italy

Italian Minor

Minor Requirements (7 units)

- At most 3 courses taught in English
- At most 2 200-level courses taught in Italian
- At least 4 300-level courses
- Students returning from study abroad must take at least 1 300-level course in Italian in senior year.

French BA/MA

The department offers a BA/MA program in French for outstanding undergraduate majors. Interested students should see Accelerated Master's Programs (p. 34) and consult with the department chair.

Gender and Sexuality Studies

gendersexuality.northwestern.edu

The Gender and Sexuality 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 Pritzker School of Law, the Feinberg School of Medicine, and the Henry and Leigh Bienen School of Music. The program offers a major and a 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. 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 and sexuality 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 first-year 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 and sexuality studies.

Programs of Study

- Gender and Sexuality Studies Major (p. 258)
- Gender and Sexuality Studies Minor (p. 258)

GNDR_ST 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

GNDR_ST 220-0 Sexual Subjects: Introduction to Sexuality Studies (1 Unit) Survey of sexuality studies across a range of disciplines. Introduction to major theoretical and methodological approaches. Epistemology, morphology, history, subjectivity/identity, race formation, gender, social organization, and regulation. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Social Behavioral Sciences Distro Area*

GNDR_ST 230-0 Traditions in Feminist Thought (1 Unit) 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. *Historical Studies Distro Area*

GNDR_ST 231-0 Gender, Sexuality, and Representation (1 Unit) Representations in art and literature within their historical, social, and political contexts. Theories of spectatorship, resistance, and revision. *Literature Fine Arts Distro Area*

GNDR_ST 232-0 Sexuality & Society (1 Unit) Examination of the role of sexuality in the cultural, economic, political, and social organization of the United States. Sex work, sex tourism, sexual migration, LGBT social movements, and moral panics. SOCIOL 232-0 and GNDR_ST 232-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

GNDR_ST 233-0 Gender, Politics, and Philosophy (1 Unit) Role of gender difference in the main political-philosophical traditions: social contract, liberalism, republicanism, socialism-Marxism, critical theory. Classics of feminist and political thought (Wollstonecraft, Mill, Taylor, Engels) and contemporary debates. PHIL 230-0 and GNDR_ST 233-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area*

GNDR_ST 234-0 Language & Gender (1 Unit) Exploration of socially significant differences in the language used by/about/to men and women, focusing on the role of language in constructing gender as part of local communities of practice. LING 223-0 and GNDR_ST 234-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

GNDR_ST 235-0 Beyond the Binary: Transgender and Race (1 Unit)

Exploration of transgender history, identity, and expression, with a focus on the intersection of gender and race. *Social Behavioral Sciences Distro Area*

GNDR_ST 250-0 Gender Issues in Science and Health (1 Unit) Aspects of gender in the cultures of science and medicine. *Social Behavioral Sciences Distro Area*

GNDR_ST 321-0 Gender, Sexuality and History (1 Unit) 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. *Historical Studies Distro Area*

GNDR_ST 324-0 US Gay and Lesbian History (1 Unit) Gender, sexuality, and the rise of modern lesbian and gay identities. Lecture and discussion. HISTORY 324-0 and GNDR_ST 324-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

GNDR_ST 327-0 Language and Sexuality (1 Unit) 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. GNDR_ST 327-0 and LING 327-0 are taught together; may not receive credit for both courses. Prerequisite: a course in linguistics or consent of instructor.

GNDR_ST 331-0 Sociology of Gender and Sexuality (1 Unit) Gender and issues of social reproduction and social change, with an emphasis on sexuality and reproduction. *Social Behavioral Sciences Distro Area*

GNDR_ST 332-0 Gender, Sexuality, and Health (1 Unit) Health-related topics concerning gender and/or sexuality. Topics include reproductive health, sexual health, HIV/AIDS, women's health movements, trans* health and activism and disability studies. Content varies by quarter; may be repeated for credit with different topics. *Social Behavioral Sciences Distro Area*

GNDR_ST 340-0 Gender, Sexuality, and the Law (1 Unit) Examination of the changing role of law in governing gender and sexual relations in America. Legal definitions of gender and sexuality in the household, the marketplace, and the state. GNDR_ST 340-0 and LEGAL_ST 340-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

GNDR_ST 341-0 Transnational Perspectives on Gender and Sexuality (1 Unit) Studies of gender and sexuality in relation to globalization or non-US/non-Western cultures. Content varies by quarter; may be repeated for credit with different topics. *Social Behavioral Sciences Distro Area*

GNDR_ST 350-3 Research Seminar in Gender & Sexuality Studies (1 Unit) Students research and complete a research paper or project on a topic of choice. Course number indicates distribution area in which a seminar counts. May be repeated for credit with change of topic. *Social Behavioral Sciences Distro Area*

GNDR_ST 350-4 Research Seminar in Gender & Sexuality Studies (1 Unit) Students research and complete a research paper or project on a topic of choice. Course number indicates distribution area in which a seminar counts. May be repeated for credit with change of topic. *Historical Studies Distro Area*

GNDR_ST 350-6 Research Seminar in Gender & Sexuality Studies (1 Unit) Students research and complete a research paper or project on

a topic of choice. Course number indicates distribution area in which a seminar counts. May be repeated for credit with change of topic. *Literature Fine Arts Distro Area*

GNDR_ST 351-0 Gender, Sexuality, and Public Policy (1 Unit) 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. *Social Behavioral Sciences Distro Area*

GNDR_ST 352-0 Gender, Sexuality, and Political Theory (1 Unit) Studies in political theory relating to gender and sexuality. Content varies by quarter; may be repeated for credit with different topics. *Social Behavioral Sciences Distro Area*

GNDR_ST 353-0 Gender and Citizenship (1 Unit) Examinations of conventional conceptions of political participation and counter-public spheres informed by feminist activism and feminist and gender theory. *Social Behavioral Sciences Distro Area*

GNDR_ST 361-0 Gender, Sexuality, and Literature (1 Unit) 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. *Literature Fine Arts Distro Area*

GNDR_ST 362-0 Gender, Sexuality, and Drama (1 Unit) 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. *Literature Fine Arts Distro Area*

GNDR_ST 363-0 Postcolonial Studies and Gender and Sexuality (1 Unit) 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. *Literature Fine Arts Distro Area*

GNDR_ST 371-0 Gender, Sexuality, and Popular Culture (1 Unit) 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. *Social Behavioral Sciences Distro Area*

GNDR_ST 372-0 Gender, Sexuality, and Performance (1 Unit) 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. *Literature Fine Arts Distro Area*

GNDR_ST 373-0 Gender, Sexuality, and Film (1 Unit) 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. *Literature Fine Arts Distro Area*

GNDR_ST 374-0 Gender, Sexuality, and Digital Technologies (1 Unit) Theories concerning gender and sexuality in digital representations, particularly Internet related. Content varies by quarter. *Literature Fine Arts Distro Area*

GNDR_ST 375-0 Internship in Gender and Sexuality Studies (1 Unit) Field research and practical work experience in activist organizations; biweekly meeting with the instructor and other interns for discussion of internship experiences and common readings. Prerequisite: consent of instructor.

GNDR_ST 380-0 Black Feminist Theory (1 Unit) Survey of black feminist theories. Content may vary by quarter. Fulfills the major’s theory requirement.

GNDR_ST 381-0 Queer Theory (1 Unit) Survey of queer theories and methodologies. Fulfills the major’s theory requirement. Content varies by quarter. *Literature Fine Arts Distro Area*

GNDR_ST 382-0 Race, Gender, and Sexuality (1 Unit) Literature and/or 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. *Literature Fine Arts Distro Area*

GNDR_ST 390-0 Topics in Gender and Sexuality Studies (1 Unit) Topics vary. For example: masculinity; gender, race, and reproduction; gender, law, and public policy; Asian American women’s history; women artists and their publics. May be repeated for credit with different topics.

GNDR_ST 396-0 Senior Capstone Seminar (1 Unit) Introduction to research methods in the interdisciplinary study of gender and sexuality.

GNDR_ST 397-0 Feminist Theory (1 Unit) Survey of gender and feminist theory. Content may vary by quarter. Fulfills the major’s theory requirement.

GNDR_ST 398-0 Senior Research Seminar (1 Unit) 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 (1 Unit) Individual tutorials or research projects. Prerequisite: consent of instructor.

Gender and Sexuality Studies Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Program Courses (11 units)	
<i>2 Core Courses:</i>	
GNDR_ST 220-0	Sexual Subjects: Introduction to Sexuality Studies
GNDR_ST 230-0	Traditions in Feminist Thought
<i>2 Theory Courses:</i>	
GNDR_ST 381-0	Queer Theory
GNDR_ST 380-0	Black Feminist Theory
or GNDR_ST 397-0	Feminist Theory
<i>2 Research Courses:</i>	
GNDR_ST 350-3	Research Seminar in Gender & Sexuality Studies
or GNDR_ST 350-4	Research Seminar in Gender & Sexuality Studies
or GNDR_ST 350-6	Research Seminar in Gender & Sexuality Studies
GNDR_ST 396-0	Senior Capstone Seminar
or GNDR_ST 398-0	Senior Research Seminar
<i>5 Additional Courses, including:</i>	
At least 3 at the 300 level	
At least 1 with a historical focus ¹	
At least 1 with a transnational focus ²	
Related Courses (4 units)	
At least 2 at the 300 level	
Gender & Sexuality Studies courses (including co- or cross-listed) may be counted. Other courses that focus on gender and/or sexuality but are not co- or cross-listed may be approved by the Director of Undergraduate Studies.	

- ¹ Historical focus courses may include (but are not limited to): GNDR_ST 233-0 Gender, Politics, and Philosophy, GNDR_ST 321-0 Gender, Sexuality and History, GNDR_ST 324-0 US Gay and Lesbian History
- ² Transnational courses may include (but are not limited to): GNDR_ST 341-0 Transnational Perspectives on Gender and Sexuality, GNDR_ST 353-0 Gender and Citizenship, GNDR_ST 363-0 Postcolonial Studies and Gender and Sexuality

Honors in Gender and Sexuality Studies

Majors with strong academic records and an interest in pursuing honors should contact the honors coordinator (typically the Director of Undergraduate Studies) in their junior year and identify a faculty member who will serve as thesis adviser. Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information, consult the Director of Undergraduate Studies and see Honors in the Major (p. 178).

Gender and Sexuality Studies Minor

Course	Title
Minor Requirements (7 units)	
<i>2 Core Courses:</i>	
GNDR_ST 220-0	Sexual Subjects: Introduction to Sexuality Studies
GNDR_ST 230-0	Traditions in Feminist Thought
<i>5 Additional Courses:</i>	
At least 2 at the 300 level.	
At least 1 must represent a humanities-based approach to gender and sexuality studies. ¹	
At least 1 must represent a social science–based approach to gender and sexuality studies. ²	
All courses must be from gender and sexuality studies (including co- or cross-listed courses).	

- ¹ Humanities-based courses may include (but are not limited to): GNDR_ST 231-0 Gender, Sexuality, and Representation, GNDR_ST 233-0 Gender, Politics, and Philosophy, GNDR_ST 321-0 Gender, Sexuality and History, GNDR_ST 324-0 US Gay and Lesbian History, GNDR_ST 361-0 Gender, Sexuality, and Literature
- ² Social Science-based courses may include (but are not limited to): GNDR_ST 232-0 Sexuality & Society, GNDR_ST 331-0 Sociology of Gender and Sexuality, GNDR_ST 351-0 Gender, Sexuality, and Public Policy, GNDR_ST 353-0 Gender and Citizenship

General Liberal Arts

General Liberal Arts (GEN_LA) are interdivisional courses open to all qualified students.

- The courses listed below are interdivisional courses open to all qualified students.**
- See Weinberg College Policies (p. 177) for more details governing the Student Organized Seminar course.
 - See Academic Options and Support (p. 178) for more about Study Abroad.

GEN_LA 114-0 Internship (0 Unit) Restricted to Weinberg College students who need documentation of an internship on their transcripts. Requires approval of the associate dean for undergraduate academic affairs. Contact college advisers for more information.

GEN_LA 160-0 UPAL: Strategies for Advancing Learning (0 Unit)

Peer-mentored weekly small-group meetings about enhanced learning strategies. Time management, study strategies, interacting with faculty, and other topics.

GEN_LA 190-0 Science Research Workshops (0 Unit)

Learn about entering research with the help of a peer group leader and writing a research proposal for summer funding. Instructor permission or prior attendance at a Finding a Lab Workshop run by the Office of Undergraduate Research required. Grade of satisfactory given to students who attend and participate in at least 7 of the weekly workshops.

GEN_LA 280-1 Residence-Linked Seminar - I (Natural Sciences) (1 Unit)

Seminar for students in a residential college or community on a theme of common interest. Meets in the residence and is directed by an associated faculty member. Enrollment is normally limited to 10 students. Proposals for seminars must be approved by the associate dean for undergraduate academic affairs of Weinberg College. *Natural Sciences Distro Area*

GEN_LA 280-2 Residence-Linked Seminar - II (Formal Studies) (1 Unit)

Seminar for students in a residential college or community on a theme of common interest. Meets in the residence and is directed by an associated faculty member. Enrollment is normally limited to 10 students. Proposals for seminars must be approved by the associate dean for undergraduate academic affairs of Weinberg College. *Formal Studies Distro Area*

GEN_LA 280-3 Residence-Linked Seminar - III (Social & Behavioral Sciences) (1 Unit)

Seminar for students in a residential college or community on a theme of common interest. Meets in the residence and is directed by an associated faculty member. Enrollment is normally limited to 10 students. Proposals for seminars must be approved by the associate dean for undergraduate academic affairs of Weinberg College. *Social Behavioral Sciences Distro Area*

GEN_LA 280-4 Residence-Linked Seminar - IV (Historical Studies) (1 Unit)

Seminar for students in a residential college or community on a theme of common interest. Meets in the residence and is directed by an associated faculty member. Enrollment is normally limited to 10 students. Proposals for seminars must be approved by the associate dean for undergraduate academic affairs of Weinberg College. *Historical Studies Distro Area*

GEN_LA 280-5 Residence-Linked Seminar - V (Ethics & Values) (1 Unit)

Seminar for students in a residential college or community on a theme of common interest. Meets in the residence and is directed by an associated faculty member. Enrollment is normally limited to 10 students. Proposals for seminars must be approved by the associate dean for undergraduate academic affairs of Weinberg College. *Ethics Values Distro Area*

GEN_LA 280-6 Residence-Linked Seminar - VI (Literature and Fine Arts) (1 Unit)

Seminar for students in a residential college or community on a theme of common interest. Meets in the residence and is directed by an associated faculty member. Enrollment is normally limited to 10 students. Proposals for seminars must be approved by the associate dean for undergraduate academic affairs of Weinberg College. *Literature Fine Arts Distro Area*

GEN_LA 280-7 Residence-Linked Seminar (1 Unit)

Seminar for students in a residential college or community on a theme of common interest. Meets in the residence and is directed by an associated faculty member. Enrollment is normally limited to 10 students. Proposals for seminars

must be approved by the associate dean for undergraduate academic affairs of Weinberg College.

GEN_LA 290-0 Undergraduate Research (0 Unit) 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 Seminar (1 Unit) Student-initiated seminar, supervised by a sponsoring faculty member. See Weinberg College Policies section of the Undergraduate Catalog for more information. P/N grading only.

GEN_LA 354-0 Study Abroad Affiliated (0 Unit) Registration in an academic program outside the United States. Upon successful completion of the program, appropriate transfer credit is added. Not for self-service enrollment.

GEN_LA 355-0 Study Abroad Summer PT (0 Unit) Registration in an academic program outside the United States. Upon successful completion of the program, appropriate transfer credit is added. Not for self-service enrollment.

GEN_LA 356-0 Study Abroad Unaffiliated (0 Unit) Registration in an academic program outside the United States. Upon successful completion of the program, appropriate transfer credit is added. Not for self-service enrollment.

GEN_LA 357-0 Study at NU-Qatar, Doha Campus (0 Unit) For Evanston-based Northwestern students studying in Qatar (NU-Q) for a term. Upon successful completion of the program, appropriate credit is added. Not for self-service enrollment.

GEN_LA 365-0 Domestic Study - Affiliated (0 Unit) Registration in an academic program in the United States that is affiliated with Northwestern. Upon successful completion of the program, appropriate transfer credit is added. Not for self-service enrollment.

Geography

geography.northwestern.edu

The Program in Geography offers three types of courses to students who seek a knowledge of the physical earth and its various modes of human occupancy. Introductory courses develop global perspectives on environments that are relevant to many social and physical science fields. Courses in regional geography present a unique way of understanding how nature and culture have interacted over time to give character to specific places or regions. Advanced courses focus on the concepts and techniques of professional geography, especially on the construction of maps and on the uses of maps in solving geographical problems. Coursework may lead to an adjunct major or a minor in geography. Students majoring in geography also must complete a major in a related social or natural science field.

Programs of Study

- Geography Adjunct Major (p. 260)
- Geography Minor (p. 260)

GEOG 211-0 World Biogeography (1 Unit) 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. *Natural Sciences Distro Area*

GEOG 235-0 Atmosphere and Climate (1 Unit) Nature and composition of the atmosphere, principles of atmospheric motion, global circulation model, cyclonic storms; climates and climatic change. *Natural Sciences Distro Area*

GEOG 240-0 Economic Geography (1 Unit) Population, natural resources, land use, commodity production, and trade, with an emphasis on the world scale. Industrial location theory and global economic structures. *Social Behavioral Sciences Distro Area*

GEOG 312-0 Geography of Chicago & Its Region (1 Unit) 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. *Social Behavioral Sciences Distro Area*

GEOG 313-0 North America (1 Unit) 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. *Social Behavioral Sciences Distro Area*

GEOG 328-0 The Human Use of the Earth (1 Unit) 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. *Social Behavioral Sciences Distro Area*

GEOG 341-0 Principles of Cartography (1 Unit) Design, construction, and use of thematic maps for effective presentation of spatial data. Typography and symbolization. Coordinate systems and map projections. Prerequisites: MATH 220-0 and MATH 224-0. *Natural Sciences Distro Area*

GEOG 343-0 Geographic Information Systems (1 Unit) Methods and techniques of digital cartography; encoding and analysis of spatial information; applications to archaeology, environmental sciences, and business geographics. Prerequisite: GEOG 341-0. *Natural Sciences Distro Area*

GEOG 399-0 Independent Study (1 Unit) Independent research projects. Open to qualified advanced students with consent of department.

Geography Adjunct Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

All adjunct majors require completion of a stand-alone major also. Students majoring in geography also must complete a major in a related social or natural science field. Program courses for the geography adjunct major may not be double-counted toward other majors.

Course	Title
Program Courses (6 units)	
GEOG 211-0 or GEOG 235-0	World Biogeography Atmosphere and Climate
GEOG 240-0	Economic Geography
GEOG 341-0 or GEOG 343-0	Principles of Cartography Geographic Information Systems
GEOG 399-0	Independent Study

2 additional geography courses	
Related Courses (Units depend on mathematics sequence taken.)	
ECON 201-0	Introduction to Macroeconomics
ECON 202-0	Introduction to Microeconomics
MATH 220-0 & MATH 224-0 or MATH 212-0 & MATH 213-0 & MATH 214-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
STAT 210-0 or STAT 202-0	Introductory Statistics for the Social Sciences Introduction to Statistics

Honors in Geography

Geography majors do not need to formally apply to be considered for honors. All majors are required to take 1 unit of independent study (GEOG 399-0 Independent Study). Those with strong academic records and an interest in pursuing honors must take an additional unit of GEOG 399-0 to more fully develop a senior project. This second GEOG 399-0 may count toward the major. Students whose projects and grades meet program criteria are recommended to the college for graduation with honors. For more information consult the program director and see Honors in the Major (p. 178).

Geography Minor

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.

Course	Title
Prerequisites	
MATH 220-0 & MATH 224-0 or MATH 212-0 & MATH 213-0 & MATH 214-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
STAT 210-0 or STAT 202-0	Introductory Statistics for the Social Sciences Introduction to Statistics
Minor Requirements (6 units)	
GEOG 211-0 or GEOG 235-0	World Biogeography Atmosphere and Climate
GEOG 240-0	Economic Geography
GEOG 341-0 or GEOG 343-0	Principles of Cartography Geographic Information Systems
3 additional courses approved by the geography program adviser	

German

german.northwestern.edu

With comprehensive courses in German and English, the German department affords students the opportunity to learn the German language; to understand the significance of German literature, thought, and culture in their European and global contexts; to study abroad at a variety of places and levels; and to pursue research in a variety of fields. Curricular offerings include

- A thorough introduction to the German language, which can be used to fulfill the college language requirement. Multimedia materials, cultural experiences, and literary readings cultivate awareness of the differences in written and spoken German in various countries and

highlight the impact of language and culture in European and global contexts.

- A broad exposure to language, literature, culture, and history, with emphasis on the modern period from the 18th-century Enlightenment to the present. Majors and minors can pursue their interests in areas of concentration, including business studies, German-Jewish studies, history and culture, literature and media, or critical theory.
- Courses taught in English, giving those not proficient in German a basis for understanding the literary, philosophical, and cultural traditions of German-speaking countries.
- Opportunities for students to enhance their command of German and to deepen their cultural awareness through study abroad in Berlin, Freiburg, Munich, Vienna, or Zurich.

Students in the department are regularly accepted into internship programs and graduate programs in a variety of disciplines, as well as prestigious postgraduate programs of the Fulbright Commission, the German Academic Exchange Service, and the Austrian-American Educational Commission.

Business German and Advanced German Examinations

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.

The department currently offers several courses that specifically address the Business German language and culture as well as historical and political issues related to Business German:

- GERMAN 209-0 German in the Business World or GERMAN 213-0 History, Politics, and Culture in 21st Century German
- GERMAN 309-1 Advanced Business German: the German Economy
- GERMAN 309-2 Advanced Business German: Marketing and Management

If you are looking for German credentials beyond a German Major or Minor from Northwestern University, there are several tests available that are recognized world wide:

- **Goethe-Test PRO: German for Professionals** (Goethe-Test PRO: Deutsch für den Beruf) is a computer-based German online test that evaluates listening and reading competence in the workplace quickly and reliably. The test is based on the Common European Framework of Reference for Languages (CEFR). You will find more information on this test here (<https://www.goethe.de/en/spr/kup/prf/prf/bul.html>).
- **Prüfung Wirtschaftsdeutsch International (PWD)** is an internationally recognized test given at Carl Duisberg Centers, various Goethe Institutes and the Association of German Chambers of Commerce and Industry. The standardized exam is carried out around the world and is recognized by employers in many countries as evidence of a high level of German business language proficiency. The level of the PWD is between levels B2 and C1 of the European Framework. You will find more information on this test here (<https://www.dihk-bildungs-gmbh.de/weiterbildung/pruefungen-von-a-z/weitere-pruefungskategorien/wirtschaftsdeutsch>).
- **TestDaF** is an advanced-level language exam. It covers levels B2 to C1 on the six-level scale of competence in the Common European Framework of Reference for Languages (CEFR). The successful completion of all four sections of the TestDaF exam at TestDaF

level 4 will act as evidence of the language skills needed to gain admission to almost any subject and degree course at universities and institutions of higher education in Germany. The TestDaF language exam also provides internationally recognized evidence that your knowledge of German is sufficient to complete scientific projects and enter academic professions. No specialist knowledge is required to take the exam. You will find more information on this test here (<https://www.goethe.de/en/spr/kup/prf/prf/testdaf.html>).

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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP (<http://www.sesp.northwestern.edu/common/people/staff/sa>) as early as possible in their academic careers.

Study Abroad

The Department of German works carefully with 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.

Programs of Study

- German Major (p. 264)
- German Minor (p. 265)
- German Studies Minor (p. 266)
- Business German Minor (p. 266)

GERMAN 101-1 Beginning German (1 Unit) This sequence emphasizing the four modalities-speaking, listening comprehension, reading, and writing-offers students a systematic introduction to German language and culture. Prerequisite: None or one year of high-school German or placement exam results.

GERMAN 101-2 Beginning German (1 Unit) This sequence emphasizing the four modalities-speaking, listening comprehension, reading, and writing-offers students a systematic introduction to German language and culture. Prerequisite: GERMAN 101-1 or placement exam results.

GERMAN 101-3 Beginning German (1 Unit) This sequence emphasizing the four modalities-speaking, listening comprehension, reading, and writing-offers students a systematic introduction to German language and culture. Prerequisite: GERMAN 101-2 or placement exam results.

GERMAN 101-SA-1 Beginning German (1 Unit) This sequence emphasizing the four modalities-speaking, listening comprehension, reading, and writing-offers students a systematic introduction to German language and culture. Prerequisite: None or one year of high-school German or placement exam results.

GERMAN 102-1 Intermediate German (1 Unit) This sequence offers students a systematic review of German language and culture. The class fosters learning in the four modalities: speaking, listening

comprehension, reading, and writing. Prerequisite: GERMAN 101-3 or placement exam results.

GERMAN 102-2 Intermediate German (1 Unit) This sequence offers students a systematic review of German language and culture. The class fosters learning in the four modalities: speaking, listening comprehension, reading, and writing. Prerequisite: GERMAN 102-1 or equivalent.

GERMAN 102-3 Intermediate German (1 Unit) This sequence offers students a systematic review of German language and culture. The class fosters learning in the four modalities: speaking, listening comprehension, reading, and writing. Prerequisite: GERMAN 102-2 or placement exam results.

GERMAN 102-SA-1 Intermediate German (1 Unit) This sequence offers students a systematic review of German language and culture. The class fosters learning in the four modalities: speaking, listening comprehension, reading, and writing. Prerequisite: GERMAN 101-3 or placement exam results.

GERMAN 104-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

GERMAN 105-0 German for Research (0 Unit)

GERMAN 115-0 Intensive Beginning German through Musical Journeys in Vienna (1 Unit) Interdisciplinary course offering musically interested students the opportunity to acquire German language skills through an immersion in the musical and cultural history of Vienna. Prerequisite: None or one year of high-school German or placement exam results.

GERMAN 201-0 Focus Reading (1 Unit) Course for students who would like to explore German texts in more depth. Examines contemporary German culture. May be repeated for credit with change of topic. Does not count for the language requirement. (This course will not count for the language requirement but may be taken concurrently with GERMAN 102-3). Prerequisite: GERMAN 102-2 or placement exam results.

GERMAN 203-0 Focus Speaking (1 Unit) Practical training in listening comprehension and speaking. Examines contemporary German culture. Does not count for the language requirement. May be repeated for credit with change of topic. (This course will not count for the language requirement but may be taken concurrently with GERMAN 102-3). Prerequisite: GERMAN 102-2 or placement exam results.

GERMAN 205-0 Focus Writing (1 Unit) Development of written proficiency in German through analysis and production of portraits, descriptions, narratives, reviews of films, reports, argumentative essays, advertisements, and interpretations of literary works. Prerequisite: GERMAN 102-3 or placement exam results.

GERMAN 205-SA Focus Writing (1 Unit) Development of written proficiency in German through analysis and production of portraits, descriptions, narratives, reviews of films, reports, argumentative essays, advertisements, and interpretations of literary works. Prerequisite: GERMAN 102-3 or placement exam results.

GERMAN 207-0 Current Events in German Media (1 Unit) Exploration of current events in a variety of German media (newspapers, TV, Internet, etc.). Topics include politics, music, film, sports, and literature. Prerequisite: GERMAN 102-3.

GERMAN 209-0 German in the Business World (1 Unit) German language study oriented toward business-related communication

situations, such as social interactions with customers, business travel, basic business letters. Prerequisite: One 200-level course in German.

GERMAN 211-0 German Culture through Film (1 Unit) Introduction to 20th century German cinema. Discussion of German identity, culture, history, and politics. Course emphasizes cultural knowledge and German language skills. Prerequisite: One 200-level course in German. *Literature Fine Arts Distro Area*

GERMAN 213-0 History, Politics, and Culture in 21st Century German (1 Unit) In-depth cultural and linguistic exploration of history, politics, and current issues (e.g., integration of foreigners, multicultural life) in Germany. Prerequisite: GERMAN 102-3 or placement exam results. *Social Behavioral Sciences Distro Area*

GERMAN 221-1 Introduction to Literature: 1800-1900 (1 Unit) Introduction to representative texts and writers of 19th century German literature and familiarizes them with literary analysis and genres. Prerequisite: One 200-level course in German. *Literature Fine Arts Distro Area*

GERMAN 221-2 Introduction to German Literature: 1900-1945 (1 Unit) Introduction to representative German texts and 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: One 200-level course in German. *Literature Fine Arts Distro Area*

GERMAN 221-3 Introduction to Literature: 1945-today (1 Unit) Introduction to representative short stories by major German-speaking authors since 1945. The stories represent a dynamic period in German literature and highlight important social, political, and intellectual issues. Prerequisite: GERMAN 102-3 or placement exam results. *Literature Fine Arts Distro Area*

GERMAN 222-0 German History from 1789-1989 (1 Unit) 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. Prerequisite: None. *Historical Studies Distro Area*

GERMAN 222-SA German History from 1789-1989 (1 Unit) 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. Prerequisite: None. *Historical Studies Distro Area*

GERMAN 223-0 Austrian Literature (1 Unit) 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: One 200-level course in German. *Literature Fine Arts Distro Area*

GERMAN 224-0 Contemporary Germany (1 Unit) The German political, social, and cultural scene after 1945. May be repeated for credit with different topic. Prerequisite: None. *Historical Studies Distro Area*

GERMAN 226-0 New Voices in German Literature (1 Unit) Introduction to contemporary German literature in English translation. Topics vary and may include the contemporary historical novel, short story, novel, or memoir. Prerequisite: None. *Literature Fine Arts Distro Area*

GERMAN 228-0 German Film (1 Unit) 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. Prerequisite: None. *Literature Fine Arts Distro Area*

GERMAN 230-0 Berlin and the Culture of Democracy (1 Unit) History and culture of the city from 1900 to the present, including the Weimar period, Nazi regime, the divisions of the Cold War, and the newly unified capital. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

GERMAN 232-0 The Theme of Faust Through the Ages (1 Unit) Faust theme in literature and music through shifting intellectual and social climates from the 16th century to the present. Prerequisite: None. *Ethics Values Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

GERMAN 234-1 Jews and Germans: An Intercultural History I (1 Unit) 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. Prerequisite: None. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

GERMAN 234-2 Jews and Germans: An Intercultural History II (1 Unit) Jewish culture-German culture exploration. German-speaking Jewry from the late 19th century to 1933. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

GERMAN 236-0 Kafka and Nietzsche (1 Unit) Exploration of two key figures in German modernity. Analysis of the relation between philosophy and literature; inquiry into the idea of the "ascetic ideal." Prerequisite: None. *Ethics Values Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

GERMAN 238-0 Turn-of-the-Century Vienna (1 Unit) 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. Prerequisite: None. *Literature Fine Arts Distro Area*

GERMAN 242-0 Imagining Modern Jewish Culture in Yiddish and German (1 Unit) History and character of Yiddish and the development of modern German culture and German-Jewish culture. Appreciation of the variety of "Judaisms" imagined and reimagined during modern European history. GERMAN 242-0 and JWSH_ST 242-0 are taught together; may not receive credit for both courses. Prerequisite: None. *Literature Fine Arts Distro Area*

GERMAN 244-0 Analyzing Freud (1 Unit) Freud's work from a comparative and interdisciplinary perspective. Fundamental texts by Freud in dialogue with related materials that situate him in historical, cultural, and intellectual context. *Literature Fine Arts Distro Area*

GERMAN 245-0 Special Topics in German Literature and Culture (1 Unit) 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: One 200-level course in German. *Literature Fine Arts Distro Area*

GERMAN 246-0 Special Topics in German Literature and Culture (1 Unit) Topics vary-for example, the fairy tale, Germanic mythology. Prerequisite: None.

GERMAN 248-0 Learning Diversity: Germany and Global Migration (1 Unit) Explores how migration from and to Germany has impacted and

shaped the country's political, social, and cultural development as an increasingly diverse country. Prerequisite: None. *Historical Studies Distro Area*

GERMAN 266-0 Introduction to Yiddish Culture: Images of the Shtetl (1 Unit) Analysis and discussion of the literary, visual, and filmic images of the communal life developed by Eastern European Jews and inseparably associated with them. GERMAN 266-0, JWSH_ST 266-0 and YIDDISH 266-0 taught together; students may receive credit for only one of these. *Literature Fine Arts Distro Area*

GERMAN 272-0 Luther and the West (1 Unit) Examination of Luther's work in the context of his life and times. Introduces basic dimensions of Western thought, showing how theology relates to broader cultural, political, social, and aesthetic issues. GERMAN 272-0 and RELIGION 272-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175)

GERMAN 303-0 Speaking as Discovery (1 Unit) A course to improve German listening and speaking skills to the advanced level. Uses current cultural texts, films, and television broadcasts. Prerequisite: Two 200-level courses in German.

GERMAN 305-0 Writing as Discovery (1 Unit) Practice of advanced and sophisticated structures of written German through a series of linguistic exercises, including a biographical piece of writing. Prerequisite: high-intermediate skills in listening, reading, and speaking German.

GERMAN 307-0 German Media (1 Unit) Current political and cultural events in Germany and Europe. Topics from German language media, including newspapers, magazines, Internet sources, and news broadcasts. Discussion of journalistic differences. Prerequisite: Two 200-level courses in German.

GERMAN 309-1 Advanced Business German: the German Economy (1 Unit) Germany's economy, its current problems, business practices, and differences from the United States. Begins preparation for the internationally recognized exam Prüfung Wirtschaftsdeutsch International. Prerequisite: Two 200-level courses in German.

GERMAN 309-2 Advanced Business German: Marketing and Management (1 Unit) Preparation for the internationally recognized exam Prüfung Wirtschaftsdeutsch International. 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. Prerequisite: Three 200-level courses in German.

GERMAN 321-1 Reason, Revolution, and Despair: 1800-1900 (1 Unit) Discussion of key texts in German intellectual history from the Enlightenment to the prerevolutionary period in the 1830s. Prerequisite: Three 200-level courses in German (at least one in literature). *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

GERMAN 321-2 Myth and Modernity: 1900-1945 (1 Unit) Literature and thought, events, and ideologies that shaped German cultural, political, and social life from 1900 to 1945, during the Weimar Republic and the Nazi state. Prerequisite: Three 200-level courses in German (at least one in literature). *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

GERMAN 321-3 Recoveries and Transitions: 1945-Present (1 Unit)

Examination of the relationship of literature and film to the sociopolitical sphere since 1945. Prerequisite: Three 200-level courses in German (at least one in literature). *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area*

GERMAN 322-0 German Contributions to World Literature (1 Unit)

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. Prerequisite: None. *Literature Fine Arts Distro Area*

GERMAN 323-0 Rhyme and Reason in German Poetry (1 Unit)

Introduction to German poetry from the early 18th century to the present. Concentrates on the main formal categories of poetry as well as the main topics and themes of German poetry. Prerequisite: Three 200-level courses in German (at least one in literature) . *Literature Fine Arts Distro Area*

GERMAN 324-0 Modern German Drama (1 Unit) Plays by authors ranging from Heinrich von Kleist to Peter Weiss, from the perspective of the stage as a "moral institution." Prerequisite: None. *Literature Fine Arts Distro Area*

GERMAN 326-0 German Cultural Studies (1 Unit) 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 327-0 German Expressionism (1 Unit) 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: Three 200-level courses in German (at least one in literature). *Literature Fine Arts Distro Area*

GERMAN 329-0 Brecht: Theater, Film, and Media (1 Unit) 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: Three 200-level courses in German (at least one in literature). *Literature Fine Arts Distro Area*

GERMAN 331-0 Shattered Worlds: Representation after the Shoa (1 Unit) Examination of the role of German literature and art in the creation of historical consciousness in the postwar period. Prerequisite: Three 200-level courses in German (at least one in literature) . *Literature Fine Arts Distro Area*

GERMAN 333-0 Literature of a Divided Nation (1 Unit) Study of the literature and culture of the German Democratic Republic within social, political, and historical contexts. Prerequisite: Three 200-level courses in German (at least one in literature). *Literature Fine Arts Distro Area*

GERMAN 334-0 Writers and their Critics (1 Unit) Study of the texts of leading writers in German through a discussion of the criticism these texts have evoked. Emphasis on 20th and 21st century criticism. Prerequisite: None. *Literature Fine Arts Distro Area*

GERMAN 335-0 Minority Voices in Germany (1 Unit) 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. *Literature Fine Arts Distro Area*

GERMAN 337-0 Science and Culture in Germany (1 Unit) Exploration of key texts popularizing major scientific innovations in Germany. The focus is on tracing the scientific, political, philosophical, aesthetic history of German as a "green nation" from the 18th century until today. Prerequisite: Three 200-level courses in German (at least one in literature). *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175)

GERMAN 344-1 German History: Weimar and Nazi Germany (1 Unit)

Survey of German political, economic, social, intellectual, and diplomatic history covering Weimar and Nazi Germany. GERMAN 344-1 and HISTORY 344-1 are taught together: may not receive credit for both courses. *Historical Studies Distro Area*

GERMAN 344-2 German History: Germany Since 1945 (1 Unit) Survey of German political, economic, social, intellectual, and diplomatic history covering Germany beginning in 1945 to reunification at the end of the Cold War. GERMAN 344-2 and HISTORY 344-2 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

GERMAN 345-0 Topics in German Literature and Culture (1 Unit)

In-depth study of topics in German literature and/or pivotal periods in German culture. May be repeated for credit with different topic. Prerequisite: Three 200-level courses in German (at least one in literature).

GERMAN 346-0 Topics in German Literature and Culture (1 Unit)

In-depth study of topics in German literature and/or pivotal periods in German culture. May be repeated for credit with different topic. Prerequisite: None.

GERMAN 366-0 Yiddish Culture and the Holocaust (1 Unit) Analysis of modern Yiddish literature before the Holocaust as well as literary work that emerged from Yiddish-speaking writers who survived the Second World War. GERMAN 366-0, JWSH_ST 366-0 and YIDDISH 366-0 taught together; may receive credit for only one course.. Prerequisite: None. *Literature Fine Arts Distro Area*

GERMAN 398-0 Undergraduate Seminar (1 Unit) Advanced work through supervised reading, research, and discussion. Prerequisite: Three 200-level courses in German (at least one in literature).

GERMAN 399-0 Independent Study (1 Unit) Open to outstanding German majors with senior standing. Prerequisite: Three 200-level courses in German (at least one in literature).

German Major

Courses for German majors are designed to provide advanced fluency in the language as well as knowledge of modern German/central European history and culture as well as the basic canon of modern (post-1750) German literature. In addition, courses in a concentration, chosen with the adviser, allow students to focus on a particular interest or subject.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Prerequisite

- GERMAN 102-3 Intermediate German or equivalent proficiency.

Department Courses (12 units)

- 8 core courses, from list posted on the department website
 - 4 German-language courses in language and culture
 - 2 at the 200 level
 - 2 at the 300 level
 - 4 German-language courses in literature, culture, history, and politics
 - 2 at the 200 level
 - 2 at the 300 level
- 4 courses in an individual concentration; must be approved by the adviser
 - At most 2 taught in English
 - At most 3 in a complementary language, such as Yiddish, Turkish, or Czech
 - May be offered by other departments or programs (Please check with the Director of Undergraduate Studies first)
- Majors returning from a study abroad program must enroll in at least one (1) 300-level German-language course in the department.

Related Courses (2 units)

- Chosen from history, philosophy, religion, or other relevant areas
- Must be approved by the adviser and complement the concentration

Honors in German

Majors with strong academic records and an interest in pursuing honors should contact the honors director in spring of junior year.

They may qualify for departmental honors by completing 2 quarters of GERMAN 398-0 Undergraduate Seminar or GERMAN 399-0 Independent Study; 2 quarters of 400-level courses; or 1 quarter of GERMAN 398-0 or GERMAN 399-0 and 1 quarter of a 400-level course. These courses may count toward the major. Students must present a research paper at the end of their second quarter of honors study.

Students whose research paper and grades meet department criteria are recommended to the college for graduation with honors. For more information consult the director of undergraduate studies and see Honors in the Major (p. 178).

Courses

Courses Taught in German

Course	Title
GERMAN 101-1 & GERMAN 101-2 & GERMAN 101-3	Beginning German and Beginning German and Beginning German
GERMAN 102-1 & GERMAN 102-2 & GERMAN 102-3	Intermediate German and Intermediate German and Intermediate German
GERMAN 115-0	Intensive Beginning German through Musical Journeys in Vienna
GERMAN 201-0	Focus Reading
GERMAN 203-0	Focus Speaking
GERMAN 205-0	Focus Writing
GERMAN 207-0	Current Events in German Media
GERMAN 209-0	German in the Business World
GERMAN 211-0	German Culture through Film
GERMAN 213-0	History, Politics, and Culture in 21st Century German
GERMAN 221-1	Introduction to Literature: 1800-1900
GERMAN 221-2	Introduction to German Literature: 1900-1945

GERMAN 221-3	Introduction to Literature: 1945-today
GERMAN 223-0	Austrian Literature
GERMAN 245-0	Special Topics in German Literature and Culture
GERMAN 303-0	Speaking as Discovery
GERMAN 305-0	Writing as Discovery
GERMAN 307-0	German Media
GERMAN 309-1	Advanced Business German: the German Economy
GERMAN 309-2	Advanced Business German: Marketing and Management
GERMAN 321-1	Reason, Revolution, and Despair: 1800-1900
GERMAN 321-2	Myth and Modernity: 1900-1945
GERMAN 321-3	Recoveries and Transitions: 1945-Present
GERMAN 323-0	Rhyme and Reason in German Poetry
GERMAN 327-0	German Expressionism
GERMAN 329-0	Brecht: Theater, Film, and Media
GERMAN 331-0	Shattered Worlds: Representation after the Shoa
GERMAN 333-0	Literature of a Divided Nation
GERMAN 335-0	Minority Voices in Germany
GERMAN 337-0	Science and Culture in Germany
GERMAN 345-0	Topics in German Literature and Culture
GERMAN 398-0	Undergraduate Seminar
GERMAN 399-0	Independent Study

Courses with Readings and Discussion in English

No prerequisites in German.

Course	Title
GERMAN 222-0	German History from 1789-1989
GERMAN 224-0	Contemporary Germany
GERMAN 226-0	New Voices in German Literature
GERMAN 228-0	German Film
GERMAN 230-0	Berlin and the Culture of Democracy
GERMAN 232-0	The Theme of Faust Through the Ages
GERMAN 234-1	Jews and Germans: An Intercultural History I
GERMAN 234-2	Jews and Germans: An Intercultural History II
GERMAN 236-0	Kafka and Nietzsche
GERMAN 238-0	Turn-of-the-Century Vienna
GERMAN 242-0	Imagining Modern Jewish Culture in Yiddish and German
GERMAN 244-0	Analyzing Freud
GERMAN 246-0	Special Topics in German Literature and Culture
GERMAN 248-0	Learning Diversity: Germany and Global Migration
GERMAN 266-0	Introduction to Yiddish Culture: Images of the Shtetl
GERMAN 272-0	Luther and the West
GERMAN 322-0	German Contributions to World Literature
GERMAN 324-0	Modern German Drama
GERMAN 326-0	German Cultural Studies
GERMAN 334-0	Writers and their Critics
GERMAN 366-0	Yiddish Culture and the Holocaust

German Minor

The Department of German offers minors in German, German studies, and Business German. Each minor consists of 8 courses. The minors are designed to help students develop a coherent set of courses in accordance with their own interests in German language, literature, thought, culture, politics, and business practices.

Minor Requirements (8 units)

- Prerequisite: GERMAN 102-3 Intermediate German or equivalent proficiency
- 3 German-language courses in language and media, from list posted on the department website
 - 2 at the 200 level
 - 1 at the 300 level
- 3 German-language courses in literature and culture, from list posted on the department website
 - 2 at the 200 level
 - 1 at the 300 level
- 2 courses making up an individual concentration developed with the undergraduate adviser; may be taught in English
- Minors returning from a study abroad program must enroll in at least 1 300-level German-language course in the department.

German Studies Minor

The Department of German offers minors in German, German studies, and Business German. Each minor consists of 8 courses. The minors are designed to help students develop a coherent set of courses in accordance with their own interests in German language, literature, thought, culture, politics, and business practices.

- Prerequisite: GERMAN 102-3 Intermediate German or equivalent proficiency
- 2 German-language courses in language, literature, and culture, from list posted on the department website
- 6 courses making up an individual concentration developed with the undergraduate adviser
 - Relevant courses are offered in such diverse areas as history, political science, philosophy, sociology, and economics.
 - At most 3 courses may be in a complementary language, such as Yiddish, Turkish, or Czech.
- Minors returning from a study abroad program must enroll in at least one (1) 300-level course in the department.

Business German Minor

The Department of German offers minors in German, German studies, and Business German. Each minor consists of 8 courses. The minors are designed to help students develop a coherent set of courses in accordance with their own interests in German language, literature, thought, culture, politics, and business practices.

- Prerequisite: GERMAN 102-3 Intermediate German or equivalent proficiency
- 3 German-language courses in language, literature, and culture, from list posted on the department website
 - 2 at the 200 level
 - 1 at the 300 level
- 3 courses in business German:
 - GERMAN 209-0 German in the Business World or GERMAN 213-0 History, Politics, and Culture in 21st Century German
 - GERMAN 309-1 Advanced Business German: the German Economy
 - GERMAN 309-2 Advanced Business German: Marketing and Management

- 2 courses making up an individual concentration developed with the undergraduate adviser; may be taught in English
- Minors returning from a study abroad program must enroll in at least 1 300-level German-language course in the department.

Global Health Studies

northwestern.edu/globalhealthstudies

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 between domestic and global forces, and the cultural and political realities that affect the design and implementation of solutions in specific settings.

The interdisciplinary Program in Global Health Studies offers an adjunct major and minor designed to provide skills for dealing with complex international health issues, focusing on health disparities and inequalities. Students learn about domestic and international approaches to international crisis management, in addition to perspectives on specific health issues within the diverse United States population.

The program is designed for students from a variety of backgrounds and schools, including those interested in medicine and health sciences. It combines an international public health experience with coursework drawing on many disciplines including public health, anthropology, history, economics, engineering, political science, sociology, international relations, and psychology.

Programs of Study

- Global Health Studies Adjunct Major (p. 268)
- Global Health Studies Minor (p. 268)

GBL_HLTH 301-0 Introduction to International Public Health (1 Unit)

Introduces students to pressing disease and health care problems worldwide. The course identifies the main actors, institutions, practices, and forms of knowledge production characteristic of what we call "global health" today, and explores the factors that shape patterns and experiences of illness and healthcare across societies.

GBL_HLTH 302-0 Global Bioethics (1 Unit) Global health is a popular field of work and study for Americans, but though entered with the best of intentions, the work is beset with ethical questions, concerns, and dilemmas. In this course, students will assess emblematic ethical challenges in global health and consider approaches to addressing them.
Ethics Values Distro Area

GBL_HLTH 303-0 Gender and Global Health (1 Unit) Overview of the interaction between sex/gender and global health. Through lectures, readings, and discussions, we examine: how sex/gender is a contributing factor in health; the social dynamics of gender and gender roles; and gender inequalities and health.

GBL_HLTH 305-0 Global Health & Indigenous Medicine (1 Unit)

Exploration of a variety of healing systems, their relationship to global health, and the factors underlying why people choose one over another.
Social Behavioral Sciences Distro Area

GBL_HLTH 306-0 Biomedicine and Culture (1 Unit) Comparative exploration of biomedical cultures in different contexts, both in the U.S. and other countries. This course covers how biomedicine intersects with technology, consumerism, politics, economics, culture, power, and place.

It further investigates the possibilities and limitations of biomedicine across the globe, particularly regarding how biomedical cultures affect and are affected by patients and health care workers. *Social Behavioral Sciences Distro Area*

GBL_HLTH 307-0 International Perspectives on Mental Health (1 Unit)

Cross-cultural and international perspectives on mental health issues and examination of the impact of psychological illness on the global burden of disease. *Social Behavioral Sciences Distro Area*

GBL_HLTH 308-0 Global Health in Human History (1 Unit)

Exploration of paleopathology, including records of pre- and proto-historic adaptations to human disease, health, and medicine. The biocultural perspective on patterns of disease links past perspectives and current realities. Taught with ANTHRO 308-0; may not receive credit for both courses. Prerequisite: 200-level anthropology or biology course, a global health course, or consent of instructor. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Natural Sciences Distro Area*

GBL_HLTH 309-0 Biomedicine and World History (1 Unit)

Introduction to the social, political, scientific, and economic forces allowing biomedical systems to become synonymous with global health governance. GBL_HLTH 309-0 and HISTORY 379-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

GBL_HLTH 310-1 Supervised Global Health Research (1 Unit)

Majors and minors are encouraged to do supervised public health research on campus and abroad. Students receive elective credit for this course only when taught abroad, however.

GBL_HLTH 310-SA Supervised Global Health Research (1 Unit)

Majors and minors are encouraged to do supervised public health research on campus and abroad. Students receive elective credit for this course only when taught abroad, however.

GBL_HLTH 311-SA Health Care Systems in Europe and the United States (1 Unit)

Provides students with an understanding of the various ways in which health care systems are organized in European countries, the problems they face, and the reforms implemented or proposed at the national and EU levels. Restricted to students in Northwestern's Paris program.

GBL_HLTH 312-SA Public Health in Europe: Issues and Policies (1 Unit)

Examines issues and debates on health policy in France and the EU, including primary health issues, health insurance, health inequalities, HIV/AIDS, SARS, elderly care, and genetically modified organisms. Lectures are supplemented by visits to relevant sites. Restricted to students in Northwestern's Paris program.

GBL_HLTH 313-SA International Organizations and Health: A Research Seminar (1 Unit)

Students design team research projects, learn about research methodology, discuss their research progress, and present findings. Restricted to students in Northwestern's Paris program.

GBL_HLTH 314-SA Health and Community Development in South Africa (1 Unit)

Health-related issues confronting South Africa, their social and economic impact, efforts to address them. Apartheid and post-transition policies. Demographics, prevention, and treatment of both infectious and chronic non-communicable diseases. Restricted to students in Northwestern's South Africa program.

GBL_HLTH 315-SA Public Health in South Africa (1 Unit)

Context of and responses to public health issues in South Africa, including HIV/AIDS, tuberculosis, malnutrition and poverty, psychosocial rehabilitation, and

environmental and occupational health. Lectures are supplemented by visits to relevant sites. Restricted to students in Northwestern's South Africa program. *Social Behavioral Sciences Distro Area*

GBL_HLTH 316-SA Development Perspectives on Health in South Africa Through Community Engagement (1 Unit)

Reflection on service-learning experiences at community organizations in relation to theories of international development and global health. Focus on how health-related issues, including HIV/ AIDS, malnutrition, poverty, the environment, occupational health, and gender, impact development. Restricted to students in Northwestern's South Africa program. *Social Behavioral Sciences Distro Area*

GBL_HLTH 320-0 Qualitative Research Methods in Global Health (1 Unit)

This course emphasizes research skills acquisition in a practical manner. Topics include how to design, conduct, analyze and write up qualitative ethnographic research. The course covers research methodologies, ethics and Institutional Review Boards, and ethnographic field methods such as participant observation, qualitative interviewing, life histories, focus groups, data coding and analysis. Students acquire research skills while receiving significant feedback throughout. *Social Behavioral Sciences Distro Area*

GBL_HLTH 321-0 War and Public Health (1 Unit)

Comparative overview of the impact of armed conflict on public health and healthcare delivery worldwide. Historical and contemporary case studies. Specific health needs of refugees and vulnerable populations. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

GBL_HLTH 322-0 The Social Determinants of Health (1 Unit)

Advanced introduction to socioeconomic, political, and cultural determinants of health disparities between social groups and categories. Case studies from the United States, South Africa, and Brazil. *Social Behavioral Sciences Distro Area*

GBL_HLTH 332-SA Public Health in China (1 Unit)

Examination of China's public health system. Focus on role of government, emerging environmental problems, food safety, and prevalent communicable and non-communicable diseases. Restricted to students in Northwestern's China program. *Social Behavioral Sciences Distro Area*

GBL_HLTH 333-SA Traditional Chinese Medicine (1 Unit)

Introduces traditional Chinese medicine (TCM) principles and methods as they relate to Chinese culture and philosophy, including TCM diagnostics and therapies. Compares and discusses integration of TCM and Western medicine. Restricted to students in Northwestern's China program. *Social Behavioral Sciences Distro Area*

GBL_HLTH 390-0 Special Topics in Global Health (1 Unit)

Advanced work in areas of developing interest and special significance. Can be repeated for credit with a different topic. Offered on campus and on Northwestern programs abroad. Recent courses include Ecology of Infant Feeding, Native American Health, and Public Health and Mental Health in Serbia.

GBL_HLTH 390-SA Special Topics in Global Health (1 Unit)

Advanced work in areas of developing interest and special significance. Can be repeated for credit with a different topic. Offered on campus and on Northwestern programs abroad. Recent courses include Ecology of Infant Feeding, Native American Health, and Public Health and Mental Health in Serbia.

GBL_HLTH 399-0 Independent Study (1 Unit)

Advanced work under faculty supervision. May be taken twice for credit but does not count

toward the core or elective requirements. Prerequisite: department consent.

Global Health Studies Adjunct Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course Title

Adjunct Major Requirements (11 units)

4 core courses:

GBL_HLTH 301-0	Introduction to International Public Health
GBL_HLTH 302-0	Global Bioethics
GBL_HLTH 309-0	Biomedicine and World History
or GBL_HLTH 322-0	The Social Determinants of Health
GBL_HLTH 320-0	Qualitative Research Methods in Global Health

3 additional GBL_HLTH courses ¹

4 elective courses from various departments as listed on the department website. Up to 2 courses taken abroad on approved programs may count toward this requirement.

- ¹ GBL_HLTH 310-1 Supervised Global Health Research, GBL_HLTH 399-0 Independent Study, and courses taken abroad may not be counted toward this requirement.
- All adjunct majors in Global Health Studies must complete an approved international experience in one of Northwestern's public health programs or another supervised international health experience approved in advance by the program director. Courses taken abroad may be counted as electives.
 - All adjunct majors require completion of a stand-alone major as well.

Global Health Studies Minor

Course Title

Minor Requirements (7 units)

2 core courses:

GBL_HLTH 301-0	Introduction to International Public Health
GBL_HLTH 302-0	Global Bioethics
or GBL_HLTH 320-0	Qualitative Research Methods in Global Health

2 additional GBL_HLTH courses ¹

3 elective courses from various departments as listed on the department website. Up to 2 courses taken abroad on approved programs may count toward this requirement.

- ¹ GBL_HLTH 310-1 Supervised Global Health Research, GBL_HLTH 399-0 Independent Study, and courses taken abroad may not be counted toward this requirement
- Global Health Studies minors must complete an approved international experience in one of Northwestern's public health programs or another supervised international health experience approved in advance by the program director. Courses taken abroad may be counted as electives.

Greek

See Classics (p. 219).

Hebrew

See the Middle East and North African Studies Program (p. 303) and also the Jewish Studies Program (p. 281).

Hindi

See Asian Languages and Cultures (p. 199).

History

history.northwestern.edu

The Department of History is a place where students can study any region of the world, during almost any historical era, from a wide variety of perspectives. The faculty includes nationally distinguished scholars in United States, European, Latin American, African, and Asian history. Faculty resources enable the department to offer major fields of study in the history of the Americas, English/European history, African/Middle Eastern history, Asian/Middle Eastern history, and global history.

Most history courses are open to any undergraduate. Few have specific prerequisites, although first-year students are generally advised to try 100- and 200-level courses before attempting 300-level courses. History majors have priority in registering for classes, but most students enrolled in history courses are majoring in other areas. 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.

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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Programs of Study

- History Major (p. 273)
- History Minor (p. 276)

HISTORY 101-6 First-Year Seminar--European History (1 Unit) WCAS
First-Year Seminar

HISTORY 102-6 First-Year Seminar--American History (1 Unit) WCAS
First-Year Seminar

HISTORY 103-6 First-Year Seminar--Non-Western History (1 Unit) WCAS
First-Year Seminar

HISTORY 200-0 New Introductory Courses in History (1 Unit)

Introductory lecture courses on topics not covered in regular offerings. Content varies. May be repeated for credit with different topic. *Historical Studies Distro Area*

HISTORY 201-1 European Civilization: High Medieval Thru Mid-18th C (1 Unit) Culture and structure of preindustrial society, high medieval through mid-18th century. *Historical Studies Distro Area*

HISTORY 201-2 European Civilization: Mid-18th C to Present (1 Unit) Impact of industrial and political change and development of modern society to the present. *Historical Studies Distro Area*

HISTORY 203-1 Jewish History 750-1492 (1 Unit) 750-1492: Political, economic, cultural, and intellectual life of Jewish communities under medieval Islam and Christianity. Judeo-Arabic culture and its critics; Jewish-Christian relations; the place of violence; rise and influence of Jewish law and mysticism. *Historical Studies Distro Area*

HISTORY 203-2 Jewish History 1492-1789 (1 Unit) 1492-1789: Jewish community's economic and cultural reshaping; legalized readmission of Jews to European cities and integration into European society. *Historical Studies Distro Area*

HISTORY 203-3 Jewish History 1789-1948 (1 Unit) 1789-1948: Plurality of models of integration, acculturation, and assimilation; multiple identities; split of traditional community; sociocultural behavior; political movements. *Historical Studies Distro Area*

HISTORY 210-1 History of the United States, Precolonial to the Civil War (1 Unit) Interpretative survey from the 17th century to the present. Pre-colonial to the Civil War. *Historical Studies Distro Area*

HISTORY 210-2 History of the United States, Reconstruction to the Present (1 Unit) Interpretative survey from the 17th century to the present. Reconstruction to the present. Lectures, discussion sections. *Historical Studies Distro Area*

HISTORY 212-1 Introduction to African-American History: Key concepts from 1700-1861 (1 Unit) African origins, the slave trade, origins of slavery and racism in the United States, life under slavery in the North and the South. AF_AM_ST 212-1 and HISTORY 212-1 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 212-2 Introduction to African American History: Emancipation to Civil Rights Movement (1 Unit) Emancipation to the civil rights era. Reconstruction, rise of legal segregation, strategies of resistance, migration, and urbanization. AF_AM_ST 212-2 and HISTORY 212-2 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 214-0 Asian American History (1 Unit) 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. ASIAN_AM 214-0 and HISTORY 214-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 216-0 Global Asians (1 Unit) Survey of Asian diasporas in the United States and elsewhere in the 19th and 20th centuries, emphasizing causes of migration, process of settlement, relations with other ethnic groups, and construction of diasporic identities. ASIAN_AM 216-0 and HISTORY 216-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 218-0 Latina and Latino History (1 Unit) History of Latina/os in the United States and in the context of US- Latin American relations from the 18th century to the present. HISTORY 218-0 and LATINO 218-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 250-1 Global History: Early Modern to Modern Transition (1 Unit) The early-modern to modern transition. *Historical Studies Distro Area*

HISTORY 250-2 Global History: The Modern World (1 Unit) The modern world. HISTORY 250-1 is not a prerequisite for HISTORY 250-2. *Historical Studies Distro Area*

HISTORY 251-0 The Politics of Disaster: A Global Environmental History (1 Unit) A global survey of key natural disasters from the eighteenth century to the present. Focus on the political and human-made dimensions of these supposedly "natural" events. *Historical Studies Distro Area*

HISTORY 255-1 Background to African Civilization and Culture: Origins to 17th C. (1 Unit) Historical approach to society, economy, polity, and culture in Africa. Agricultural origins to the 17th century. *Historical Studies Distro Area*

HISTORY 255-2 Background to African Civilization and Culture: 16th-19th C. (1 Unit) Historical approach to society, economy, polity, and culture in Africa. 16th through 19th centuries. *Historical Studies Distro Area*

HISTORY 255-3 Background to African Civilization and Culture: 1875-1994 (1 Unit) Historical approach to society, economy, polity, and culture in Africa. 1875 to 1994. *Historical Studies Distro Area*

HISTORY 260-1 History of Latin America in the Colonial Period 1492-1821 (1 Unit) Aspects of the development of Latin America's socioeconomic, political, cultural, and religious institutions and practices. From the pre-Columbian and Iberian backgrounds through the colonial period, c. 1492-1821. *Historical Studies Distro Area*

HISTORY 260-2 History of Latin America in the Modern Period, 1789-present (1 Unit) Aspects of the development of Latin America's socioeconomic, political, cultural, and religious institutions and practices. After independence and through the modern period, c. 1821 to the present. *Historical Studies Distro Area*

HISTORY 261-0 Sex after Shakespeare (1 Unit) Sexual behavior in England between 1500 and 1800, concentrating on scandalous narratives and public controversy. *Historical Studies Distro Area*

HISTORY 270-0 Middle Eastern/Islamic Civilization (1 Unit) Influence of Islam on the components of Middle Eastern societies (nomads, agrarian and urban populations) from the inception of the faith (7th century BCE) to the modern period. *Historical Studies Distro Area*

HISTORY 271-1 History of the Islamic Middle East: 600-1200 (1 Unit) The classical Islamic community; medieval Islamic civilization, 600-1200. *Historical Studies Distro Area*

HISTORY 271-2 History of the Islamic Middle East: 1200-1789 (1 Unit) Invasions from Central Asia and the empires that followed: Mamluks (Egypt), Ottomans (Turkey), and Safavids (Iran), 1200-1800. *Historical Studies Distro Area*

HISTORY 271-3 History of the Islamic Middle East: 1789-present (1 Unit) Jewish and Arab nationalism, oil diplomacy, Islam in the modern context, 1789-present. *Historical Studies Distro Area*

HISTORY 275-1 History of Western Science and Medicine: Origins in Early Mod Europe (1 Unit) Origins of science and medicine in early modern Europe: science, religion, and cosmology; anatomy and sexual difference; the Enlightenment and social science. *Historical Studies Distro Area*

HISTORY 275-2 History of Western Science and Medicine: In Modern Europe and America (1 Unit) Modern science and medicine in Europe

and America: quantum physics and the A-bomb; Darwinism, genetics, and eugenics; DNA typing and "racial science." *Historical Studies Distro Area*

HISTORY 281-0 Chinese Civilization (1 Unit) Chinese history to the 16th century, emphasizing cultural and intellectual history. *Historical Studies Distro Area*

HISTORY 282-0 Sino-American Relations in the Modern World (1 Unit) This course considers the bilateral Sino-American relationship in its larger global context and in connection to the issues of war, diplomacy, race, gender, religion, and material and popular culture. Focuses on the ways domestic politics shape international relations. *Historical Studies Distro Area*

HISTORY 284-1 Japanese History, Ancient & Medieval, 200-1600 (1 Unit) Ancient and medieval Japan (200-1600), from the first evidence of civilization on the archipelago through the Warring States Period. *Historical Studies Distro Area*

HISTORY 284-2 Japanese History: Tokugawa Period, 1600-1868 (1 Unit) Social, cultural, and political developments in the Tokugawa Period (1600-1868). *Historical Studies Distro Area*

HISTORY 286-0 World War II in Asia (1 Unit) Analysis of the vast intended and unintended effects of World War II on Asia. Nationalism, global history, decolonization, fascism, Communism, democracy, and the experiences of ordinary people. *Historical Studies Distro Area*

HISTORY 300-0 New Lectures in History (1 Unit) Lecture courses on special topics not covered in regular offerings. Content varies. May be repeated for credit with different topic. *Historical Studies Distro Area*

HISTORY 301-SA-1 New Lectures in History: City and Civilization in the Eastern Mediterranean World (1 Unit) Topics in the history of the eastern Mediterranean world. Restricted to students in Northwestern's study abroad programs. *Historical Studies Distro Area*

HISTORY 301-SA-2 New Lectures in History: Milestones of Czech History & Civilization (1 Unit) Topics in the history of the Czech Republic. Restricted to students in Northwestern's study abroad programs. *Historical Studies Distro Area*

HISTORY 303-1 American Women's History, to 1865 (1 Unit) Women and gender in American life, with attention to differences among women based on class, race, and ethnicity. To 1865. *Historical Studies Distro Area*

HISTORY 303-2 American Women's History, since 1865 (1 Unit) Women and gender in American life, with attention to differences among women based on class, race, and ethnicity. Since 1865.

HISTORY 304-0 Asian American Women's History (1 Unit) Exploration of race, gender, and the contours of US history from the perspective of Asian American women's experiences. Considers migration, exclusion, labor, marriage, family, sexuality, and cross-racial alliances. ASIAN_AM 304-0 and HISTORY 304-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 305-0 American Immigration (1 Unit) Themes in history of immigration, especially from Europe, Latin America, and Asia. Law, racial formation, acculturation, transnational and international contexts, competing notions of citizenship. HISTORY 305-0 and LEGAL_ST 305-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 308-0 The American West (1 Unit) Examination of the history of the American West as both frontier and region, real and imagined, from the first contacts between natives and colonizers in the 15th century to the multicultural encounters of the 21st century. *Historical Studies Distro Area*

HISTORY 309-0 American Environmental History (1 Unit) American history from precontact to the present, focusing on the role of the natural world in human history and the role of human thought and action in natural history. ENVR_POL 309-0 and HISTORY 309-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 310-1 Early American History: Conquest and Colonization, to 1688 (1 Unit) Conquest and colonization. *Historical Studies Distro Area*

HISTORY 310-2 Early American History: The Age of the American Revolution, 1688-1789 (1 Unit) The age of the American Revolution. *Historical Studies Distro Area*

HISTORY 311-0 New Nation: The United States, 1787-1848 (1 Unit) The early years of the new republic from the Constitution to the war with Mexico. Political theory, slavery, social reform, religious revivalism, westward expansion, political parties, the growth of capitalism. *Historical Studies Distro Area*

HISTORY 314-0 The Civil War and Reconstruction (1 Unit) "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. *Historical Studies Distro Area*

HISTORY 315-1 The United States Since 1900: Early 20th C. (1 Unit) America's domestic history and role in world affairs since 1900. Early 20th century. *Historical Studies Distro Area*

HISTORY 315-2 The United States Since 1900: Mid-20th C. (1 Unit) America's domestic history and role in world affairs since 1900. Mid-20th century. *Historical Studies Distro Area*

HISTORY 315-3 The United States Since 1900: Late 20th C. to Present (1 Unit) America's domestic history and role in world affairs since 1900. Late 20th century to the present. *Historical Studies Distro Area*

HISTORY 316-0 The Sixties (1 Unit) Examination of one of the most tumultuous eras in US 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. *Historical Studies Distro Area*

HISTORY 317-1 American Cultural History: 19th C. (1 Unit) Changing values of the American people, how they have been transmitted, and how they have shaped American society, politics, and the economy. 19th century. *Historical Studies Distro Area*

HISTORY 317-2 American Cultural History: 20th C. to Present (1 Unit) Changing values of the American people, how they have been transmitted, and how they have shaped American society, politics, and the economy. 20th century to the present. *Historical Studies Distro Area*

HISTORY 318-1 Legal and Constitutional History of the United States: Colonial Period to 1850 (1 Unit) Colonial period-1850. Development of legal institutions, constitutionalism, law and social change, law and economic development. Taught with LEGAL_ST 318-1; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 318-2 Legal and Constitutional History of the United States: 1850 to Present (1 Unit) 1850-present. Law in industrial society: administration, race relations, corporations, environmental protection, civil liberties. Taught with LEGAL_ST 318-2; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 319-0 History of US Foreign Relations (1 Unit) Survey of US relations with the rest of the world from the 18th century to the present, with particular attention to the 20th century. *Historical Studies Distro Area*

HISTORY 320-0 History of Social Movements in the United States (1 Unit) From the abolition movement of the early 19th century to the New Right of the present. Samples radical, reform, and reactionary movements, with their development, organization, and effect on American politics and culture. *Historical Studies Distro Area*

HISTORY 321-0 The Vietnam Wars (1 Unit) Analysis of Vietnam's wars for national independence, with emphasis on US involvement. Topics include international context, political rationales, military engagements, popular attitudes, cultural exchange, and lasting legacies. *Historical Studies Distro Area*

HISTORY 322-1 Development of the Modern American City: to 1880 (1 Unit) City characteristics of urban society in America from the period of settlement to the present. To 1880. *Historical Studies Distro Area*

HISTORY 322-2 Development of the Modern American City: 1880-Present (1 Unit) City characteristics of urban society in America from the period of settlement to the present. 1880-present. *Historical Studies Distro Area*

HISTORY 324-0 US Gay and Lesbian History (1 Unit) Gender, sexuality, and the rise of modern lesbian and gay identities. Lecture and discussion. HISTORY 324-0 and GNDR_ST 324-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 325-0 History of American Technology (1 Unit) 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. *Historical Studies Distro Area*

HISTORY 326-0 U.S. Intellectual History (1 Unit) Central questions in America's intellectual past from the colonial era forward; specific dates vary by instructor. *Historical Studies Distro Area*

HISTORY 330-0 Medieval Sexuality (1 Unit) Fluidity of sex and gender roles in an age before "sexual orientation"; impact of and resistance to Christian theology's negative assessment of sexuality; the cult of chastity. *Historical Studies Distro Area*

HISTORY 331-0 Women in Medieval Society (1 Unit) Examination of medieval women's lives in both secular and religious spheres through the different ideologies (religious, philosophical, scientific) that shaped them. *Historical Studies Distro Area*

HISTORY 332-1 The Development of Medieval Europe: Early Middle Ages, 300-1000 (1 Unit) Early Middle Ages, 300-1000. *Historical Studies Distro Area*

HISTORY 332-2 The Development of Medieval Europe: High & Late Middle Ages, 1000-1450 (1 Unit) High and Late Middle Ages, 1000-1450. *Historical Studies Distro Area*

HISTORY 333-0 The Age of the Renaissance (1 Unit) Decline and revival of European civilization, 1350-1530. Cultural, political, economic, and social developments. *Historical Studies Distro Area*

HISTORY 334-0 The Age of the Reformation (1 Unit) Europe in the 16th century, especially origins, evolution, and effects of changes in religion. *Historical Studies Distro Area*

HISTORY 336-0 Spain 1500 - 1700: Rise and Fall of a European Empire (1 Unit) Social, political, and economic history of the largest early-modern European empire, its multicultural genesis, rise to domination in Europe and the Americas, and struggle to integrate internally. *Historical Studies Distro Area*

HISTORY 337-0 History of Modern Europe (1 Unit) 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. *Historical Studies Distro Area*

HISTORY 338-1 Europe in the 20th Century, 1900-1945 (1 Unit) Growth of mass politics, fascism, the home fronts, rise of the welfare state, loss of empire, economic resurgence and integration. 1900-45. *Historical Studies Distro Area*

HISTORY 338-2 Europe in the 20th Century, 1945-Present (1 Unit) Growth of mass politics, fascism, the home fronts, rise of the welfare state, loss of empire, economic resurgence and integration. 1945-present. *Historical Studies Distro Area*

HISTORY 340-0 Gender, War, and Revolution in the 20th Century (1 Unit) Examination of changes in gender ideals and in the lives of women and men in Europe and America as a result of world wars, Russian revolution, fascism, and the Cold War. *Historical Studies Distro Area*

HISTORY 341-0 Paris: World City, 1700 to the Present (1 Unit) Survey of the social, cultural, political, economic, and spatial development of Paris from aristocratic enclave to a class-divided bourgeois city, from an imperial capital to a postcolonial metropolis. *Historical Studies Distro Area*

HISTORY 342-1 History of Modern France: Ancien Regime and the French Revolution (1 Unit) The Ancien Régime and the French revolution. *Historical Studies Distro Area*

HISTORY 342-2 History of Modern France : 19th c. to present (1 Unit) 19th century to the present. *Historical Studies Distro Area*

HISTORY 343-0 Modern Italy (1 Unit) Italy from the Enlightenment to the present, concentrating on the Risorgimento, the world wars, Mussolini and fascism, the postwar economic miracle, and terrorism. *Historical Studies Distro Area*

HISTORY 344-1 Weimer and Nazi Germany (1 Unit) Survey of German political, economic, social, intellectual, and diplomatic history covering Weimar and Nazi Germany. GERMAN 344-1 and HISTORY 344-1 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 344-2 Germany Since 1945 (1 Unit) Debates about the development of the postwar German states from 1945 to the present. Social, political, economic, and everyday history within the context of East, West, and unified Germany. GERMAN 344-2 and HISTORY 344-2 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 345-1 History of Russia: 800-1700 (1 Unit) Emergence of the Kievan and Muscovite states, 800-1700. *Historical Studies Distro Area*

HISTORY 345-2 History of Russia, 1700-1917 (1 Unit) Russia from Peter to the Revolution, 1700-1917. *Historical Studies Distro Area*

HISTORY 345-3 History of Russia, 1917-Present (1 Unit) The Soviet Union and its successor states, 1917-present. *Historical Studies Distro Area*

HISTORY 346-0 East Central Europe under Communist Rule and Beyond, 1945 to the Present (1 Unit) The history of East-Central Europe from the World War II to the collapse of Soviet rule and beyond. *Historical Studies Distro Area*

HISTORY 347-0 Christians and Jews (1 Unit) Varieties of historical encounters between Jews and Christians. Origins of the "Jesus movement"; rabbinic attitudes toward Christianity; medieval polemic and engagement; the modern "Judeo-Christian tradition"; Christian Zionism and postwar ecumenicism. *Historical Studies Distro Area*

HISTORY 348-1 Jews in Poland, Ukraine, and Russia (1 Unit) Social, political, religious, and cultural interaction of Jews and Slavs over a millennium, 1250-1917. *Historical Studies Distro Area*

HISTORY 348-2 Jews in Poland, Ukraine, and Russia (1 Unit) Jewish encounter with Marxism and communism; social, political, cultural, and artistic aspects of Jewish life; Soviet Jews and the Russian empire: patterns of survival, accommodation, and interaction, 1917-91. *Historical Studies Distro Area*

HISTORY 349-0 History of the Holocaust (1 Unit) Origins and development of the massacre of European Jewry during World War II. *Historical Studies Distro Area*

HISTORY 352-0 Global History of Death and Dying (1 Unit) How death shapes the modern world via slave trades, imperial conquests, pandemics, wars, medicine, and genocide. Transformations in rituals; personal and social meanings of death; ways and patterns of dying. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175)

HISTORY 356-1 History of South Africa, Early Times to 1879 (1 Unit) 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. *Historical Studies Distro Area*

HISTORY 356-2 History of South Africa, 20th century (1 Unit) Emphasis on the 20th century, the rise of African nationalism, and the clash with the apartheid state. *Historical Studies Distro Area*

HISTORY 357-0 East Africa (1 Unit) Selected topics in East African history. *Historical Studies Distro Area*

HISTORY 358-0 Topics in West African History (1 Unit) Selected topics in West African history: economy, society, and government. *Historical Studies Distro Area*

HISTORY 360-0 Tudor and Stuart Britain (1 Unit) Formation of the British state during the Tudor and Stuart dynasties, 1485- 1714, with emphasis on changing patterns of religious belief and the transformation of the monarchy. *Historical Studies Distro Area*

HISTORY 362-1 Modern British History, 1688 - 1815 (1 Unit) Social, political, and institutional history, 1688-1815. *Historical Studies Distro Area*

HISTORY 362-2 Modern British History, 1780-1900 (1 Unit) The Victorians: liberalism, empire, and morality, 1780-1900. *Historical Studies Distro Area*

HISTORY 362-3 Modern British History, 1900-present (1 Unit) Empire to Cool Britannia, 1900-present. *Historical Studies Distro Area*

HISTORY 363-0 Modern Ireland in Historical Perspective (1 Unit) History of Ireland from the Celts to the "troubles" in northern Ireland. Emphasis on 19th and 20th centuries. *Historical Studies Distro Area*

HISTORY 364-0 Gender and Sexuality in Victorian Britain (1 Unit) Key debates and issues: prostitution, the city and sexual crime, sexuality and empire, sex and the single woman, homosexuality on trial, and the "scientific" writings of Victorian sexologists. *Historical Studies Distro Area*

HISTORY 366-0 Race and Nation in the Independence Era (1 Unit) The process of Latin American independence, from the colonial background to 19th century insurgency wars, economic development, and nation formation, with emphasis on race and "the Indian question" in liberal thought. *Historical Studies Distro Area*

HISTORY 367-0 History of Modern Brazil (1 Unit) Historical roots of modern Brazilian society: its rush toward economic modernization; radical social and economic inequalities; racially and culturally hybrid national identities; quest for effective democracy and universal citizenship. *Historical Studies Distro Area*

HISTORY 368-1 Revolution in 20th Century Latin America: Mexico and its Revolutions (1 Unit) 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. *Historical Studies Distro Area*

HISTORY 368-2 Revolution in 20th Century Latin America: Marxist Revolutions (1 Unit) Comparative study of the origins and aftermaths of major Marxist revolutions in Cuba and South and Central America. *Historical Studies Distro Area*

HISTORY 369-0 Development and Inequality in Modern Latin America (1 Unit) 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. *Historical Studies Distro Area*

HISTORY 372-0 History of Ancient Egypt, 3100-c. 1000 B.C.E. (1 Unit) The Old Kingdom: centralized government, divine kingship. The Middle Kingdom: new monarchic principles in the aftermath of social disorder. The New Kingdom: imperialism in response to foreign aggression; religious revolution of Akhenaton. *Historical Studies Distro Area*

HISTORY 373-1 The Ottomans: Last Empire of Islam, 1300-1622 (1 Unit) The Last Empire of Islam, 1300-1622. Emergence and rise to power; relations with other European and Asian powers; principal institutions; governmental and societal frameworks. *Historical Studies Distro Area*

HISTORY 373-2 The Ottomans: From "Second Empire" to the Age of Nationalism, 1622-1918 (1 Unit) From the Second Ottoman Empire to the Age of Nationalism, 1622-1918. Political and societal changes that shaped the modern Middle East and southeast Europe. *Historical Studies Distro Area*

HISTORY 376-0 Global Environments and World History (1 Unit) Introduction to the recent histories of environmental issues around

the world, including urbanization, industrialization, population growth, commodification, empire building, intercontinental welfare, energy extraction, and new technologies. ENVR_POL 340-0 and HISTORY 376-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 378-0 History of Law and Science (1 Unit) The changing relations between justice and science-including the forensic sciences of identification and intellectual property-in the United States and Europe over the past 300 years. *Historical Studies Distro Area*

HISTORY 379-0 Biomedicine and World History (1 Unit) Introduction to the social, political, scientific, and economic forces allowing biomedical systems to become synonymous with global health governance. GBL_HLTH 309-0 and HISTORY 379-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

HISTORY 381-1 History of Modern China: Late Imperial China, 1600-1911 (1 Unit) Late Imperial China, 1600-1911. *Historical Studies Distro Area*

HISTORY 381-2 History of Modern China: 1911-present (1 Unit) 1911-present. *Historical Studies Distro Area*

HISTORY 382-0 The Modern Japanese City (1 Unit) Social and cultural history of urban Japan. *Historical Studies Distro Area*

HISTORY 383-0 Japan's Modern Revolution (1 Unit) History of Japan from 1830 to 1912, focusing on the overthrow of the Tokugawa shogunate and emergence as a modern imperialist power. *Historical Studies Distro Area*

HISTORY 384-1 History of Modern Japan: The Modern State, 1860-1943 (1 Unit) Japan: the modern state, 1860-1943. *Historical Studies Distro Area*

HISTORY 384-2 History of Modern Japan: War and postwar Japan, 1943-present (1 Unit) War and postwar Japan, 1943-present. *Historical Studies Distro Area*

HISTORY 385-1 History of Modern South Asia, 1500-1800 (1 Unit) The early modern period, ca. 1500-1800: The Mughal Empire; the early phase of European trade and conquest in the subcontinent. *Historical Studies Distro Area*

HISTORY 385-2 History of Modern South Asia, ca. 1750-present (1 Unit) ca. 1750-present: The age of British colonial dominance; the politics of nation building and anticolonial resistance; independence, partition, and the postcolonial predicament. *Historical Studies Distro Area*

HISTORY 386-2 History of Modern Southeast Asia Until 1945 (1 Unit) A social and economic history of Southeast Asia from c.1750 to 1945. *Historical Studies Distro Area*

HISTORY 386-3 History of Contemporary Southeast Asia Since 1945 (1 Unit) A social and political history of Southeast Asia from the end of the Second World War to the Present. *Historical Studies Distro Area*

HISTORY 392-0 Topics In History (1 Unit) Advanced work through reading, research, and discussion in an area of special significance. Graduate students permitted in some courses with consent of instructor.

HISTORY 393-0 Approaches to History (1 Unit) Introductory seminar for history majors and others interested in understanding how history is thought about and written. Intensive exploration of a significant historical event, period, or topic. *Historical Studies Distro Area*

HISTORY 395-0 Research Seminar (1 Unit) Students research and complete a term paper on a topic of choice. Required of majors.

HISTORY 398-1 Thesis Seminar (1 Unit) 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 398-2 Thesis Seminar (1 Unit) 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 398-3 Thesis Seminar (1 Unit) 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 (1 Unit) Reading and conferences on special subjects for advanced undergraduates. Open only with consent of director of undergraduate studies and instructor.

HISTORY 399-SA Independent Study (1 Unit) Reading and conferences on special subjects for advanced undergraduates. Open only with consent of director of undergraduate studies and instructor.

History Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

The history major enables students to broaden their intellectual horizons as they study the experiences of people outside their time and place. Courses are designed to develop the ability to read insightfully, think critically, and write with precision and polish. Students enroll in a range of historical courses as well as develop an area of concentration. Majors are each assigned a faculty adviser with whom they are encouraged to consult frequently.

Students majoring in history select one of five concentrations and may arrange to emphasize special fields within its context:

- History of the Americas
- English/European history
- African/Middle Eastern history
- Asian/Middle Eastern history
- Global history

The program for majors consists of 12 graded courses in history, none of which may be substituted by advanced placement credits. These courses, chosen by the student with the adviser, are distributed as follows.

Course	Title
Major Requirements (12 units)	
<i>2 undergraduate seminars:</i>	
HISTORY 393-0	Approaches to History (taken as soon as possible after declaring the history major)
HISTORY 395-0	Research Seminar (should be taken in junior or senior year and need not be within the student's concentration)
<i>10 additional 200- or 300-level courses:</i>	
For nonglobal history concentrations:	

6 courses in a geographic concentration. See department website for eligible courses; 1 only allowed from:

HISTORY 101-6	First-Year Seminar–European History
or HISTORY 102-6	First-Year Seminar–American History
or HISTORY 103-6	First-Year Seminar–Non-Western History

4 courses outside the geographic concentration

For global history concentration:

HISTORY 250-1 & HISTORY 250-2	Global History: Early Modern to Modern Transition and Global History: The Modern World
----------------------------------	---

2 additional global history courses (see department website for eligible courses)

6 courses outside global history, either 2 each in three geographic areas or 3 each in 2 geographic areas

At least 2 of the 12 courses must be in fields other than modern European or US history (e.g., courses in European history before 1800 or in African, Asian, Middle Eastern, or Latin American history in any period).

Honors in History

Junior majors with strong academic records and an interest in pursuing honors attend informational sessions during winter quarter. They submit a thesis proposal and a letter of recommendation from a Northwestern history professor by an early spring deadline. Those chosen enroll as seniors in a 3-quarter thesis seminar (HISTORY 398-1, HISTORY 398-2, HISTORY 398-3) and submit a completed thesis in May. All 3 thesis seminar quarters (HISTORY 398-1, HISTORY 398-2, HISTORY 398-3) may count toward the major; see the department for details.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information consult the director of undergraduate studies and see Honors in the Major (p. 178).

History Courses

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 first-year students only.

Course	Title
HISTORY 101-6	First-Year Seminar–European History
HISTORY 102-6	First-Year Seminar–American History
HISTORY 103-6	First-Year Seminar–Non-Western History

Introductory Lecture Courses

Course	Title
HISTORY 200-0	New Introductory Courses in History
HISTORY 300-0	New Lectures in History
HISTORY 301-SA-1 & HISTORY 301-SA-2	New Lectures in History: City and Civilization in the Eastern Mediterranean World and New Lectures in History: Milestones of Czech History & Civilization

African History Courses

Course	Title
HISTORY 255-1 & HISTORY 255-2 & HISTORY 255-3	Background to African Civilization and Culture: Origins to 17th C. and Background to African Civilization and Culture: 16th-19th C. and Background to African Civilization and Culture: 1875-1994

HISTORY 356-1 & HISTORY 356-2	History of South Africa, Early Times to 1879 and History of South Africa, 20th century
HISTORY 357-0	East Africa
HISTORY 358-0	Topics in West African History

Asian History Courses

Course	Title
HISTORY 281-0	Chinese Civilization
HISTORY 284-1 & HISTORY 284-2	Japanese History, Ancient & Medieval, 200-1600 and Japanese History: Tokugawa Period, 1600-1868
HISTORY 286-0	World War II in Asia
HISTORY 381-1 & HISTORY 381-2	History of Modern China: Late Imperial China, 1600-1911 and History of Modern China: 1911-present
HISTORY 382-0	The Modern Japanese City
HISTORY 383-0	Japan's Modern Revolution
HISTORY 384-1 & HISTORY 384-2	History of Modern Japan: The Modern State, 1860-1943 and History of Modern Japan: War and postwar Japan, 1943-present
HISTORY 385-1 & HISTORY 385-2	History of Modern South Asia, 1500-1800 and History of Modern South Asia, ca. 1750-present

England and the British Isles History Courses

Course	Title
HISTORY 261-0	Sex after Shakespeare
HISTORY 360-0	Tudor and Stuart Britain
HISTORY 362-1 & HISTORY 362-2 & HISTORY 362-3	Modern British History, 1688 - 1815 and Modern British History, 1780-1900 and Modern British History, 1900-present
HISTORY 364-0	Gender and Sexuality in Victorian Britain

European History Courses

Course	Title
HISTORY 201-1 & HISTORY 201-2	European Civilization: High Medieval Thru Mid-18th C and European Civilization: Mid-18th C to Present
HISTORY 203-1 & HISTORY 203-2 & HISTORY 203-3	Jewish History 750-1492 and Jewish History 1492-1789 and Jewish History 1789-1948
HISTORY 330-0	Medieval Sexuality
HISTORY 331-0	Women in Medieval Society
HISTORY 332-1 & HISTORY 332-2	The Development of Medieval Europe: Early Middle Ages, 300-1000 and The Development of Medieval Europe: High & Late Middle Ages, 1000-1450
HISTORY 333-0	The Age of the Renaissance
HISTORY 334-0	The Age of the Reformation
HISTORY 336-0	Spain 1500 - 1700: Rise and Fall of a European Empire
HISTORY 337-0	History of Modern Europe
HISTORY 338-1 & HISTORY 338-2	Europe in the 20th Century, 1900-1945 and Europe in the 20th Century, 1945-Present
HISTORY 340-0	Gender, War, and Revolution in the 20th Century
HISTORY 341-0	Paris: World City, 1700 to the Present
HISTORY 342-1 & HISTORY 342-2	History of Modern France: Ancien Regime and the French Revolution and History of Modern France : 19th c. to present
HISTORY 343-0	Modern Italy
HISTORY 344-1	Weimer and Nazi Germany
HISTORY 344-2	Germany Since 1945

HISTORY 345-1 & HISTORY 345-2 & HISTORY 345-3	History of Russia: 800-1700 and History of Russia, 1700-1917 and History of Russia, 1917-Present
HISTORY 346-0	East Central Europe under Communist Rule and Beyond, 1945 to the Present
HISTORY 347-0	Christians and Jews
HISTORY 348-1 & HISTORY 348-2	Jews in Poland, Ukraine, and Russia and Jews in Poland, Ukraine, and Russia
HISTORY 349-0	History of the Holocaust

Global History Courses

Course	Title
HISTORY 250-1 & HISTORY 250-2	Global History: Early Modern to Modern Transition and Global History: The Modern World
HISTORY 251-0	The Politics of Disaster: A Global Environmental History
HISTORY 352-0	Global History of Death and Dying

Latin American History Courses

Course	Title
HISTORY 260-1 & HISTORY 260-2	History of Latin America in the Colonial Period 1492-1821 and History of Latin America in the Modern Period, 1789-present
HISTORY 366-0	Race and Nation in the Independence Era
HISTORY 367-0	History of Modern Brazil
HISTORY 368-1 & HISTORY 368-2	Revolution in 20th Century Latin America: Mexico and its Revolutions and Revolution in 20th Century Latin America: Marxist Revolutions
HISTORY 369-0	Development and Inequality in Modern Latin America

Middle Eastern History Courses

Course	Title
HISTORY 270-0	Middle Eastern/Islamic Civilization
HISTORY 271-1	History of the Islamic Middle East: 600-1200
HISTORY 271-2	History of the Islamic Middle East: 1200-1789
HISTORY 271-3	History of the Islamic Middle East: 1789-present
HISTORY 372-0	History of Ancient Egypt, 3100-c. 1000 B.C.E.
HISTORY 373-1 & HISTORY 373-2	The Ottomans: Last Empire of Islam, 1300-1622 and The Ottomans: From "Second Empire" to the Age of Nationalism, 1622-1918

United States History Courses

Course	Title
HISTORY 210-1 & HISTORY 210-2	History of the United States, Precolonial to the Civil War and History of the United States, Reconstruction to the Present
HISTORY 212-1 & HISTORY 212-2	Introduction to African-American History: Key concepts from 1700-1861 and Introduction to African American History: Emancipation to Civil Rights Movement
HISTORY 214-0	Asian American History
HISTORY 216-0	Global Asians
HISTORY 218-0	Latina and Latino History
HISTORY 303-1 & HISTORY 303-2	American Women's History, to 1865 and American Women's History, since 1865
HISTORY 304-0	Asian American Women's History
HISTORY 305-0	American Immigration

HISTORY 308-0	The American West
HISTORY 309-0	American Environmental History
HISTORY 310-1 & HISTORY 310-2	Early American History: Conquest and Colonization, to 1688 and Early American History: The Age of the American Revolution, 1688-1789
HISTORY 311-0	New Nation: The United States, 1787-1848
HISTORY 314-0	The Civil War and Reconstruction
HISTORY 315-1 & HISTORY 315-2 & HISTORY 315-3	The United States Since 1900: Early 20th C. and The United States Since 1900: Mid-20th C. and The United States Since 1900: Late 20th C. to Present
HISTORY 316-0	The Sixties
HISTORY 317-1 & HISTORY 317-2	American Cultural History: 19th C. and American Cultural History: 20th C. to Present
HISTORY 318-1 & HISTORY 318-2	Legal and Constitutional History of the United States: Colonial Period to 1850 and Legal and Constitutional History of the United States: 1850 to Present
HISTORY 319-0	History of US Foreign Relations
HISTORY 321-0	The Vietnam Wars
HISTORY 322-1 & HISTORY 322-2	Development of the Modern American City: to 1880 and Development of the Modern American City: 1880- Present
HISTORY 324-0	US Gay and Lesbian History
HISTORY 326-0	U.S. Intellectual History

History of Science and Technology Courses

Course	Title
HISTORY 275-1 & HISTORY 275-2	History of Western Science and Medicine: Origins in Early Mod Europe and History of Western Science and Medicine: In Modern Europe and America
HISTORY 325-0	History of American Technology
HISTORY 376-0	Global Environments and World History
HISTORY 378-0	History of Law and Science
HISTORY 379-0	Biomedicine and World History

Courses Primarily for Majors in History

Course	Title
HISTORY 392-0	Topics In History
HISTORY 393-0	Approaches to History
HISTORY 395-0	Research Seminar
HISTORY 398-1 & HISTORY 398-2 & HISTORY 398-3	Thesis Seminar and Thesis Seminar and Thesis Seminar
HISTORY 399-0	Independent Study

History Courses in Other Departments

A history major may take no more than 2 courses listed below to satisfy the 12-course history requirement.

Course	Title
CLASSICS 211-0	Ancient Athens: Democracy, Drama, Civilization
CLASSICS 212-0	Rome: Culture and Empire
ECON 315-0	Topics in Economic History
ECON 318-0	History of Economic Thought
ECON 323-1	Economic History of the United States Before 1865
ECON 323-2	Economic History of the United States 1865 to Present

ECON 324-0	Western Economic History
RELIGION 264-0	American Religious History from 1865 to the Great Depression
RELIGION 265-0	American Religious History from World War II to the Present

History Minor

The minor in history encourages students majoring in other fields to study history and to organize their historical studies in a coherent way. The structure of the minor requires students to gain both depth and breadth in history. Students must select a concentration, which enables them to acquire significant knowledge of one area of the world, and take courses outside the concentration, which encourages an understanding of diverse cultural contexts.

Minor Requirements (7 units)

- At least 3 must be at the 300 level.
- Only 1 may be an introductory colloquium:

Course	Title
HISTORY 101-6	First-Year Seminar–European History
HISTORY 102-6	First-Year Seminar–American History
HISTORY 103-6	First-Year Seminar–Non-Western History
- 4 must be in one of the following areas of concentration, and at least 2 of these must be at the 300 level:
 - Africa
 - Asia
 - Europe, including Britain
 - Latin America
 - Middle East
 - United States
 - Economic and labor history¹
 - Environmental history¹
 - Law and crime¹
 - Science and technology¹
- 3 must be outside the area of concentration.

¹ See History Department website (<https://www.history.northwestern.edu/undergraduate/major-minor/minor-requirements.html>) for details.

Humanities

humanities.northwestern.edu

Humanities courses—known as “HUM” in CAESAR—are offered by the **Kaplan Humanities Institute** (“Kaplan”). With the exception of particular courses for first-year students they are open to all students—from any year, any school, any major—at Northwestern.

The humanities are a broad and interdisciplinary collection of fields that differ from the physical, biological, and certain of the social sciences by concentrating on the study and interpretation of human thought and culture. The humanities include literature, philosophy, history, law, art, and music, as well as other cultural forms and practices such as film, dance, theater, television, media, and religion. Certain scholars in sociology, psychology, anthropology, and political science also pursue humanities research.

The humanities pose big questions about the meaning of life and examine assumptions about how we make sense of our complex and globalized world. Studying them permits us to examine ourselves and what it means to be human—here and now, as well as elsewhere and in the past. The humanities foster a critical perspective on human artifacts and records of human experience (verbal, visual, aural), enabling us to learn, through a combination of interpretative and analytical research, how to think creatively about questions that often do not have set answers.

Humanities courses offered by Kaplan feature themes that span the humanities and other domains; link the classroom to the world beyond through experiential field study; feature team-taught offerings; and combine inquiry with digital tools to allow students to go beyond textual sources to integrate multimedia, content analysis, and user interfaces into humanities subjects. Each course may feature unique methods, but all humanities courses emphasize critical reading, speaking, and writing skills; examine subjects from multiple perspectives; and provide training in synthesizing competing forms of evidence and developing complex opinions and arguments.

Humanities courses are open to students from any school at Northwestern (with the exception of Weinberg College First-Year Seminars). Many of the classes are small-enrollment, 300-level seminars taught by faculty from every humanities discipline, from history to philosophy, African American studies to performance studies, and dozens of departments in between. These seminars tend to be one-of-a-kind offerings that are geared to students in their sophomore to senior years. But Kaplan also features several popular lecture courses, offered every year, that welcome first-years through seniors and are taught by award-winning professors (see HUM 205-0, HUM 220-0, HUM 225-0 and HUM 260-0). Very few humanities courses have prerequisites, and many fulfill distribution requirements.

Kaplan Global Humanities Labs (<https://www.humanities.northwestern.edu/undergraduate/global-humanities-lab>) are quarter-long seminars that feature an international field study component. And the Humanities Plunge (<https://www.humanities.northwestern.edu/undergraduate/humanities-plunge>) is a spring break immersion in Chicago’s theatre, art, music, architecture and dance, guided by artists and scholars to help students learn to analyze and interpret these cultural riches.

A note: Many students think that humanities courses are only open to Kaplan Humanities Scholars; not so! Kaplan encourages and welcomes students from any major or field of study to enroll in humanities courses. Humanities training—in deliberation, analysis, and judgment—enables students to process the human experience from varied perspectives, which is valuable preparation for any scholarly or career pursuit.

Since all courses are not offered every year (or in the same quarter from year to year), make sure to check CAESAR each quarter for specific course descriptions that are fitted under the broad “umbrella” categories listed in the humanities course list.

Alice Kaplan Institute for the Humanities

The Alice Kaplan Institute for the Humanities is committed to disseminating humanities research and providing opportunities for faculty, students, and the broader community to explore issues, examine beliefs, and engage in interdisciplinary dialogue about human thought and culture. As a site for exchange and connection across the humanities, sciences, and social sciences at Northwestern, we are dedicated to fostering critical, creative, and scholarly discussions

about what it means to be human, across time and space. Each year, the Kaplan Institute sponsors fellowship competitions to support humanities faculty and student research; hosts a range of dynamic performances, workshops, and talks; supports quarterly artists in residence; and organizes an innovative curriculum of classes positioned at the intersection of humanities disciplines.

The Kaplan Humanities Institute coordinates humanities courses, the Kaplan Humanities Scholars Program (<https://www.humanities.northwestern.edu/kaplan-humanities-scholars-program>), and the humanities minor.

Program of Study

- Humanities Minor (p. 278)
- Kaplan Humanities Scholars Program (p. 278)

HUM 100-1-BR Introduction to Critical Thinking & Research in the Humanities & Social Sciences (1 Unit) For participants in Bridge I summer program. Commonalities and distinguishing features of critical thinking in humanities and social sciences. Emphasis on analysis and argumentation. Taken with either HUM 100-2-BR or JOUR 190-BR.

HUM 100-2-BR Questions to Answers: define, research, & write about topics that interest you (1 Unit) For participants in Bridge I summer program. How to determine the appropriate scope of a research paper, how to begin research, and related skills in humanities and social sciences. Taken with HUM 100-1-BR.

HUM 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

HUM 102-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

HUM 105-0 The Humanities Plunge (0.5 Unit) A half-credit course over spring break immersing students in Chicago's cultural riches. Events and tours are introduced and contextualized by field experts.

HUM 205-0 The World of Homer (1 Unit) Introduction to the history and material culture of Iron Age Greece. Society, economy, art, and archaeology of the Greek world that gave rise to the Homeric epic. CLASSICS 210-0 and HUM 205-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Literature Fine Arts Distro Area*

HUM 210-0 Humanities in the World I (1 Unit) *Literature Fine Arts Distro Area*

HUM 211-0 Humanities in the World II (1 Unit) *Historical Studies Distro Area*

HUM 220-0 Health, Biomedicine, Culture, and Society (1 Unit) Broad introduction to controversies surrounding health and biomedicine by analyzing culture, politics, values, and social institutions. HUM 220-0 and SOCIOL 220-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

HUM 225-0 Media Theory (1 Unit) Comprehensive introduction from a humanistic perspective to theories about the nature of media and the role of technology in modern culture. ART_HIST 375-0 and HUM 225-0 are taught together; may not receive credit for both courses. *Literature Fine Arts Distro Area*

HUM 260-0 Humanities Explorations (1 Unit) Lecture course, often team-taught, that explores social, ethical, and political big questions-e.g., the nature of love, the value of reading, relativity in science and culture, ways to model "choice" across the humanities-from different disciplinary perspectives. May be repeated for credit with change of topic. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Literature Fine Arts Distro Area*

HUM 310-3 Global Humanities Lab (1 Unit) Investigation of an international humanities topic through experiential learning and offsite research; focus on how different cultures process and understand the artifacts of human cultures and their values. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change of topic. *Social Behavioral Sciences Distro Area*

HUM 310-4 Global Humanities Lab (1 Unit) Investigation of an international humanities topic through experiential learning and offsite research; focus on how different cultures process and understand the artifacts of human cultures and their values. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change of topic. *Historical Studies Distro Area*

HUM 310-5 Global Humanities Lab (1 Unit) Investigation of an international humanities topic through experiential learning and offsite research; focus on how different cultures process and understand the artifacts of human cultures and their values. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change of topic. *Ethics Values Distro Area*

HUM 310-6 Global Humanities Lab (1 Unit) Investigation of an international humanities topic through experiential learning and offsite research; focus on how different cultures process and understand the artifacts of human cultures and their values. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change of topic. *Literature Fine Arts Distro Area*

HUM 325-3 Humanities in the Digital Age (1 Unit) Innovative and collaborative ways to incorporate technology into humanistic study. Ways to digitize text, image, sound, and/or video for analysis. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change of topic. *Social Behavioral Sciences Distro Area*

HUM 325-4 Humanities in the Digital Age (1 Unit) Innovative and collaborative ways to incorporate technology into humanistic study. Ways to digitize text, image, sound, and/or video for analysis. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change of topic. *Historical Studies Distro Area*

HUM 325-5 Humanities in the Digital Age (1 Unit) Innovative and collaborative ways to incorporate technology into humanistic study. Ways to digitize text, image, sound, and/or video for analysis. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change of topic. *Ethics Values Distro Area*

HUM 325-6 Humanities in the Digital Age (1 Unit) Innovative and collaborative ways to incorporate technology into humanistic study. Ways to digitize text, image, sound, and/or video for analysis. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change of topic. *Literature Fine Arts Distro Area*

HUM 370-3 Special Topics in the Humanities (1 Unit) Intensive seminars in cutting-edge research on interdisciplinary issues. Course number indicates distribution requirement area in which a course counts. May be

repeated for credit with change in topic. *Social Behavioral Sciences Distro Area*

HUM 370-4 Special Topics in the Humanities (1 Unit) Intensive seminars in cutting-edge research on interdisciplinary issues. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change in topic. *Historical Studies Distro Area*

HUM 370-5 Special Topics in the Humanities (1 Unit) Intensive seminars in cutting-edge research on interdisciplinary issues. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change in topic. *Ethics Values Distro Area*

HUM 370-6 Special Topics in the Humanities (1 Unit) Intensive seminars in cutting-edge research on interdisciplinary issues. Course number indicates distribution requirement area in which a course counts. May be repeated for credit with change in topic. *Literature Fine Arts Distro Area*

HUM 395-0 Humanities Seminar (1 Unit) Interdisciplinary course offered by a changing roster of humanities faculty. Topics have included cities as modern utopia/dystopia in Europe, Asia, and America; the afterlife of Marxism; the politics of reputation; being animal, being human.

HUM 397-0 Exhibiting Antiquity: The Culture and Politics of Display (1 Unit) Examination of the construction of Mediterranean antiquity through modes of reception since 1750. Analysis of programs of collecting and display and the intersection of institutional and scholarly agendas. ART_HIST 318-0, CLASSICS 397-0 and HUM 397-0 taught together; may receive credit for only 1 of these courses. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Literature Fine Arts Distro Area*

HUM 398-1 Senior Humanities Seminar (0.5 Unit) Two consecutive quarters (fall and winter) during which students work on a senior humanities project under faculty mentorship and within the interdisciplinary community of the Kaplan Humanities Institute. Prerequisite: selection as a Franke Undergraduate Fellow.

HUM 398-2 Senior Humanities Seminar (0.5 Unit) Two consecutive quarters (fall and winter) during which students work on a senior humanities project under faculty mentorship and within the interdisciplinary community of the Kaplan Humanities Institute. Prerequisite: selection as a Franke Undergraduate Fellow.

HUM 399-0 Independent Study (1 Unit) Individual projects with faculty guidance. Open to junior and senior minors. Prerequisite: consent of instructor.

Humanities Minor

The minor in the humanities exposes undergraduate students to diverse examples of human thought and culture and to the interdisciplinary methods and theories used in humanities scholarship. Its premise is that studying an assortment of humanities topics from a wide range of perspectives complements the more closely focused coursework of any major, inside or outside the humanities.

Humanities minors get priority in registering for HUM classes during pre-registration periods.

Minor Requirements (7 units)

- Up to three (3) 200-level HUM classes
- Balance from 300-level HUM classes, which may include HUM 399-0 Independent Study and/or a humanities internship through the Chicago Field Studies (p. 218) program

Kaplan Humanities Scholars Program

Students accepted into the competitive Kaplan Humanities Scholars Program participate in an innovative exploration of the humanities via two intensive courses in both fall and winter of the first year. Designed especially for program participants, both the First-Year Seminar and the Humanities in the World courses are team-taught by three award-winning professors drawn from different departments. They include a lecture course and small coordinated seminar each quarter where students refine their critical reading and writing skills; confront the works of great authors and artists; attend special performances and field trips; and examine how artists, thinkers, and ordinary citizens alike have contributed to the central role played by the humanities in our world. For more information see [kaplan-humanities-scholars-program \(https://www.humanities.northwestern.edu/kaplan-humanities-scholars-program\)](https://www.humanities.northwestern.edu/kaplan-humanities-scholars-program).

Courses in the Kaplan Humanities Scholars Program

Specific topics in these courses will vary as different professors participate.

Course	Title
HUM 101-6	First-Year Seminar
HUM 102-6	First-Year Seminar
HUM 210-0	Humanities in the World I
HUM 211-0	Humanities in the World II

Integrated Science

isp.northwestern.edu

The Integrated Science Program is a highly selective curriculum of natural sciences and mathematics presented predominantly in small classes at an accelerated pace. Courses emphasize the common base and relationships between the traditional sciences, including the importance of mathematics and the development of first principles, leading to interdisciplinary topics at the forefront of science today. The goal is to provide students who are interested in careers in science and mathematics with a broad quantitative background that will give them superior preparation for further work in graduate or professional schools or permanent employment. The curriculum is composed of 25.7 units, 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 world-class laboratories at Northwestern and are able to publish peer-reviewed papers in professional journals. For Weinberg College students ISP may lead to a three-year bachelor of arts degree if, by the end of the third year, the student has completed 38.7 or more units and satisfied all other college requirements.

Students must be accepted to Northwestern to be eligible for admission to ISP, which requires a separate application to the program director. For more information on admission procedures, see Special Admission

Programs (p. 10). Also see the ISP website for the required AP and achievement tests.

The ISP curriculum consists of specially designed courses taught by faculty members of science and mathematics departments. Course descriptions are found in the appropriate departments in this catalog. Though listed in a three-year format, the program is often spread over four years, particularly if a student wishes to combine an ISP major with a second major in a traditional department, such as biological sciences, chemistry, computer science, environmental sciences, earth and planetary sciences, materials science, mathematics, neuroscience, physics, psychology, or in an engineering field. Specific second-major requirements for ISP students can be found on the program website and under individual departments in this catalog.

Program of Study

- Integrated Science Major (p. 279)

INTG_SCI 101-1 Computing Applications (0.5 Unit) Introduction to the formulation and solution of scientific problems using advanced computational programming methods.

INTG_SCI 101-2 Computing Applications (0.5 Unit) Introduction to the formulation and solution of scientific problems using advanced computational programming methods.

INTG_SCI 101-6 First-Year Seminar (1 Unit)

INTG_SCI 398-0 Undergraduate Research (1 Unit) Advanced independent study and research for superior students. Consent of ISP director required.

Integrated Science Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Major Requirements (25.7 units)	
<i>First Year</i>	
INTG_SCI 101-1 & INTG_SCI 101-2	Computing Applications and Computing Applications
CHEM 171-0 & CHEM 181-0 & CHEM 172-0 & CHEM 182-0	Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory and Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory
MATH 281-1 & MATH 281-2 & MATH 281-3	Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year
PHYSICS 125-1 & PHYSICS 125-2 & PHYSICS 125-3 & PHYSICS 126-1 & PHYSICS 126-2 & PHYSICS 126-3	General Physics ISP and General Physics for ISP and General Physics for ISP and Physics for ISP Laboratory and Physics for ISP Laboratory and Physics for ISP Laboratory
<i>Second Year</i>	
BIOL_SCI 240-0 & BIOL_SCI 220-0 & BIOL_SCI 241-0 & BIOL_SCI 221-0	Molecular and Cell Biology for ISP and Genetics and Molecular Processes Laboratory and Biochemistry for ISP and Cellular Processes Laboratory
CHEM 212-1 & CHEM 232-1	Organic Chemistry and Organic Chemistry Laboratory I

CHEM 348-0	Physical Chemistry for ISP
EARTH 350-0	Physics of the Earth
MATH 381-0	Fourier Analysis and Boundary Value Problems for ISP
MATH 382-0	Complex Analysis and Group Theory for ISP
PHYSICS 339-1 & PHYSICS 339-2	Quantum Mechanics and Quantum Mechanics
<i>Third Year</i>	
ASTRON 331-0	Astrophysics ISP
BIOL_SCI 323-0 or BIOL_SCI 341-0 or BIOL_SCI 361-0 or BIOL_SCI 390-0	Bioinformatics: Sequence and Structure Analysis Population Genetics Protein Structure and Function Advanced Molecular Biology
NEUROSCI 311-0	Biophysical Analysis of Neurons for ISP
PHYSICS 337-0 or PHYSICS 339-3	Physics of Condensed Matter Particle and Nuclear Physics
STAT 383-0	Probability and Statistics for ISP

Course Title
With permission, Undergraduate Research (INTG_SCI 398-0) may be substituted for up to 3 of the following courses:

ASTRON 331-0	Astrophysics ISP
BIOL_SCI 323-0 or BIOL_SCI 341-0 or BIOL_SCI 361-0 or BIOL_SCI 390-0	Bioinformatics: Sequence and Structure Analysis Population Genetics Protein Structure and Function Advanced Molecular Biology
MATH 382-0	Complex Analysis and Group Theory for ISP
NEUROSCI 311-0	Biophysical Analysis of Neurons for ISP
PHYSICS 337-0 or PHYSICS 339-3	Physics of Condensed Matter Particle and Nuclear Physics
STAT 383-0	Probability and Statistics for ISP

Honors in Integrated Science

Students eligible to pursue honors based on their overall performance in ISP courses will be so informed no later than fall quarter of senior year. Those who choose to pursue honors must then enroll with a faculty research adviser in at least 2 quarters of Undergraduate Research either in ISP (INTG_SCI 398-0) or an ISP-affiliated department (some of these credits may count toward the major; see the program director for details). At the beginning of May eligible students submit a senior thesis describing their research activities for consideration by the ISP committee.

Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information consult the program director and see Honors in the Major (p. 178).

International Studies

internationalstudies.northwestern.edu

International studies is an undergraduate adjunct major taken in conjunction with a disciplinary major. It complements other Weinberg majors with a broad perspective on global issues. It is open to students in all schools.

The adjunct major provides students with a platform for interdisciplinary understanding of international affairs in connection with contemporary politics and society. Students are required to take a core set of courses in

history, economy and markets, and US foreign policy that are designed to introduce key elements and concepts related to global and international issues. Each student also chooses a thematic concentration, 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 2-quarter honors seminar.

Each student majoring in international studies has a different combination of courses. Because international studies majors must show a minimum of 8 courses not double-counted in any other major(s), students should see an international studies adviser when designing their programs.

Programs of Study

- International Studies Adjunct Major (p. 280)
- International Studies Minor (p. 281)

INTL_ST 290-0 Topics in International Studies (1 Unit) Topics vary. Augments offerings of departments. *Social Behavioral Sciences Distro Area*

INTL_ST 390-0 Special Topics in International Studies (1 Unit) Topics vary. Augments offerings of departments.

INTL_ST 390-SA Special Topics in International Studies (1 Unit) Topics vary. Augments offerings of departments.

INTL_ST 393-SA Development in the Global Context: Participation, Power, and Social Change (1-3 Units) Central debates and issues of international development. Global poverty, development goals, alternative approaches, participation, scale, sustainability, power, evaluation, and social change. Restricted to students in the Global Engagement Studies Institute program. *Social Behavioral Sciences Distro Area*

INTL_ST 395-0 Integrating Project Seminar (1 Unit) Small research seminars allow international studies majors to conduct research in their chosen themes.

INTL_ST 398-1 Honors Seminar (1 Unit) Two consecutive quarters (fall and winter) during which students work on their senior theses. Admission by written application to the program director.

INTL_ST 398-2 Honors Seminar (1 Unit) Two consecutive quarters (fall and winter) during which students work on their senior theses. Admission by written application to the program director.

INTL_ST 399-0 Independent Research (1 Unit) Advanced research is carried out under the supervision of a Northwestern professor. Independent study may count 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.

International Studies Adjunct Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

The major in International Studies is a gateway to the study of global affairs in Weinberg College. Its mission is to encourage and support student education and scholarship in international affairs and it is open to all Weinberg students and to students from across the university. In addition to the curriculum set out below, International Studies offers

weekly seminars, research support, career counseling, public events, and more.

Adjunct Major Requirements (10 units)

- 5 core courses

Course	Title
HISTORY 250-1	Global History: Early Modern to Modern Transition
HISTORY 250-2	Global History: The Modern World
HISTORY 319-0	History of US Foreign Relations
or POLI_SCI 344-0	U.S. Foreign Policy
or JOUR 353-0	Dilemmas of American Power
ECON 201-0	Introduction to Macroeconomics
or SOCIOL 215-0	Economy and Society
POLI_SCI 240-0	Introduction to International Relations

- 4 courses (except where noted) in a thematic concentration. More information about the concentrations and lists of eligible courses may be found each quarter at the program office and on the International Studies website (<https://www.internationalstudies.northwestern.edu>).
 - Global Humanities
 - Political Economy
 - Borders, Boundaries, and Crossings
 - Global Law and Society
 - The U.S. and the World
 - World Language and Experience - requires six units of training in a language beyond coursework satisfying the International Studies foreign language study requirement, plus study abroad or comparable foreign experience.
 - Students who wish to propose a thematic program of study that does not fit into one of the themes listed above may petition to create a self-designed thematic cluster.
- 1 unit minimum of integrating project seminar or thesis seminar
 - Most international studies majors in their junior or senior year take INTL_ST 395-0 Integrating Project Seminar. The seminar provides a format to complete a research project that integrates a variety of disciplines to address an issue in international culture, society, economics, or politics.
 - Instead of an integrating seminar, students admitted to the international studies honors program participate in the 2-quarter thesis seminar (INTL_ST 398-1 & INTL_ST 398-2) and write an integrated honors thesis.
- Foreign language study requirement. Students must take at least three foreign-language courses at Northwestern. These may also count toward the Weinberg College language proficiency requirement and are not subject to double-counting restrictions with other majors or minors.
- All adjunct majors require completion of a stand-alone major as well. At most 2 of the 10 required units may be double-counted toward both the international studies adjunct major and another major.

Honors in International Studies

Majors with strong academic records and an interest in pursuing honors should apply in spring quarter of junior year. Students accepted into the honors program enroll in a 2-quarter seminar (INTL_ST 398-1, INTL_ST 398-2) in fall and winter of senior year, during which they plan, research, and write their theses. The two seminar enrollments take the

place of the integrating project seminar required of other international studies majors.

Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information contact the International Studies Program (<https://www.internationalstudies.northwestern.edu>), and see Honors in the Major (p. 178).

International Studies Minor

Minor Requirements (8 units)

Students who minor in International Studies must take four courses chosen from a list of core courses, and complete one concentration of at least four courses. Though students completing the minor are not required to take a capstone seminar or complete the language requirement, Weinberg College or other school foreign language requirements may still apply.

- 4 core courses chosen from:

Course	Title
HISTORY 250-1	Global History: Early Modern to Modern Transition
HISTORY 250-2	Global History: The Modern World
HISTORY 319-0	History of US Foreign Relations
or POLL_SCI 344-0	U.S. Foreign Policy
or JOUR 353-0	Dilemmas of American Power
ECON 201-0	Introduction to Macroeconomics
or SOCIOL 215-0	Economy and Society
POLL_SCI 240-0	Introduction to International Relations

- 4 courses (except where noted) in a thematic concentration. More information about the concentrations and lists of eligible courses may be found each quarter at the program office and on the International Studies website (<https://www.internationalstudies.northwestern.edu>).
 - Global Humanities
 - Political Economy
 - Borders, Boundaries, and Crossings
 - Global Law and Society
 - The U.S. and the World
 - World Language and Experience - requires six units of training in a language beyond coursework satisfying the International Studies foreign language study requirement, plus study abroad or comparable foreign experience.
 - Students who wish to propose a thematic program of study that does not fit into one of the themes listed above may petition to create a self-designed thematic cluster.

Italian

See French and Italian (p. 248).

Japanese

See Asian Languages and Cultures (p. 199).

Jewish Studies

jewish-studies.northwestern.edu

The Jewish Studies Program focuses not only on Judaism in its narrow sense as a religious phenomenon but also in its broader sense as a culture and civilization. A good case can be made that the roots of Western culture lie in two places: Athens and Jerusalem. The traditional education of the humanist scholar recognized this by requiring not only the mastery of Greek and Latin but also of Hebrew. Thus, the study of Judaism in this program considers the many and varied dimensions of the phenomenon of Jewish civilization. A typical program of study includes, in addition to the religious dimension, the historical, sociological, linguistic, philosophic, and artistic dimensions. The Jewish Studies Program offers a major and two minors: Jewish studies and Hebrew studies.

In addition to courses with the JWSH_ST prefix, Jewish Studies courses are offered by many departments and programs. The following is a sample; a list of courses being taught this academic year is available on the program website (<https://www.jewish-studies.northwestern.edu/undergraduate/courses/yearly-planner.html>):

- COMP_LIT 270-0 Literatures in Translation (relevant sections; consult with DUS)
- GNDR_ST 382-0 Race, Gender, and Sexuality (relevant sections; consult with DUS)
- GERMAN 234-1 Jews and Germans: An Intercultural History I
- GERMAN 234-2 Jews and Germans: An Intercultural History II
- HISTORY 203-1 Jewish History 750-1492
- HISTORY 203-2 Jewish History 1492-1789
- HISTORY 203-3 Jewish History 1789-1948
- HISTORY 347-0 Christians and Jews
- HISTORY 348-1 Jews in Poland, Ukraine, and Russia
- HISTORY 348-2 Jews in Poland, Ukraine, and Russia
- HISTORY 349-0 History of the Holocaust
- HISTORY 392-0 Topics In History (relevant sections; consult with DUS)
- HISTORY 395-0 Research Seminar (relevant sections; consult with DUS)
- POLI_SCI 357-SA Political Economy of Israel
- POLI_SCI 395-0 Political Research Seminar (relevant sections; consult with DUS)
- RELIGION 220-0 Introduction to Hebrew Bible
- RELIGION 230-0 Introduction to Judaism
- RELIGION 329-0 Topics in the Bible (relevant sections; consult with DUS)
- RELIGION 330-0 Varieties of Ancient Judaism
- RELIGION 332-0 Modern Jewish Thought
- RELIGION 333-0 Judaism in the Modern World
- RELIGION 339-0 Topics in Judaism
- RELIGION 374-0 Contemporary Religious Thought (relevant sections; consult with DUS)

• RELIGION 379-0 Topics in Comparative Religion (relevant sections; consult with DUS)

• SPANISH 397-0 Topics in Latin American, Latina and Latino, and Iberian Literatures and Cultures (relevant sections; consult with DUS)

Programs of Study

- Jewish Studies Major (p. 283)
- Hebrew Studies Minor (p. 284)
- Jewish Studies Minor (p. 284)

Below see also Hebrew Courses (p. 282) and Yiddish Courses (p. 283). In addition, please see relevant courses listed by other academic units here (p. 281).

Jewish Studies Courses

JWSH_ST 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

JWSH_ST 210-0 Jewish Studies: An Overview (1 Unit) Introduction to the field of Jewish studies. Methodologies used to research and analyze Jewish culture, history, and religion. *Ethics Values Distro Area*

JWSH_ST 242-0 Imagining Modern Jewish Culture in Yiddish and German (1 Unit) History and character of Yiddish and the development of modern German culture in general and German-Jewish culture in particular. Appreciation of the variety of "Judaisms" imagined and reimagined during modern European history. GERMAN 242-0 and JWSH_ST 242-0 are taught together; may not receive credit for both courses. *Literature Fine Arts Distro Area*

JWSH_ST 266-0 Introduction to Yiddish Culture: Images of the Shtetl (1 Unit) Analysis and discussion of the literary, visual, and filmic images of the communal life developed by Eastern European Jews and inseparably associated with them. GERMAN 266-0, JWSH_ST 266-0 and YIDDISH 266-0 taught together; students may receive credit for only one of these. *Literature Fine Arts Distro Area*

JWSH_ST 278-0 Modern Hebrew Literature in Translation (1 Unit) History of Hebrew literature. *Literature Fine Arts Distro Area*

JWSH_ST 279-0 Modern Jewish Literature (1 Unit) Modern European, American, and Israeli Jewish literature in historical context. *Literature Fine Arts Distro Area*

JWSH_ST 280-4 Topics in Israel Studies (1 Unit) Topics in Israel Studies: History, culture and society of the modern State of Israel. Content varies. May be repeated for credit with change of topic. Topics taught under this course number may be applied towards Weinberg College distribution requirement Area IV. *Historical Studies Distro Area*

JWSH_ST 280-5 Topics in Israel Studies (1 Unit) Topics in Israel Studies History, culture and society of the modern State of Israel. Content varies. May be repeated for credit with change of topic. Topics taught under this course number may be applied towards Weinberg College distribution requirement Area V. *Ethics Values Distro Area*

JWSH_ST 280-6 Topics in Israel Studies (1 Unit) Topics in Israel Studies: History, culture and society of the modern State of Israel. Content varies. May be repeated for credit with change of topic. Topics taught under this course number may be applied towards Weinberg College distribution requirement Area VI. *Literature Fine Arts Distro Area*

JWSH_ST 280-7 Topics in Israel Studies (1 Unit) Topics in Israel Studies: History, culture and society of the modern State of Israel. Content varies. Course number indicates distribution area towards which course counts. May be repeated for credit with change of topic.

JWSH_ST 350-0 Representing the Holocaust in Literature and Film (1 Unit) Analysis of artistic, ethical, and historical questions about representing the Holocaust in different genres. *Literature Fine Arts Distro Area*

JWSH_ST 366-0 Yiddish Culture and the Holocaust (1 Unit) Analysis of modern Yiddish literature before the Holocaust as well as literary work that emerged from Yiddish-speaking writers who survived the Second World War. GERMAN 366-0, JWSH_ST 366-0 and YIDDISH 366-0 taught together; may receive credit for only one course. Prerequisite: None. *Literature Fine Arts Distro Area*

JWSH_ST 379-0 Storytelling in American Jewish Literature (1 Unit) Modern Jewish writers from diverse national and linguistic backgrounds who have reshaped the oral tradition in Judaism to their individual talents. *Literature Fine Arts Distro Area*

JWSH_ST 390-0 Topics in Jewish Studies (1 Unit) Addresses topics not covered by other course offerings. Content varies.

JWSH_ST 396-0 Topics in Modern Jewish Culture (1 Unit) Analysis of major texts and figures in 20th and 21st century Jewish literature, with attention to their cultural context and import. *Literature Fine Arts Distro Area*

JWSH_ST 399-0 Independent Study (1 Unit) For majors selected as candidates for departmental honors. Consent of department is required to enroll.

Hebrew Courses

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

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

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

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

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

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

HEBREW 216-1 Hebrew III: Topics in Hebrew Literature (1 Unit) Reading Hebrew literature, some biblical but mostly modern prose. Compositions

and oral presentations. Prerequisite: HEBREW 121-3 or equivalent.
Literature Fine Arts Distro Area

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

HEBREW 216-3 Hebrew III: Topics in Hebrew Literature (1 Unit) Reading Hebrew literature, some biblical but mostly modern prose. Compositions and oral presentations. Prerequisite: HEBREW 121-3 or equivalent.
Literature Fine Arts Distro Area

HEBREW 316-1 Hebrew IV: Advanced Topics in Hebrew Literature (1 Unit) Literature Reading 20th-century Hebrew literature. Presentations, discussion, and essays in Hebrew. Prerequisite: HEBREW 216-3 or consent of instructor. *Literature Fine Arts Distro Area*

HEBREW 316-2 Hebrew IV: Advanced Topics In Hebrew Literature (1 Unit) Literature Reading 20th-century Hebrew literature. Presentations, discussion, and essays in Hebrew. Prerequisite: HEBREW 216-3 or consent of instructor. *Literature Fine Arts Distro Area*

HEBREW 316-3 Advanced Topics in Hebrew Literature (1 Unit) Literature Reading 20th-century Hebrew literature. Presentations, discussion, and essays in Hebrew. Prerequisite: HEBREW 216-3 or consent of instructor.
Literature Fine Arts Distro Area

HEBREW 399-0 Independent Study (1 Unit) For students who have advanced with distinction beyond the regular course offerings in Hebrew. Prerequisite: consent of instructor.

Yiddish Courses

YIDDISH 266-0 Introduction to Yiddish Culture: Images of the Shtetl (1 Unit) Analysis and discussion of the literary, visual, and filmic images of the communal life developed by Eastern European Jews and inseparably associated with them. GERMAN 266-0, JWSH_ST 266-0 and YIDDISH 266-0 taught together; students may receive credit for only one of these. *Literature Fine Arts Distro Area*

YIDDISH 366-0 Yiddish Culture and the Holocaust (1 Unit) Analysis of modern Yiddish literature before the Holocaust as well as literary work that emerged from Yiddish-speaking writers who survived the Second World War. GERMAN 366-0, JWSH_ST 366-0 and YIDDISH 366-0 taught together; may receive credit for only one course. Prerequisite: None.
Literature Fine Arts Distro Area

YIDDISH 399-0 Independent Study (1 Unit) Prerequisite: Consent of instructor.

Jewish Studies Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Prerequisite

- Complete or place out of :

Course	Title
HEBREW 121-1 & HEBREW 121-2 & HEBREW 121-3	Hebrew II and Hebrew II and Hebrew II

Major Requirements (12 units)

- 2 courses chosen from third-year Hebrew (HEBREW 216-1, HEBREW 216-2, HEBREW 216-3), courses in the Department of Religious Studies on classical Jewish texts in Hebrew, or courses in Hebrew literature read in Hebrew.
- RELIGION 230-0 Introduction to Judaism
- 1 course covering the biblical period, such as RELIGION 220-0 Introduction to Hebrew Bible
- 1 course covering the rabbinic period
- 2 courses covering the post-rabbinic periods (post-800 CE), such as:

Course	Title
HISTORY 203-1	Jewish History 750-1492
HISTORY 203-2	Jewish History 1492-1789
HISTORY 348-1	Jews in Poland, Ukraine, and Russia
HISTORY 348-2	Jews in Poland, Ukraine, and Russia
HISTORY 349-0	History of the Holocaust

- 5 additional courses counting for major or minor credit in Jewish studies; may include third-year courses in Hebrew and Yiddish
- At least 6 courses must be at the 300 level.
- At least 1 must be from the history department.
- At least 1 must be in literature.

Honors in Jewish Studies

Majors with strong academic records and an interest in pursuing honors should submit a written proposal in spring quarter of junior year. Accepted students take JWSH_ST 399-0 Independent Study with their thesis adviser in fall and winter of senior year; 1 quarter may count toward the major. Alternatively, students may enroll in a 3-quarter-long seminar in a relevant department. Those interested in this option should consult with the relevant department, the anticipated thesis adviser, and the director of undergraduate studies.

Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information contact the director of undergraduate studies and see Honors in the Major (p. 178).

Relevant Courses in Other Departments

Additional Jewish studies courses are offered by many departments and programs. This list below is partial and in some cases, only certain sections of a course may count toward Jewish Studies. Please see the Jewish Studies website for up-to-date information and/or consult with the DUS.

Course	Title
COMP_LIT 270-0	Literatures in Translation
GNDR_ST 382-0	Race, Gender, and Sexuality (relevant sections)
GERMAN 234-1	Jews and Germans: An Intercultural History I
GERMAN 234-2	Jews and Germans: An Intercultural History II
HISTORY 203-1	Jewish History 750-1492
HISTORY 203-2	Jewish History 1492-1789
HISTORY 203-3	Jewish History 1789-1948
HISTORY 348-1	Jews in Poland, Ukraine, and Russia
HISTORY 348-2	Jews in Poland, Ukraine, and Russia
HISTORY 349-0	History of the Holocaust
HISTORY 347-0	Christians and Jews
HISTORY 392-0	Topics In History (relevant sections)

HISTORY 395-0	Research Seminar
POLI_SCI 357-SA	Political Economy of Israel
POLI_SCI 395-0	Political Research Seminar (relevant sections)
RELIGION 220-0	Introduction to Hebrew Bible
RELIGION 230-0	Introduction to Judaism
RELIGION 329-0	Topics in the Bible (relevant sections)
RELIGION 330-0	Varieties of Ancient Judaism
RELIGION 332-0	Modern Jewish Thought
RELIGION 333-0	Judaism in the Modern World
RELIGION 339-0	Topics in Judaism
RELIGION 374-0	Contemporary Religious Thought (relevant sections)
RELIGION 379-0	Topics in Comparative Religion (relevant sections)
SPANISH 397-0	Topics in Latin American, Latina and Latino, and Iberian Literatures and Cultures (relevant sections)

Hebrew Studies Minor

Prerequisite

Complete or place out of:	
Course	Title
HEBREW 121-1 & HEBREW 121-2 & HEBREW 121-3	Hebrew II and Hebrew II and Hebrew II

Minor Requirements (6 units)

2 courses conducted in Hebrew—for example, third-year Hebrew:	
Course	Title
HEBREW 216-1 & HEBREW 216-2 & HEBREW 216-3	Hebrew III:Topics in Hebrew Literature and Hebrew III: Topics in Hebrew Literature and Hebrew III: Topics in Hebrew Literature
1 course on a classical Hebrew text read in Hebrew (eligible courses are typically on biblical, rabbinic, or mystical texts, such as RELIGION 329-0 Topics in the Bible or RELIGION 339-0 Topics in Judaism)	
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; in Israel studies; in the Department of Linguistics relevant to Semitic languages; covering classical Hebrew texts in translation or in the original; or conducted in Hebrew. e.g.:	
Course	Title
HEBREW 216-1 & HEBREW 216-2 & HEBREW 216-3	Hebrew III:Topics in Hebrew Literature and Hebrew III: Topics in Hebrew Literature and Hebrew III: Topics in Hebrew Literature
HEBREW 316-1 & HEBREW 316-2 & HEBREW 316-3	Hebrew IV: Advanced Topics in Hebrew Literature and Hebrew IV: Advanced Topics In Hebrew Literature and Advanced Topics in Hebrew Literature

- At least 2 of the 6 courses must be at the 300 level.

Jewish Studies Minor

Minor Requirements (7 units)

3 courses in Jewish history that provide a basis for advanced work	
1 course on ancient or biblical Judaism, such as RELIGION 220-0 Introduction to Hebrew Bible	
1 approved course on the history or culture of the Jewish people in the Middle Ages, such as HISTORY 203-1 Jewish History 750-1492	
1 approved course on some aspect of modern Jewish history, such as HISTORY 203-2 Jewish History1492-1789 or HISTORY 348-2 Jews in Poland, Ukraine, and Russia	
2 courses on Jewish religion offered in the Department of Religious Studies or approved by the director of undergraduate studies; eligible courses include:	

Course	Title
RELIGION 230-0	Introduction to Judaism
RELIGION 332-0	Modern Jewish Thought
RELIGION 333-0	Judaism in the Modern World
RELIGION 339-0	Topics in Judaism

- 2 additional approved courses chosen from the fields of Jewish literature; Jewish philosophy or theology; or the sociology/ anthropology of Jewish communities.
- At least 5 of the courses may not be double-counted toward a major.
- Students who also satisfactorily complete two years of language study in Hebrew complete the minor requirements with 5 courses:
 - 3 in Jewish history
 - 1 in religion
 - 1 in Jewish literature or philosophy

Korean

See Asian Languages and Cultures (p. 199).

Latin

See Classics (p. 219).

Latin American and Caribbean Studies

lacs.northwestern.edu

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 Undergraduate Learning Abroad (<https://www.northwestern.edu/abroad>).

Program of Study

- Latin American and Caribbean Studies Minor (p. 285)

LATIN_AM 101-6 First-Year Seminar (1 Unit) WCAS First-Year Seminar

LATIN_AM 391-0 Topics in Latin American and Caribbean Studies (1 Unit) An interdisciplinary introduction to significant topics in Latin American and Caribbean studies. Content varies from year to year; may be repeated for credit with a different topic.

Latin American and Caribbean Studies Minor

All students in the program are expected to have an effective reading knowledge of Spanish, Portuguese, or another language spoken in the region. Students who would like more information about the minor should contact the program director.

Course	Title
Minor Requirements (8 units)	
4 core courses, normally chosen from the following lists, although substitutions may be approved by the program director. At most 1 core course may come from each of the 5 areas.	
Anthropology (p. 285)	
History (p. 285)	
Latina and Latino Studies (p. 285)	
Political Science (p. 285)	
Portuguese and Spanish (p. 285)	
4 additional courses on Latin America and the Caribbean	
Courses must be chosen from the list on the program website or approved by the program director. Many departments and programs, especially anthropology, history, Latina and Latino studies, political science, and Spanish and Portuguese, regularly offer courses that can count toward this requirement.	
1 course focusing on Latina/os in the United States is strongly recommended for students who do not take a LATINO core course.	

- At most 2 LATINO courses may be counted toward the minor.
- At least 5 courses for the minor must not be double-counted toward a major.

Core Course Areas

Anthropology

Course	Title
When relevant to Latin America, the Caribbean, and/or US Latina/os:	
ANTHRO 390-0	Topics In Anthropology
ANTHRO 490-0	Topics in Anthropology

History¹

Course	Title
HISTORY 260-1	History of Latin America in the Colonial Period 1492-1821
HISTORY 260-2	History of Latin America in the Modern Period, 1789-present
HISTORY 366-0	Race and Nation in the Independence Era
HISTORY 367-0	History of Modern Brazil
HISTORY 368-1	Revolution in 20th Century Latin America: Mexico and its Revolutions
HISTORY 368-2	Revolution in 20th Century Latin America: Marxist Revolutions
HISTORY 369-0	Development and Inequality in Modern Latin America

¹ HISTORY 300-0 New Lectures in History and HISTORY 392-0 Topics In History may also count toward this requirement when topic is relevant to Latin America or the Caribbean.

Latina and Latino Studies

Course	Title
LATINO 201-0	Introduction to Latina and Latino Studies
LATINO 203-0	Introduction to Latina & Latino Cultural Studies
LATINO 218-0	Latina & Latino History
LATINO 222-0	Latina & Latino Youth in U.S. Cities
LATINO 277-0	Introduction to Latina and Latino Literature
LATINO 342-0	Latina and Latino Social Movements
LATINO 391-0	Topics in Latina and Latino History
LATINO 392-0	Topics in Latina and Latino Social and Political Issues
LATINO 393-0	Topics in Latina and Latino Text and Representation

Political Science

Course	Title
POLI_SCI 353-0	Politics of Latin America

Portuguese and Spanish

Course	Title
PORT 396-0	Topics in Lusophone Cultures ²
SPANISH 231-0	The "New" Latin American Narrative
SPANISH 260-0	Literature in Latin America before 1888
SPANISH 261-0	Literature in Latin America since 1888
SPANISH 361-0	Latin America: Studies in Culture and Society
SPANISH 395-0	Topics in Latin American, Latina and Latino, and/or Iberian Cultures ²
SPANISH 397-0	Topics in Latin American, Latina and Latino, and Iberian Literatures and Cultures ²

² When relevant to Latin America, the Caribbean, and/or US Latina/os.

Latina and Latino Studies

latinostudies.northwestern.edu

Latina and Latino Studies focuses on the historic and contemporary circumstances that shape Latina and Latino lives, spaces, subjectivities, and politics in the United States. This field encompasses diverse communities and nationalities while also offering critical attention to transnational dynamics or to how Latinas and Latinos relate and connect to cultural or geographical origins across the Americas. Similar to other race/ethnic studies fields, Latina and Latino Studies has origins outside of universities. To a large extent, it originated in social movements led by organizers, thinkers, artists, students, workers and teachers who were opposed to legacies of racial injustice, ethnic prejudice, exploitation, criminalization and neglect. Latina and Latino Studies represents the academic branch of this dynamic political culture. As an interdisciplinary field, it sustains this activist impulse by honoring the diverse mediums and methods through which Latinas and Latinos have advocated for social justice and dignity. Latina and Latino Studies produces ways of knowing and seeing that challenge normative and stereotypical representations of Latinas and Latinos in U.S. society. In solidarity with other race/ethnic studies interdisciplines, Latina and Latino Studies unsettles traditional and Eurocentric modes of knowledge production in order to recuperate, speculate and illuminate other possible worlds.

Our courses particularly explore: political economies, decolonial thought, expressive cultures, histories, inter- and intra-group dynamics, social movements, race and racialization, critical analysis of gender and sexuality, transnational processes, electoral politics, indigeneity

and settler colonialism, slavery and anti-blackness, nepantla and border thought, and critical interrogations of heteropatriarchy.

Majors and minors meet with the Advisor for advising, including review and approval of course selections and review of progress toward timely completion of the major or minor.

Programs of Study

- Latina and Latino Studies Major (p. 286)
- Latina and Latino Studies Minor (p. 287)

LATINO 101-6 First-Year Seminar (1 Unit) Open to first-year students in Weinberg College. *WCAS First-Year Seminar*

LATINO 201-0 Introduction to Latina and Latino Studies (1 Unit)
Introduction to major themes and debates shaping US Latina/o communities, such as history of colonization, diverse ethnicities, debates on immigration, racialization, assimilation, and cultural resistance. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

LATINO 203-0 Introduction to Latina & Latino Cultural Studies (1 Unit)
Introduction to representations of identity and difference through literary theories and cultural studies. Draws on diverse cultural texts such as literature, popular music, folklore, journalism, media, visual culture, and performance arts. *Literature Fine Arts Distro Area*

LATINO 218-0 Latina & Latino History (1 Unit) History of Latinas/os in the United States and in the context of US-Latin American relations from the 18th century to the present. HISTORY 218-0 and LATINO 218-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

LATINO 222-0 Latina & Latino Youth in U.S. Cities (1 Unit) Cultural, social, and political contexts that shape the lives of Latina/o youth in US cities, as well as Latina/o youths' ideas of self-identity and civic engagement. *Social Behavioral Sciences Distro Area*

LATINO 277-0 Introduction to Latina and Latino Literature (1 Unit)
Survey of major writers and movements from Spanish colonial era to the present, covering a range of genres and ethnicities. Taught with ENGLISH 277-0 and SPANISH 277-0; may receive credit for only 1 of these courses. *Literature Fine Arts Distro Area*

LATINO 342-0 Latina and Latino Social Movements (1 Unit) Histories and ideologies of various US Latina/o social movements. Draws upon historical, ethnographic, autobiographical, and documentary accounts. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

LATINO 391-0 Topics in Latina and Latino History (1 Unit) Historical approach to US Latina/o lives and communities, such as history of Latina/o Chicago, labor history, and immigration. Content varies; may be repeated for credit with different topic. *Historical Studies Distro Area*

LATINO 392-0 Topics in Latina and Latino Social and Political Issues (1 Unit) Social and political issues affecting US Latina/o communities. May include quantitative or qualitative methods, or both. Topics may include electoral politics, immigration, and race and demography. Content varies; may be repeated for credit with different topic. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

LATINO 393-0 Topics in Latina and Latino Text and Representation (1 Unit) The politics of representation in mainstream and Latina/o media, literature, visual culture, popular music, and performance arts. Content varies; may be repeated for credit with different topic. *Literature Fine Arts Distro Area*

LATINO 395-0 Capstone Seminar in Latina & Latino Studies (1-3 Units)
Advanced course synthesizing the state of current research. Questions the boundaries of Latina/o studies. Contextualizes research and topics in relation to other ethnic studies, gender/queer studies, and diaspora studies. Primarily for majors and graduate students. Prerequisite: consent of the program director.

LATINO 399-0 Independent Study in Latina and Latino Studies (1 Unit)
Reading, research, and/or tutorials for students pursuing projects outside the context of regularly offered courses. Prerequisite: consent of instructor.

Latina and Latino Studies Major

The major consists of 12 courses plus a related immersion experience. All must be selected in consultation with the Advisor.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

12 Required courses for the major:

- **1 introductory course:** *Either* LATINO 201-0 Introduction to Latina and Latino Studies *or* LATINO 203-0 Introduction to Latina & Latino Cultural Studies. *If students take both, only one will count towards the major.*
- **1 senior-year seminar:** LATINO 395-0 Capstone Seminar in Latina & Latino Studies. All majors are required to enroll.
- **7 core courses in Latina and Latino Studies:**
 - Up to three can be selected from 200 level courses. The remainder must be 300 level courses.
 - One of these core courses must have a focus on history.
 - One of these core courses must have a focus on gender and/or sexuality.
- **3 courses in comparative race and ethnic studies:**
 - Two courses must address the experiences of indigenous populations or other racialized groups in the U.S.
 - One course can address peoples or places in Latin America and/or the Caribbean.
 - At least two courses must be at the 300 level.
 - Courses are typically drawn from, but not limited to, African American Studies, Asian American Studies, Native American and Indigenous Studies, Latin American and Caribbean Studies or American Studies.

Required Immersion Experience

All majors must have an immersion experience with Latina and Latino communities in the United States or a transnational counterpart. Courses for the immersion experience may double-count toward elective and required courses for the major with permission of advisor.

Examples of immersion experiences include but are not limited to:

- Study abroad in Mexico or Latin America
- Chicago Field Studies (p. 218)

- Senior thesis in Latina and Latino Studies
- Independently proposed research or internship
- Civic Engagement Capstone Research Project (SESP 299-1 & SESP 299-2) if it relates to Latina/o communities
- Youth Participatory Action Research
- 2 performance-based courses in theater, dance, communication, sound design or performance with a US Latina/o focus.

Independent Study in Latina and Latino Studies

Students may work on an approved independent study or thesis in Latina and Latino Studies under the supervision of a faculty member (LATINO 399-0 Independent Study in Latina and Latino Studies). Students must submit a proposal, including a reading list, to the program director and receive confirmation from the faculty member supervising the independent study. Seniors may complete a senior thesis regardless of whether or not they qualify for honors nomination.

Honors in Latina and Latino Studies

Majors with strong academic records and an interest in pursuing honors should apply by the end of junior year. The application includes a project proposal and approval from a faculty thesis adviser, who may be from another department. Accepted students complete a senior thesis or project through 2 quarters of independent study (LATINO 399-0 Independent Study in Latina and Latino Studies). Taken in fall and spring of senior year, both quarters of LATINO 399-0 may count toward the major requirements.

Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information see the Latina and Latino Studies Honors (<http://www.latinostudies.northwestern.edu/undergraduate/honors.html>) and Honors in the Major (p. 178).

Latina and Latino Studies Minor

6 Required courses for the minor:

- **1 Introductory course:** *Either* LATINO 201-0 Introduction to Latina and Latino Studies *or* LATINO 203-0 Introduction to Latina & Latino Cultural Studies. *If students take both, only one will count towards the minor.*
- **3 core courses in Latina and Latino Studies:**
 - One course must have a focus on Latina and Latino histories (HISTORY 218-0 or LATINO 218-0; relevant sections of LATINO 391-0)
 - One course must have a focus on Latina and Latino genders and/or sexualities
- **2 courses in comparative race and ethnic studies:**
 - One course must address the experiences of indigenous populations or other racialized groups in the U.S.
 - One course can address peoples or places in Latin America and/or the Caribbean

Courses must be selected with the program director or director of undergraduate studies from an approved list. At least 3 courses must be at the 300 level.

Legal Studies

legalstudies.northwestern.edu

The Legal Studies program promotes the interdisciplinary study of law, legal institutions, and legal processes from social science and humanities perspectives. It is not a “prelaw” program; instead, it examines how legal institutions, actors, and processes fit within a broader social context. In this conception, the law is a social institution that warrants study in its own right and provides an excellent lens through which students may critically examine a variety of themes central to other disciplines (such as race and ethnicity, class, gender, inequality, social change, governance, politics, and culture). The program also prepares students to conduct empirical research and theoretical inquiries across a broad range of contemporary and historical subjects that implicate law.

Programs of Study

- Legal Studies Major (p. 288)
- Legal Studies Minor (p. 289)

LEGAL_ST 101-6 First-Year Seminar (1 Unit) Open to first-year students in Weinberg College; can satisfy at most 1 credit towards major or minor requirements in Legal Studies. *WCAS First-Year Seminar*

LEGAL_ST 206-0 Law and Society (1 Unit) Introduction to the role of law in American society. Relationship of law, inequality, and social change. Changes in legal institutions: the courts, the legal profession, and legal services for the poor. Taught with SOCIOL 206-0; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

LEGAL_ST 207-0 Legal Studies Research Methods (1 Unit) Introduction to research methodologies used in interdisciplinary legal studies, including jurisprudence and legal reasoning, qualitative and quantitative social science methods, and historical and textual analysis. LEGAL_ST 207-0 and SOCIOL 227-0 are taught together; may not receive credit for both courses. Prerequisite: LEGAL_ST 206-0. *Social Behavioral Sciences Distro Area*

LEGAL_ST 276-0 Introductory Topics in Legal Studies (1 Unit) May be repeated for credit with different topics.

LEGAL_ST 305-0 American Immigration (1 Unit) Themes in history of immigration, especially from Europe, Latin America, and Asia. Law, racial formation, acculturation, transnational and international contexts, competing notions of citizenship. HISTORY 305-0 and LEGAL_ST 305-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

LEGAL_ST 308-0 Sociology of Law (1 Unit) Sociological analysis of legal institutions such as courts, the police, and lawyers. Law, inequality, and social change. Taught with SOCIOL 318-0; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

LEGAL_ST 309-0 Political Theories of the Rule of Law (1 Unit) Key documents and debates in the development of theories of law and jurisprudence. From Aeschylus to contemporary democratic and legal theories and major court cases on topics ranging from torture to Title IX. POLI_SCI 309-0 and LEGAL_ST 309-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area*

LEGAL_ST 318-1 Legal and Constitutional History of the United States (1 Unit) Colonial period - 1850. Development of legal institutions,

constitutionalism, law and social change, law and economic development. Taught with HISTORY 318-1; may not receive credit for both courses. *Historical Studies Distro Area*

LEGAL_ST 318-2 Legal and Constitutional History of the United States: Since 1850 (1 Unit) 1850 - present. Law in industrial society: administration, race relations, corporations, environmental protection, civil liberties. Taught with HISTORY 318-2; may not receive credit for both courses. *Historical Studies Distro Area*

LEGAL_ST 330-0 U.S. Refugee Policy & Localities (1 Unit) Comparative understandings of refugee policies in liberal democracies and their relation to constitutional and human rights. Street level bureaucracy, constitutional governance, federalism, integration, refugee resettlement policy, citizenship and belonging. POLI_SCI 330-0 and LEGAL_ST 330-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

LEGAL_ST 332-0 Constitutional Law I (1 Unit) Introduction to interpretation of the US Constitution by the Supreme Court. Judicial review, federalism, congressional and executive authority, separation of powers. Taught with POLI_SCI 332-0; may not receive credit for both courses. Prerequisite: POLI_SCI 220-0 or POLI_SCI 230-0. *Social Behavioral Sciences Distro Area*

LEGAL_ST 333-0 Constitutional Law II (1 Unit) Consideration of US Supreme Court decisions dealing with civil and political rights, including equality, freedom of speech and religion, and criminal procedures. LEGAL_ST 333-0 and POLI_SCI 333-0 are taught together; may not receive credit for both courses. Prerequisite: POLI_SCI 220-0 or POLI_SCI 230-0. *Social Behavioral Sciences Distro Area*

LEGAL_ST 340-0 Gender and the Law (1 Unit) Examination of the changing role of law in governing gender and sexual relations in America. Legal definitions of gender and sexuality in the household, the marketplace, and the state. GNDR_ST 340-0 and LEGAL_ST 340-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

LEGAL_ST 342-0 International Organizations (1 Unit) Institutions that govern the interactions of states, including the WTO, UN, ICJ, and ICC; informal norms, such as international intervention, international criminal law, and sovereignty. POLI_SCI 342-0 and LEGAL_ST 342-0 are taught together; may not receive credit for both courses. Prerequisite: POLI_SCI 240-0 or consent of instructor. *Social Behavioral Sciences Distro Area*

LEGAL_ST 347-0 Comparative Race & Ethnicity (1 Unit) Comparative history of Latinos, Asian Americans, African Americans, and white ethnics in the 20th century United States; role of law, politics, and society in shaping and being shaped by racial and ethnic categories. *Historical Studies Distro Area*

LEGAL_ST 348-0 Race, Politics, and the Law (1 Unit) Current role of race and racism from multiple disciplinary perspectives. Application to contemporary legal and political issues. How law deals with racial inequality. LEGAL_ST 348-0 and SOCIOL 348-0 are taught together; may not receive credit for both courses. Prerequisite: LEGAL_ST 206-0, SOCIOL 206-0, SOCIOL 208-0, LEGAL_ST 308-0, or SOCIOL 318-0. *Social Behavioral Sciences Distro Area*

LEGAL_ST 350-0 Psychology and the Law (1 Unit) Examines the application of psychology to law, including topics such as the insanity

defense, criminal profiling, eyewitness testimony, and interrogation. Taught with PSYCH 340-0; may not receive credit for both courses. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

LEGAL_ST 356-0 Constitutional Challenges in Comparative Perspective (1 Unit) Constitutional controversies and resolutions in liberal democracies. Constitutional traditions and governance, rule of law, legitimacy and authority in diverse societies, human rights, social transformation. POLI_SCI 356-0 and LEGAL_ST 356-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

LEGAL_ST 376-0 Topics in Legal Studies (1 Unit) May be repeated for credit with different topics.

LEGAL_ST 381-0 Children and the Law (1 Unit) Examines from a developmental perspective research on children's involvement in the legal system as decision makers, witnesses, victims, and perpetrators. Taught with PSYCH 381-0; may not receive credit for both courses. Prerequisites: PSYCH 205-0, PSYCH 218-0. *Social Behavioral Sciences Distro Area*

LEGAL_ST 398-1 Advanced Research Seminar 1 (1 Unit) Exposure to theoretical and empirical approaches to the study of law and legal institutions in society; preparation of original thesis. Consecutive enrollment required in LEGAL_ST 398-2. Prerequisites: LEGAL_ST 207-0 and acceptance to program as major.

LEGAL_ST 398-2 Advanced Research Seminar 2 (1 Unit) Preparation and presentation of original thesis. Prerequisite: LEGAL_ST 398-1 within the same academic year.

LEGAL_ST 399-0 Independent Study (1 Unit) Readings and conferences on special subjects for students pursuing a specific area of interest in legal studies.

Legal Studies Major

The Legal Studies major is a 12-course program with 4 core legal studies courses, and 8 approved electives taught in legal studies or drawn from other departments.

Admission to the major is by application only; see the program website (<http://www.legalstudies.northwestern.edu>) for application details. Before applying, students must complete or be in the process of completing LEGAL_ST 206-0 Law and Society and at least 1 approved elective. Students typically apply for the major in the first or second year.

All legal studies majors complete the advanced research seminar sequence (LEGAL_ST 398-1 & LEGAL_ST 398-2) and prepare a thesis as part of the course requirements. LEGAL_ST 398-1 and LEGAL_ST 398-2 must be taken in consecutive quarters, and are typically taken in the third or fourth year (as a junior or senior).

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Major Requirements (12 units)	
4 core courses:	
LEGAL_ST 206-0	Law and Society (required for admission to the major)
LEGAL_ST 207-0	Legal Studies Research Methods

LEGAL_ST 398-1 Advanced Research Seminar 1
& LEGAL_ST 398-2 and Advanced Research Seminar 2 (taken during
junior or senior year)

8 approved electives taught in legal studies or drawn from other departments

- Approved electives are listed on the program website (<http://www.legalstudies.northwestern.edu>) each quarter.
- POLI_SCI 230-0 Introduction to Law in the Political Arena is strongly recommended.
- At most 2 Chicago Field Studies (p. 218) credits may be counted with permission of the legal studies adviser.

Honors in Legal Studies

Those whose theses and grades meet program criteria are recommended to the college for graduation with honors; students do not need to formally apply for consideration. For more information consult the program director and see Honors in the Major (p. 178).

Legal Studies Minor Minor Requirements (6 units)

- 1 core course: LEGAL_ST 206-0 Law and Society (required to declare the minor)
- 5 approved electives taught in legal studies or drawn from other departments
 - At least 3 courses must be at the 300 level.
 - At most 2 Chicago Field Studies (p. 218) credits may be counted with permission of the legal studies adviser.

Approved electives are listed on the program website (<http://www.legalstudies.northwestern.edu>) each quarter.

Linguistics

linguistics.northwestern.edu

Linguistics is the scientific study of language, its structure and function as a means of communication, its acquisition, and the mental and physiological processes involved in its use. Knowledge of the structure, origins, and functions of language can provide deep insight into human nature and behavior. The major in linguistics prepares students for professional studies in law, medicine, technology, data science, 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 theories, research methods and current research developments in various subfields.

Linguistics majors are encouraged to participate in faculty research and to develop independent research. Students often enhance their linguistics major through interdisciplinary studies in cognitive science, communication sciences and disorders, psychology, philosophy, international studies, mathematics, or computer science. Students with a strong record in their major courses and an interest in pursuing linguistics at the graduate level are encouraged to enroll in 400-level courses.

Programs of Study

- Linguistics Major (p. 291)
- Linguistics Minor (p. 291)
- Linguistics BA/MA (p. 291)

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.

LING 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

LING 220-0 Language and Society (1 Unit) Introduction to linguistic variation and change from a variety of perspectives on social processes. How language can be connected with social group membership and viewed as a tool used in social practice to construct identity. These issues are explored through the quantitative analysis of linguistic variation in a social context. *Social Behavioral Sciences Distro Area*

LING 221-0 Language and Prejudice (1 Unit) Exploration of attitudes toward different accents, dialects, and speech styles in the US context. The relation between language and thought; how language may reflect or reinforce prejudice. Introduction to methods in linguistic research. *Ethics Values Distro Area*

LING 222-0 Language, Politics, and Identity (1 Unit) Role of language in constructing, preserving, and manipulating political and national identities. Topics include language discrimination, linguistic nationalism, language and religion, alphabet issues, dialect issues. Regional content varies. *Ethics Values Distro Area*

LING 223-0 Language and Gender (1 Unit) Exploration of socially significant differences in the language used by/about/to men and women, focusing on the role of language in constructing gender as part of local communities of practice. Taught with GNDR_ST 234-0; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

LING 243-0 Language Evolution (1 Unit) Introduction to linguistics from an evolutionary perspective. The biological basis of communicative systems; the evolution of the human language capacity; sounds, syntactic structures, and meanings in the world's languages. *Natural Sciences Distro Area*

LING 250-0 Sound Patterns in Human Language (1 Unit) Introduction to phonetics and phonology. Description and classification of speech sounds in terms of articulation, acoustics, and perception. Similarities and differences of sound patterns across languages. Introduction to speech technology. *Natural Sciences Distro Area*

LING 260-0 Formal Analysis of Words & Sentences (1 Unit) Formal structure of words (morphology) and sentences (syntax) in natural language. Biological basis of human language. *Formal Studies Distro Area*

LING 270-0 Meaning (1 Unit) How information is encoded in words and sentences and how speakers and listeners use language to communicate. *Formal Studies Distro Area*

LING 300-0 Topics in Linguistics (1 Unit) Topics in linguistic theory. Content varies. May be repeated for credit with different topic.

LING 311-0 Child Language (1 Unit) 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. *Social Behavioral Sciences Distro Area*

LING 315-0 Experimental Approaches to Word Form Processing (1 Unit) Experimental techniques and theoretical models for analyzing perception and production of spoken and written word forms. Access to the mental lexicon in perception and production. Prerequisite: LING 250-0 or consent of instructor. *Social Behavioral Sciences Distro Area*

LING 316-0 Experimental Syntax (1 Unit) Experimental methodologies and theories of sentence comprehension. Studies of syntactic structures in sentence comprehension. Prerequisite: LING 260-0 or consent of instructor. *Social Behavioral Sciences Distro Area*

LING 317-0 Experimental Pragmatics (1 Unit) Experimental methodologies for analyzing the role of context in utterance production and comprehension. Prerequisite: LING 270-0 or consent of instructor. *Social Behavioral Sciences Distro Area*

LING 320-0 Sociolinguistics (1 Unit) Overview of classic and contemporary work in sociolinguistics. How quantitative methods in linguistics can be coupled with social theoretic insights to engage questions in linguistic variation and change, stylistic practice, how language reflects, reinforces, or contests social inequalities. *Social Behavioral Sciences Distro Area*

LING 321-0 Bilingualism (1 Unit) Cognitive, linguistic, neuroscientific, and computational aspects of the acquisition, representation, and processing of two or more languages in an individual's mind/brain. Prerequisite: LING 250-0, LING 260-0, or LING 270-0. *Social Behavioral Sciences Distro Area*

LING 324-0 Linguistics and English Composition (1 Unit) Recent trends in the study of the uses and forms of writing and the processes of written composition. The learning and teaching of written language.

LING 327-0 Language and Sexuality (1 Unit) 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. GNDR_ST 327-0 and LING 327-0 are taught together; may not receive credit for both courses. Prerequisite: a course in linguistics or consent of instructor.

LING 330-0 Research Methods in Linguistics (1 Unit) Methods of linguistic data collection, management, and analysis with an emphasis on the use of computational, experimental, and statistical methods. *Social Behavioral Sciences Distro Area*

LING 332-0 Linguistic Field Methods (1 Unit) Collection of primary linguistic data from an unfamiliar language. Lexicon and grammar development focusing on phonology, morphology, and syntax. Prerequisite: LING 250-0, LING 260-0, or LING 270-0. *Social Behavioral Sciences Distro Area*

LING 334-0 Introduction to Computational Linguistics (1 Unit) Hands-on introduction to computational methods in empirical linguistic analysis and natural language processing. *Formal Studies Distro Area*

LING 336-0 Words, Networks and the Internet (1 Unit) Word networks and language on the Internet. Python tools for exploring spam, search

engines, and social media. Prerequisite: LING 330-0, LING 334-0, LING 361-0, or equivalent background. *Formal Studies Distro Area*

LING 340-0 Historical Linguistics (1 Unit) Introduction to the study of how and why language changes. Topics include the comparative method, the regularity of sound change, syntactic change, distant genetic relationships, and language evolution. *Historical Studies Distro Area*

LING 341-0 Language Typology (1 Unit) A comparison of varying and universal features of the world's languages. Prerequisite: LING 250-0, LING 260-0, or LING 270-0. *Formal Studies Distro Area*

LING 342-0 Structure of Various Languages (1 Unit) Phonological, morphological, or syntactic structure of a particular language. May be repeated for credit with change in language. *Formal Studies Distro Area*

LING 350-0 Fundamentals of Laboratory Phonology (1 Unit) Articulatory and acoustic phonetics. Syllable structure, phonotactics, morpho-phonological alternation, stress. Fundamentals of experimental design and data analysis. Prerequisite: LING 250-0 or consent of instructor. *Natural Sciences Distro Area*

LING 360-0 Fundamentals of Syntax (1 Unit) Fundamental principles of theoretical syntax. Phrase structure, argument structure, movement operations. Emphasis on argumentation, hypothesis formation and testing, and analytic methods. Prerequisite: LING 260-0 or consent of instructor. *Formal Studies Distro Area*

LING 361-0 Morphology (1 Unit) Issues in theoretical morphology. The internal structure of words. Linguistic and psycholinguistic findings about the representation and processing of word structures. Prerequisite: LING 250-0, LING 260-0, or LING 270-0. *Formal Studies Distro Area*

LING 363-0 Making a Dictionary: The Northwestern Project (1 Unit) Creation of an online dictionary of Northwestern jargon, slang, etc. Learning about the connection between language, society, and identity; sociolinguistic fieldwork; lexicography; politics of dictionaries; culture and power of book form vs. digital. LING 363-0 and SLAVIC 322-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

LING 370-0 Fundamentals of Meaning (1 Unit) 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: LING 270-0 or consent of instructor. *Formal Studies Distro Area*

LING 371-0 Reference (1 Unit) Linguistic and philosophical approaches to the study of reference, focusing on the role of context in utterance production and interpretation. Topics include definiteness, genericity, deixis, and anaphora. Prerequisite: a course in linguistics or philosophy of language, or consent of instructor. *Formal Studies Distro Area*

LING 372-0 Pragmatics (1 Unit) Introduction to extra-semantic meaning, focusing on the role of context in utterance production and interpretation. Topics include the semantics-pragmatics boundary, implicature, presupposition, speech acts, reference, and information structure. Prerequisite: LING 250-0, LING 260-0, or LING 270-0.

LING 373-0 Implicature (1 Unit) An interdisciplinary approach to the study of extra-semantic meaning, drawing on primary readings from linguistics, philosophy, and psychology. Topics include conversational and conventional implicature, explicature, implicature, and the semantics-

pragmatics boundary. Prerequisite: LING 370-0, LING 372-0, or consent of instructor. *Social Behavioral Sciences Distro Area*

LING 380-0 Spoken English for Non-Native Speakers (0 Unit)

Conversational English addressing all oral language skills; primarily for international graduate students who are nonnative speakers of English. Content varies.

LING 381-0 Written English for Non-native Speakers (0 Unit) Written argumentation skills and all aspects of academic writing; primarily for international graduate students who are nonnative speakers of English.

LING 398-0 Undergraduate Seminar in Linguistics (1 Unit) By invitation of the department. For students of superior ability, with choice of topic left to the group.

LING 399-0 Independent Study (1 Unit)

Linguistics Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Department Courses (12 units)	
<i>3 introductory courses:</i>	
LING 250-0	Sound Patterns in Human Language
LING 260-0	Formal Analysis of Words & Sentences
LING 270-0	Meaning
<i>9 courses beyond the 200 level:</i> ^{1,2}	
Should include these three: ³	
LING 350-0	Fundamentals of Laboratory Phonology
LING 360-0	Fundamentals of Syntax
LING 370-0	Fundamentals of Meaning
Related Courses (4 units)	
Selected with the linguistics director of undergraduate studies.	

¹ Only 1 of the 9 may be LING 398-0 Undergraduate Seminar in Linguistics or LING 399-0 Independent Study.

² Certain exceptions or substitutions, such as COG_SCI 210-0 Language and the Brain, may be granted with the consent of the director of undergraduate studies.

³ A methods course such as LING 330-0 Research Methods in Linguistics, LING 332-0 Linguistic Field Methods, or LING 334-0 Introduction to Computational Linguistics may be substituted for 1 of these courses.

Honors in Linguistics

In the spring or summer before senior year, eligible students majoring in linguistics are invited to participate in the honors program, under the supervision of a faculty advisor. Criteria include completion of prerequisite and core coursework and sufficiently high grades in the major and overall. Students then undertake the research and writing of a thesis in conjunction with 2 additional linguistics courses beyond those required for the major. These courses may be selected from LING 398-0 Undergraduate Seminar in Linguistics, LING 399-0 Independent Study, and 400-level courses.

Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more

information see the director of undergraduate studies and the catalog entry for Honors in the Major (p. 178).

Linguistics Minor

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.

Course	Title
Minor Requirements (8 units)	
LING 250-0	Sound Patterns in Human Language
LING 260-0	Formal Analysis of Words & Sentences
LING 270-0	Meaning
5 courses beyond the 200 level, including 2 chosen from: ¹	
LING 350-0	Fundamentals of Laboratory Phonology
LING 360-0	Fundamentals of Syntax
LING 370-0	Fundamentals of Meaning

¹ A methods course such as LING 330-0 Research Methods in Linguistics, LING 332-0 Linguistic Field Methods, or LING 334-0 Introduction to Computational Linguistics may be substituted for 1 of these courses

Linguistics BA/MA

Students with a strong record in their major courses and an interest in graduate study are eligible to apply for the BA/MA program in linguistics when they are within 4 courses of completing all Weinberg College requirements for the BA degree. Students pursuing the combined BA/MA degree must complete all requirements for the BA degree along with the course requirements for the Linguistics major, and must complete 7 additional courses for the Linguistics MA. Up to 3 courses can be double-counted towards both BA and the Linguistics MA requirements, but double-counting does not reduce the total number of courses required to complete the combined degree. Linguistics majors interested in the combined BA/MA program must meet with the Linguistics Director of Undergraduate Study no later than the end of their junior year.

More information on the combined BA/MA degree can be found on The Graduate School website <http://www.tgs.northwestern.edu/academics/programs/dual-degrees/bachelors-masters.html>. Applications for the combined degree should be made no later than spring quarter of junior year. For more information on the application process, see <https://www.applyweb.com/nugrad/index.ftl>. See also Accelerated Master's Programs (p. 34) in this catalog.

Materials Science

mccormick.northwestern.edu/materials-science

Materials science is the study of processing-structure-property relationships in materials of importance to society, such as metals, ceramics, polymers, semiconductors, biomaterials, nanomaterials, 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 Materials 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.

Programs of Study

- Materials Science Major (p. 292)
- Materials Science Minor (p. 293)
- Materials Science Second Major for ISP Students (p. 293)

These courses are offered by the Robert R. McCormick School of Engineering and Applied Sciences. See Materials Science and Engineering (p. 159).

Materials Science Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Students majoring in materials science in Weinberg College choose from two tracks: general materials or soft materials.

Requirements include foundation courses in mathematics and science and advanced electives. Course descriptions for materials science courses are listed in the McCormick School (p. 158) chapter of this catalog.

Course	Title
Program Courses (13 units)	
Laboratory components of general and organic chemistry courses require separate registration and bear separate credit; see the chemistry section for details.	
5 core courses:	
MAT_SCI 201-0 or MAT_SCI 301-0	Introduction to Materials Materials Science Principles
MAT_SCI 315-0	Phase Equilibria & Diffusion of Materials
MAT_SCI 316-1 & MAT_SCI 316-2	Microstructural Dynamics and Microstructural Dynamics
MAT_SCI 351-1	Introductory Physics of Materials
5 courses in the chosen track:	
General Materials Track (p. 293)	
Soft Materials Track (p. 293)	
3 advanced electives:	
At least 1 in materials science chosen from: ¹	
MAT_SCI 332-0	Mechanical Behavior of Solids
MAT_SCI 333-0	Composite Materials
MAT_SCI 336-0	Chemical Synthesis of Materials
MAT_SCI 337-0	Conducting Polymers
MAT_SCI 340-0	Ceramic Processing
MAT_SCI 341-0	Introduction to Modern Ceramics
MAT_SCI 351-2	Introductory Physics of Materials
MAT_SCI 355-0	Electronic Materials
MAT_SCI 360-0	Introduction to Electron Microscopy
MAT_SCI 361-0	Crystallography & Diffraction

MAT_SCI 370-0	Biomaterials
MAT_SCI 371-0	Biomaterials: Hierarchical Architecture & Function
MAT_SCI 376-0	Nanomaterials
MAT_SCI 380-0	Intro Surface Science & Spectroscopy
MAT_SCI 381-0	Materials for Energy-Efficient Technology
MAT_SCI 382-0	Electrochemical Energy Materials and Devices
MAT_SCI 385-0	Electronic and Thermal Properties of Materials
MAT_SCI 390-0	Materials Design
MAT_SCI 391-0	Process Design
MAT_SCI 397-0	Special Topics in Materials Science and Engineering
At least 1 in another department chosen from the following:	
CHEM 210-3 or CHEM 212-3	Organic Chemistry Organic Chemistry
CHEM 307-0	Materials and Nanochemistry
CHEM 333-0	Inorganic Chemistry
CHEM 342-2	Quantum Mechanics and Spectroscopy
CHEM 342-3	Kinetics and Statistical Thermodynamics
CHEM 360-0	Nanopatterning: Top-down meets Bottom-up
EARTH 300-0	Earth and Planetary Materials
MATH 250-0	Elementary Differential Equations
MATH 351-0 or MATH 381-0	Fourier Analysis and Boundary Value Problems Fourier Analysis and Boundary Value Problems for ISP
PHYSICS 332-0	Statistical Mechanics
PHYSICS 333-1	Advanced Electricity & Magnetism
PHYSICS 333-2	Advanced Electricity & Magnetism
PHYSICS 337-0	Physics of Condensed Matter
PHYSICS 339-3	Particle and Nuclear Physics
PHYSICS 357-0	Optics Laboratory
PHYSICS 358-0	Nanolithography
Foundations in Mathematics and Science (Units depend on chemistry and mathematics sequences taken.)	
MATH 220-0 & MATH 224-0 or MATH 212-0 & MATH 213-0 & MATH 214-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
MATH 230-0 & MATH 234-0 & MATH 240-0 or MATH 281-1 & MATH 281-2 & MATH 281-3 or MATH 285-1 & MATH 285-2 & MATH 285-3 or MATH 290-1 & MATH 290-2 & MATH 290-3 or MATH 291-1 & MATH 291-2 & MATH 291-3	Differential Calculus of Multivariable Functions and Multiple Integration and Vector Calculus and Linear Algebra Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus
CHEM 110-0 & CHEM 131-0 & CHEM 132-0 or CHEM 151-0 & CHEM 152-0	Quantitative Problem Solving in Chemistry and General Chemistry 1 and General Chemistry 2 Accelerated General Chemistry 1 and Accelerated General Chemistry 2

or CHEM 171-0
& CHEM 172-0

Advanced General Inorganic Chemistry
and Advanced General Physical Chemistry

PHYSICS 135-1
& PHYSICS 135-2
& PHYSICS 135-3

General Physics
and General Physics
and General Physics

or PHYSICS 125-1
& PHYSICS 125-2
& PHYSICS 125-3

General Physics ISP
and General Physics for ISP
and General Physics for ISP

Students in the soft materials track who are interested in biomaterials and/or medicine are encouraged to take additional courses in biology.

¹ MAT_SCI 395-0 Special Topics in Materials Science and Engineering may count only with permission of the director of undergraduate studies

Tracks

General Materials Track

Course	Title
CHEM 210-1 or CHEM 212-1	Organic Chemistry
CHEM 342-1 or MAT_SCI 314-0	Thermodynamics
MAT_SCI 331-0	Thermodynamics of Materials
MAT_SCI 331-0	Soft Materials
2 courses chosen from:	
MAT_SCI 332-0	Mechanical Behavior of Solids
MAT_SCI 351-2	Introductory Physics of Materials
MAT_SCI 361-0	Crystallography & Diffraction
At least 1 in another department chosen from the following:	

Soft Materials Track

Course	Title
CHEM 210-1 & CHEM 210-2 or CHEM 212-1 & CHEM 212-2	Organic Chemistry
CHEM 342-1 or MAT_SCI 314-0	Organic Chemistry and Organic Chemistry
MAT_SCI 331-0	Thermodynamics
MAT_SCI 370-0	Thermodynamics of Materials
MAT_SCI 331-0	Soft Materials
MAT_SCI 370-0	Biomaterials

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 considered, a student must meet minimum GPA requirements, complete 2 units of research (see table), and complete a written research report.

Course	Title
2 units of research selected from:	
CHEM 398-0	Undergraduate Seminar
CHEM 399-0	Independent Study
MAT_SCI 396-1	Senior Project in Materials Science and Engineering
MAT_SCI 396-2	Senior Project in Materials Science and Engineering
MAT_SCI 394-0	Honors Project in Materials Science
MAT_SCI 399-0	Projects
PHYSICS 398-0	Independent Thesis Research
PHYSICS 399-0	Independent Study

These 2 units are neither required for nor counted toward the major. Students who intend to submit a senior research report should send an e-mail including the name of the research adviser to the director of undergraduate studies by fall of senior year.

Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information consult the program director and see Honors in the Major (p. 178).

Materials Science Minor

Course	Title
Program Courses (6 units)	
MAT_SCI 201-0 or MAT_SCI 301-0	Introduction to Materials
MAT_SCI 315-0	Materials Science Principles
MAT_SCI 316-1 & MAT_SCI 316-2	Phase Equilibria & Diffusion of Materials
2 other 300-level materials science courses ¹	
Foundations in Mathematics and Science (units depend on chemistry and mathematics sequences taken)	
MATH 220-0 & MATH 224-0 or MATH 212-0 & MATH 213-0 & MATH 214-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions
MATH 230-0 & MATH 234-0	Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
CHEM 110-0 & CHEM 131-0 & CHEM 132-0 or CHEM 151-0 & CHEM 152-0 or CHEM 171-0 & CHEM 172-0	Differential Calculus of Multivariable Functions and Multiple Integration and Vector Calculus (or equivalent) ²
Quantitative Problem Solving in Chemistry and General Chemistry 1 and General Chemistry 2	
Accelerated General Chemistry 1 and Accelerated General Chemistry 2	
Advanced General Inorganic Chemistry and Advanced General Physical Chemistry	
1 course in thermodynamics:	
MAT_SCI 314-0 or CHEM 342-1 or PHYSICS 332-0	Thermodynamics of Materials
	Thermodynamics
	Statistical Mechanics

¹ Excluding MAT_SCI 394-0 Honors Project in Materials Science, MAT_SCI 396-1 Senior Project in Materials Science and Engineering, MAT_SCI 396-2 Senior Project in Materials Science and Engineering, MAT_SCI 399-0 Projects; MAT_SCI 395-0 Special Topics in Materials Science and Engineering may count only with permission of the director of undergraduate studies

² e.g., MATH 290-2 MENU: Linear Algebra and Multivariable Calculus, MATH 290-3 MENU: Linear Algebra and Multivariable Calculus or MATH 291-2 MENU: Intensive Linear Algebra and Multivariable Calculus, MATH 291-3 MENU: Intensive Linear Algebra and Multivariable Calculus

Materials Science Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

The Integrated Science Program 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

Course	Title
MAT_SCI 201-0 or MAT_SCI 301-0	Introduction to Materials Materials Science Principles
MAT_SCI 315-0	Phase Equilibria & Diffusion of Materials
MAT_SCI 316-1 & MAT_SCI 316-2	Microstructural Dynamics and Microstructural Dynamics
2 300-level MAT SCI electives ¹	

¹ MAT_SCI 395-0 Special Topics in Materials Science and Engineering may count only with permission of the director of undergraduate studies.

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 considered, a student must meet minimum GPA requirements, complete 2 units of research (see table), and complete a written research report.

Course	Title
2 units of research selected from:	
CHEM 398-0	Undergraduate Seminar
CHEM 399-0	Independent Study
MAT_SCI 396-1	Senior Project in Materials Science and Engineering
MAT_SCI 396-2	Senior Project in Materials Science and Engineering
MAT_SCI 394-0	Honors Project in Materials Science
MAT_SCI 399-0	Projects
PHYSICS 398-0	Independent Thesis Research
PHYSICS 399-0	Independent Study

These 2 units are neither required for nor counted toward the major. Students who intend to submit a senior research report should send an e-mail including the name of the research adviser to the director of undergraduate studies by fall of senior year.

Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information consult the program director and see Honors in the Major (p. 178).

Mathematical Methods in the Social Sciences

mmss.northwestern.edu

MMSS is an adjunct major and must be completed with a stand-alone major in a social science or other approved area. See the Mathematics Second Major or Minor for MMSS Students (p. 303) for information about the major or the minor in mathematics when combined with the MMSS adjunct major; see the program website (<https://www.mmss.northwestern.edu/undergraduate>) for information on adjustments to requirements in other majors for students in MMSS.

A central feature of modern social, behavioral, managerial, and policy sciences is the use of mathematics, statistics, and computers, both as languages and as methods of abstraction and analysis. Most undergraduate programs in the social sciences do not incorporate

mathematical approaches in an organized and consistent manner, however. The Mathematical Methods in the Social Sciences Program (MMSS) was created to give undergraduate students an opportunity to combine the study of social sciences with training in formal analytical methods.

MMSS students pursue a double course of study: a common mathematics/quantitative methods sequence and the social science major of their choice. (In some cases, students choose their joint major from outside the social sciences.) The program is for students with high mathematical aptitude and strong interest in social problems and issues, including policy and research implications. It provides excellent preparation for graduate study in social or managerial sciences as well as for careers requiring quantitative skills and a solid background in the social sciences.

In the first two years of the program, students enroll in a coordinated sequence of 12 1-quarter courses (two 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 senior year, all MMSS students participate in a senior seminar in which they write a thesis. There are no other required MMSS courses, but students must fulfill the requirements of their joint major.

Admission to the MMSS program is very selective and is limited to first-year students and to Northwestern sophomores with superior academic records and a demonstrated strong aptitude in mathematics.

A full-year course in calculus is a prerequisite for admission. High school students fulfilling this prerequisite are encouraged to enter the program as first-year students, applying to both Northwestern and the program.

Sophomore Entry to MMSS

To be considered for admission as sophomores, students lacking calculus should complete at least 2 quarters of calculus (MATH 220-0 Differential Calculus of One-Variable Functions and MATH 224-0 Integral Calculus of One-Variable Functions) in the first year of college. Those with sufficient background in calculus are advised to register for a 200-level calculus/linear algebra sequence in the first year such as:

Course	Title
MATH 230-0	Differential Calculus of Multivariable Functions
MATH 234-0	Multiple Integration and Vector Calculus
MATH 240-0	Linear Algebra
MATH 290-1 & MATH 290-2 & MATH 290-3	MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus
MATH 291-1 & MATH 291-2 & MATH 291-3	MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus
ES_APPM 252-1 & ES_APPM 252-2	Honors Calculus for Engineers and Honors Calculus for Engineers

Students with less mathematics preparation who are admitted to the program after the first year may be required to take all or part of the first-year MMSS math sequence.

Northwestern applicants interested in the program should see Special Admission Programs (p. 10). Current students who wish to be

considered for the program should complete an online application at mmss.northwestern.edu.

Programs of Study

- MMSS Adjunct Major (p. 295)

Please note, MMSS students are required to take six mathematics courses/units which include: MATH 285-1, MATH 285-2, MATH 285-3, MATH 385-0, MATH 386-1, and MATH 386-2 in addition to the MMSS course list.

MMSS Courses

MMSS 211-1 Social Science Theories & Meth-First Yr (1 Unit) Intermediate microeconomics.

MMSS 211-2 Social Science Theories & Meth-First Yr (1 Unit) Game theory.

MMSS 211-3 Social Science Theories & Meth-First Yr (1 Unit) Formal models in social science disciplines other than economics.

MMSS 300-0 Foundations of Mathematical Social Science (1 Unit) Introduction to the core mathematical elements of formal Social Science, including Individual Decision Making, Choice Under Uncertainty, Social Choice and Welfare, Efficiency Concepts, and Dynamic Decision-Making.

MMSS 311-1 Social Science Theories & Meth--2nd Yr (1 Unit) Advanced game theory.

MMSS 311-2 Social Science Theories & Meth--2nd Yr (1 Unit) Advanced formal models in social science disciplines other than economics.

MMSS 398-1 Senior Seminar (1 Unit) Senior thesis seminar.

MMSS 398-2 Senior Seminar (1 Unit) Senior thesis seminar.

MMSS 398-3 Senior Seminar (1 Unit) Senior thesis seminar.

MMSS Adjunct Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Adjunct Major Requirements (14 units)	
6 first-year courses:	
MMSS 211-1 & MMSS 211-2 & MMSS 211-3	Social Science Theories & Meth-First Yr and Social Science Theories & Meth-First Yr and Social Science Theories & Meth-First Yr
MATH 285-1 & MATH 285-2 & MATH 285-3	Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year
6 second-year courses:	
MMSS 300-0	Foundations of Mathematical Social Science
MMSS 311-1 & MMSS 311-2	Social Science Theories & Meth--2nd Yr and Social Science Theories & Meth--2nd Yr
MATH 385-0	Probability and Statistics for MMSS
MATH 386-1 & MATH 386-2	Econometrics for MMSS and Econometrics for MMSS
2 senior-year courses:	
MMSS 398-1 & MMSS 398-2	Senior Seminar and Senior Seminar

or MMSS 398-1
& MMSS 398-3

Senior Seminar
and Senior Seminar

- All adjunct majors require completion of a stand-alone major as well. MMSS students must complete a major in a social science or other approved area. See the Mathematics Second Major or Minor for MMSS Students (p. 303) for information about the major or the minor in mathematics when combined with the MMSS adjunct major; see the program website (<https://www.mmss.northwestern.edu/undergraduate>) for information on adjustments to requirements in other majors for students in MMSS.

Honors in MMSS

All MMSS students write a senior thesis in MMSS, in another major, or in both. Students should enroll in two units of the MMSS senior seminar. Students must enroll in MMSS 398-1 Senior Seminar, and at least MMSS 398-2 Senior Seminar or MMSS 398-3 Senior Seminar. Students who write an MMSS thesis of sufficiently high quality, and earn sufficiently high grades may be recommended to the college for graduation with honors in MMSS. For more information consult the program director and see Honors in the Major (p. 178).

Mathematics

math.northwestern.edu

Mathematics, often celebrated as the “Queen of the Sciences,” has long been an indispensable tool in the physical sciences, engineering, and commerce. Today the social sciences and humanities also use mathematics in increasingly sophisticated ways. Students majoring or minoring in mathematics have an 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 applications to the natural or social sciences, and those interested in management or engineering.

Students with sufficiently strong preparation who seek an early exposure to rigorous mathematics should consider participating in Mathematical Experience for Northwestern Undergraduates (MENU) - see “Course Recommendations” below for more information. The department also encourages appropriately prepared undergraduate students to enroll in its graduate courses.

Course Recommendations

First-Year Placement

For information regarding course placement for first-year students, see our First Year Focus (<http://www.math.northwestern.edu/undergraduate/first-year-focus>).

Mathematical Experience for Northwestern Undergraduates (MENU)

Mathematical Experience for Northwestern Undergraduates (MENU) (<http://math.northwestern.edu/undergraduate/menu>) is a flexible program of challenging courses designed to provide qualified undergraduates with a thorough foundation in mathematics suitable for advanced study in mathematics and its applications across a wide range of disciplines.

MENU offers students an opportunity to expand their mathematical knowledge while retaining flexibility about their majors. Although MENU attracts participants with a variety of interests, the program is especially well-suited for students considering a major in mathematics, the natural sciences, or economics. The director of MENU is available to advise all MENU participants regardless of major.

During the first year MENU participants typically enroll in one of two yearlong sequences:

Course	Title
MATH 290-1 & MATH 290-2 & MATH 290-3	MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus
or MATH 291-1 & MATH 291-2 & MATH 291-3	MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus

Each sequence provides a strong background in linear algebra and multivariable calculus. In contrast to our standard mathematics courses, these sequences develop linear algebra before multivariable calculus and use linear algebra as an important tool in the study of multivariable calculus. In particular, MATH 291-1 emphasizes theory and proofs and is appropriate for students who are particularly skilled in and passionate about mathematics. Students may transfer between MATH 290-1 and MATH 291-1 with permission from the director of MENU.

After the first year MENU participants may choose among four upper-level MENU sequences:

Course	Title
MATH 311-1 & MATH 311-2 & MATH 311-3	MENU: Probability and Stochastic Processes and MENU: Probability and Stochastic Processes and MENU: Probability and Stochastic Processes
MATH 321-1 & MATH 321-2 & MATH 321-3	MENU: Real Analysis and MENU: Real Analysis and MENU: Real Analysis
MATH 331-1 & MATH 331-2 & MATH 331-3	MENU: Abstract Algebra and MENU: Abstract Algebra and MENU: Abstract Algebra
MATH 360-1 & MATH 360-2	MENU: Applied Analysis and MENU: Applied Analysis

or they may enroll in other advanced mathematics courses.

Participation in MENU is by invitation only. Students who earn a score of at least 4 on the Advanced Placement Calculus BC examination should automatically receive an invitation to participate. A student who does not automatically receive an invitation can obtain one from the director of MENU if he or she is

- an international student who has completed single variable calculus, or
- has completed a college-level sequence in single variable calculus with high grades, or
- has earned a score of 7 on the International Baccalaureate Higher-Level Mathematics Examination.

Students who excel in MATH 220-0 and MATH 224-0 may consult the director of MENU about continuing their studies of mathematics in

MENU. Further information is available at math.northwestern.edu/undergraduate/menu.

Mathematics and Economics

Students interested in mathematics and economics should consider the following course sequences:

Course	Title
MATH 320-1 & MATH 320-2 & MATH 320-3	Real Analysis and Real Analysis and Real Analysis
or MATH 321-1 & MATH 321-2 & MATH 321-3	MENU: Real Analysis and MENU: Real Analysis and MENU: Real Analysis
MATH 310-1 & MATH 310-2 & MATH 310-3	Probability and Stochastic Processes and Probability and Stochastic Processes and Probability and Stochastic Processes
or MATH 311-1 & MATH 311-2 & MATH 311-3	MENU: Probability and Stochastic Processes and MENU: Probability and Stochastic Processes and MENU: Probability and Stochastic Processes
ECON 380-1 & ECON 380-2	Game Theory and Game Theory
ECON 381-1 & ECON 381-2	Econometrics and Econometrics

Actuarial Science

Students interested in actuarial science should consider the following courses and course sequences:

Course	Title
MATH 310-1 & MATH 310-2 & MATH 310-3	Probability and Stochastic Processes and Probability and Stochastic Processes and Probability and Stochastic Processes
or MATH 311-1 & MATH 311-2 & MATH 311-3	MENU: Probability and Stochastic Processes and MENU: Probability and Stochastic Processes and MENU: Probability and Stochastic Processes
MATH 320-1 & MATH 320-2 & MATH 320-3	Real Analysis and Real Analysis and Real Analysis
or MATH 321-1 & MATH 321-2 & MATH 321-3	MENU: Real Analysis and MENU: Real Analysis and MENU: Real Analysis
STAT 320-2 & STAT 320-3	Statistical Methods 2 and Statistical Methods 3
STAT 350-0	Regression Analysis
STAT 351-0	Design and Analysis of Experiments
STAT 352-0	Nonparametric Statistical Methods
STAT 355-0	Analysis of Qualitative Data

Programs of Study

- Mathematics Major (p. 300)
- Mathematics Minor (p. 302)
- Mathematics Second Major for ISP Students (p. 302)
- Mathematics Second Major or Minor for MMSS Students (p. 303)

The director of undergraduate studies may waive prerequisites for mathematics courses. However, without the permission of the department, no waived prerequisite course is eligible for credit after a student completes another course for which it is prerequisite. Except for MATH 100-0 Quantitative Reasoning and MATH 105-6 First-Year Seminar, no 100 level course may be taken for credit after completing a 200 or

higher-level course. See the course descriptions for other restrictions. See Weinberg College Policies (p. 177) for additional information about mathematics courses and distribution requirements.

MATH 100-0 Quantitative Reasoning (1 Unit) Analyzing topical, real-life problems from a quantitative perspective. Developing facility with basic algebra, probability, and statistics to solve multistep problems. *Formal Studies Distro Area*

MATH 100-BR Quantitative Reasoning (1 Unit) For participants in Bridge I summer program. Analyzing topical, real-life problems from a quantitative perspective. Developing facility with basic algebra, probability, and statistics to solve multistep problems. Taken with either CHEM 100-BR or ECON 100-BR.

MATH 104-0 Introduction to Game Theory (1 Unit) 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 students with minimal mathematical background. *Formal Studies Distro Area*

MATH 105-6 First-Year Seminar (1 Unit) Topics vary. *WCAS First-Year Seminar*

MATH 110-0 Introduction to Mathematics (1 Unit) Exploration of the beauty of mathematics through a study of the patterns and properties of the natural numbers. Topics include counting, probability, prime numbers, the Euclidean algorithm, and unique factorization. For students with minimal mathematical background. *Formal Studies Distro Area*

MATH 202-0 Finite Mathematics (1 Unit) Topics chosen from elementary linear algebra and its applications, finite probability, and elementary statistics. For students majoring in the behavioral sciences. *Formal Studies Distro Area*

MATH 211-0 Short Course in Calculus (1 Unit) Elements of differential and integral calculus. Students may not receive credit for both MATH 211-0 and any of MATH 212-0, MATH 213-0, MATH 220-0, or MATH 224-0. Not suitable for students planning to major in mathematics, the natural sciences, or economics. *Formal Studies Distro Area*

MATH 212-0 Single Variable Calculus I (1 Unit) Review of functions and graphs. Limits, differentiation, related rates, linear approximation, l'Hopital's rule, and transcendental functions. For students with little or no previous exposure to calculus who are not confident about their mathematical preparation. Students may not receive credit for both MATH 212-0 and either MATH 211-0 or MATH 220-0. Prerequisite: consent of the department. *Formal Studies Distro Area*

MATH 213-0 Single Variable Calculus II (1 Unit) Optimization and curve sketching. Antiderivatives. Integration and techniques of integration. Students may not receive credit for both MATH 213-0 and MATH 211-0. Prerequisite: MATH 212-0 or consent of the department. *Formal Studies Distro Area*

MATH 214-0 Single Variable Calculus III (1 Unit) Improper integrals, areas and volumes, sequences and series, and Taylor polynomials. Students may not receive credit for both MATH 214-0 and MATH 224-0. Prerequisite: MATH 213-0 or consent of the department. *Formal Studies Distro Area*

MATH 220-0 Differential Calculus of One-Variable Functions (1 Unit) Limits, differentiation, related rates, linear approximation, optimization, curve sketching, Newton's method, and antiderivatives. Students may

not receive credit for both MATH 220-0 and either MATH 211-0 or MATH 212-0. *Formal Studies Distro Area*

MATH 224-0 Integral Calculus of One-Variable Functions (1 Unit) Integration, techniques of integration, areas and volumes, sequences and series, and Taylor polynomials. Students may not receive credit for both MATH 224-0 and either of MATH 211-0 or MATH 214-0. Prerequisite: MATH 220-0 or consent of the department. *Formal Studies Distro Area*

MATH 230-0 Differential Calculus of Multivariable Functions (1 Unit) Vectors, vector functions, partial derivatives, and optimization. Students may not receive credit for both MATH 230-0 and any of MATH 281-1, MATH 285-2, MATH 290-2, MATH 291-2, or ES_APPM 252-1. Prerequisite: MATH 214-0 or MATH 224-0. *Formal Studies Distro Area*

MATH 234-0 Multiple Integration and Vector Calculus (1 Unit) Multiple integration: double integrals, triple integrals, and the change of variables theorem. Vector calculus: vector fields, line integrals, surface integrals, curl and divergence, Green's theorem, Stokes' theorem, and the divergence theorem. Students may not receive credit for both MATH 234-0 and any of MATH 281-2, MATH 285-3, MATH 290-3, MATH 291-3, or ES_APPM 252-2. Prerequisite: MATH 230-0 or MATH 281-1 or MATH 285-2 or MATH 290-2 or MATH 291-2 or ES_APPM 252-1. *Formal Studies Distro Area*

MATH 240-0 Linear Algebra (1 Unit) Elementary linear algebra: systems of linear equations, matrix algebra, subspaces, determinants, eigenvalues, eigenvectors, and orthogonality. Students may not receive credit for both MATH 240-0 and any of MATH 281-3, MATH 285-1, MATH 290-1, MATH 291-1, GEN_ENG 205-1, or GEN_ENG 206-1. Prerequisite: MATH 230-0 or MATH 281-1 or ES_APPM 252-1. *Formal Studies Distro Area*

MATH 250-0 Elementary Differential Equations (1 Unit) Elementary ordinary differential equations: first-order equations, second-order linear equations, series solutions, and systems of first-order linear equations. Students may not receive credit for both MATH 250-0 and any of MATH 281-3, MATH 360-1, GEN_ENG 205-4, or GEN_ENG 206-4. Prerequisites: MATH 234-0 or MATH 281-2 or MATH 285-3 or MATH 290-3 or MATH 291-3 or ES_APPM 252-2; and MATH 240-0 or MATH 285-1 or MATH 290-1 or MATH 291-1 or GEN_ENG 205-1 or GEN_ENG 206-1. *Formal Studies Distro Area*

MATH 281-1 Accelerated Mathematics for ISP: First Year (1 Unit) Multivariable differential and integral calculus. Students may not receive credit for both MATH 281-1 and any of MATH 230-0, MATH 285-2, MATH 290-2, MATH 291-2, or ES_APPM 252-1. Prerequisite: first-year standing in ISP. *Formal Studies Distro Area*

MATH 281-2 Accelerated Mathematics for ISP: First Year (1 Unit) Vector calculus, ordinary differential equations, and infinite series. Students may not receive credit for both MATH 281-2 and any of MATH 234-0, MATH 285-3, MATH 290-3, MATH 291-3, or ES_APPM 252-2. Prerequisite: MATH 281-1. *Formal Studies Distro Area*

MATH 281-3 Accelerated Mathematics for ISP: First Year (1 Unit) Linear algebra and systems of ordinary differential equations. Students may not receive credit for both MATH 281-3 and any of MATH 240-0, MATH 250-0, MATH 285-1, MATH 290-1, MATH 291-1, MATH 360-1, GEN_ENG 205-1, GEN_ENG 206-1, GEN_ENG 205-4, or GEN_ENG 206-4. Prerequisite: MATH 281-2. *Formal Studies Distro Area*

MATH 285-1 Accelerated Mathematics for MMSS: First Year (1 Unit) Linear algebra: systems of linear equations, linear transformations,

determinants, vector spaces, eigenvalues and eigenvectors. Students may not receive credit for both MATH 285-1 and any of MATH 240-0, MATH 281-3, MATH 290-1, MATH 291-1, GEN_ENG 205-1, or GEN_ENG 206-1. Prerequisite: first-year standing in MMSS. *Formal Studies Distro Area*

MATH 285-2 Accelerated Mathematics for MMSS: First Year (1 Unit) Linear algebra: orthogonality, symmetric matrices, and quadratic forms. Multivariable differential calculus: vectors, differentiation, vector-valued functions, and optimization. Students may not receive credit for both MATH 285-2 and any of MATH 230-0, MATH 281-1, MATH 290-2, MATH 291-2, or ES_APPM 252-1. Prerequisite: MATH 285-1. *Formal Studies Distro Area*

MATH 285-3 Accelerated Mathematics for MMSS: First Year (1 Unit) Multivariable integral calculus: multiple integration, line integrals, surface integrals, and vector analysis. Students may not receive credit for both MATH 285-3 and any of MATH 234-0, MATH 281-2, MATH 290-3, MATH 291-3, or ES_APPM 252-2. Prerequisite: MATH 285-2. *Formal Studies Distro Area*

MATH 290-1 MENU: Linear Algebra and Multivariable Calculus (1 Unit) Linear algebra: systems of linear equations, linear transformations, determinants, eigenvalues and eigenvectors. Students may not receive credit for both MATH 290-1 and any of MATH 240-0, MATH 281-3, MATH 285-1, MATH 291-1, GEN_ENG 205-1, or GEN_ENG 206-1. Prerequisite: consent of the department. *Formal Studies Distro Area*

MATH 290-2 MENU: Linear Algebra and Multivariable Calculus (1 Unit) Linear algebra: orthogonality, symmetric matrices, and quadratic forms. Multivariable differential calculus: vectors, differentiation, vector-valued functions, and optimization. Students may not receive credit for both MATH 290-2 and any of MATH 230-0, MATH 281-1, MATH 285-2, MATH 291-2, or ES_APPM 252-1. Prerequisite: MATH 290-1. *Formal Studies Distro Area*

MATH 290-3 MENU: Linear Algebra and Multivariable Calculus (1 Unit) Multivariable integral calculus: multiple integration, line integrals, surface integrals, and vector analysis. Students may not receive credit for both MATH 290-3 and any of MATH 234-0, MATH 281-2, MATH 285-3, MATH 291-3, or ES_APPM 252-2. Prerequisite: MATH 290-2. *Formal Studies Distro Area*

MATH 291-1 MENU: Intensive Linear Algebra and Multivariable Calculus (1 Unit) Foundations. Linear algebra: systems of linear equations, linear transformations, subspaces, vector spaces, and determinants. The course emphasizes theory and proofs. Students may not receive credit for both MATH 291-1 and any of MATH 240-0, MATH 281-3, MATH 285-1, MATH 290-1, GEN_ENG 205-1, or GEN_ENG 206-1. Prerequisite: consent of the department. *Formal Studies Distro Area*

MATH 291-2 MENU: Intensive Linear Algebra and Multivariable Calculus (1 Unit) Linear algebra: eigenvalues and eigenvectors, orthogonality, symmetric matrices, and quadratic forms. Multivariable differential calculus: vectors, differentiation, and vector-valued functions. The course emphasizes theory and proofs. Students may not receive credit for both MATH 291-2 and any of MATH 230-0, MATH 281-1, MATH 285-2, MATH 290-2, or ES_APPM 252-1. Prerequisite: MATH 291-1 or consent of the department. *Formal Studies Distro Area*

MATH 291-3 MENU: Intensive Linear Algebra and Multivariable Calculus (1 Unit) Multivariable differential calculus: optimization. Multivariable integral calculus: multiple integration, line integrals, surface integrals, and vector analysis. The course emphasizes theory and proofs. Students

may not receive credit for both MATH 291-3 and any of MATH 234-0, MATH 281-2, MATH 285-3, MATH 290-3, or ES_APPM 252-2. Prerequisite: MATH 291-2 or consent of the department. *Formal Studies Distro Area*

MATH 300-0 Foundations of Higher Mathematics (1 Unit) Introduction to fundamental mathematical structures, including sets, functions, equivalence relations, and cardinal numbers. Elementary logic and proof techniques. Without prior departmental consent students may not receive credit for MATH 300-0 after passing any of MATH 320-1, MATH 321-1, MATH 330-1, or MATH 331-1. Prerequisite: MATH 240-0 or MATH 281-3 or MATH 285-1 or MATH 290-1 or MATH 291-1 or GEN_ENG 205-1 or GEN_ENG 206-1 or consent of the department. *Formal Studies Distro Area*

MATH 306-0 Combinatorics & Discrete Mathematics (1 Unit) Discrete mathematics, inductive reasoning, counting problems, binomial coefficients and Pascal's triangle, Fibonacci numbers, combinatorial probability, divisibility and primes, partitions, and generating functions. Prerequisite: MATH 240-0 or MATH 281-3 or MATH 285-1 or MATH 290-1 or MATH 291-1 or GEN_ENG 205-1 or GEN_ENG 206-1 or consent of the instructor. *Formal Studies Distro Area*

MATH 308-0 Graph Theory (1 Unit) Introduction to graph theory: graphs, trees, matchings, planar graphs, and colorings. Additional topics as time permits. Prerequisite: MATH 291-1 or MATH 300-0 or MATH 306-0. *Formal Studies Distro Area*

MATH 310-1 Probability and Stochastic Processes (1 Unit) Axioms of probability. Conditional probability and independence. Random variables. Joint distributions. Expectation. Limit theorems: the weak law of large numbers and the central limit theorem. Students may not receive credit for both MATH 310-1 and any of MATH 311-1, MATH 314-0, MATH 385-0, STAT 320-1, STAT 383-0, IEMS 202-0, or EECS 302-0. Prerequisite or Corequisite: MATH 234-0 or MATH 281-2 or MATH 285-3 or MATH 290-3 or MATH 291-3 or ES_APPM 252-2. *Formal Studies Distro Area*

MATH 310-2 Probability and Stochastic Processes (1 Unit) Discrete-time Markov chains, recurrence and transience. Students may not receive credit for both MATH 310-2 and MATH 311-2. Prerequisites: MATH 240-0 or MATH 281-3 or MATH 285-1 or MATH 290-1 or MATH 291-1 or GEN_ENG 205-1 or GEN_ENG 206-1; and MATH 310-1 or MATH 311-1. *Formal Studies Distro Area*

MATH 310-3 Probability and Stochastic Processes (1 Unit) Continuous-time Markov chains, queues, population growth models. Brownian motion and other diffusion processes. Additional topics as time permits. Students may not receive credit for both MATH 310-3 and MATH 311-3. Prerequisite: MATH 310-2 or MATH 311-2. *Formal Studies Distro Area*

MATH 311-1 MENU: Probability and Stochastic Processes (1 Unit) Probability spaces. Random variables. Independence. Distributions. Generating functions. The central limit theorem. Students may not receive credit for both MATH 311-1 and any of MATH 310-1, MATH 314-0, MATH 385-0, STAT 320-1, STAT 383-0, IEMS 202-0, or EECS 302-0. Recommended: MATH 320-1 or MATH 321-1. Prerequisite: MATH 291-3; or MATH 300-0 and MATH 290-3, MATH 281-2, MATH 285-3 or ES_APPM 252-2; or consent of the department. *Formal Studies Distro Area*

MATH 311-2 MENU: Probability and Stochastic Processes (1 Unit) Markov chains, convergence of random variables, random processes, renewals, and queues. Students may not receive credit for both MATH 311-2 and MATH 310-2. Prerequisite: MATH 311-1 or consent of the department. *Formal Studies Distro Area*

MATH 311-3 MENU: Probability and Stochastic Processes (1 Unit)

Stationary processes, martingales, and diffusion processes. Students may not receive credit for both MATH 311-3 and MATH 310-3.

Prerequisite: MATH 311-2 or consent of the department. *Formal Studies Distro Area*

MATH 314-0 Probability and Statistics for Econometrics (1 Unit)

Introduction to probability theory and statistical methods, including properties of probability distributions, sampling distributions, estimation, confidence intervals and hypothesis testing. For students planning to take ECON 381-1. Students may not receive credit for both MATH 314-0 and any of MATH 310-1, MATH 311-1, MATH 385-0, STAT 320-1, STAT 383-0, IEMS 202-0, or EECS 302-0. Prerequisite or Corequisite: MATH 234-0 or MATH 281-1 or MATH 285-3 or MATH 290-3 or MATH 291-3. *Formal Studies Distro Area*

MATH 320-1 Real Analysis (1 Unit) Analysis on the real line: axiomatic development of the real number system, sequences and series of real numbers, continuity, and differentiability. Students may not receive credit for both MATH 320-1 and MATH 321-1. Prerequisite: MATH 300-0 or MATH 291-3 or consent of the department. *Formal Studies Distro Area*

MATH 320-2 Real Analysis (1 Unit) Analysis on the real line: the Riemann integral and sequences and series of functions. Additional topics as time permits. Students may not receive credit for both MATH 320-2 and MATH 321-2. Prerequisite: MATH 320-1 or MATH 321-1. *Formal Studies Distro Area*

MATH 320-3 Real Analysis (1 Unit) Analysis on Euclidean spaces: the topology of Euclidean spaces, limits, continuity, and differentiability, including the inverse and implicit function theorems. Additional topics as time permits. Students may not receive credit for both MATH 320-3 and MATH 321-2. Prerequisite: MATH 320-2. *Formal Studies Distro Area*

MATH 321-1 MENU: Real Analysis (1 Unit) Analysis on metric spaces: the real number system, the topology of metric spaces, sequences and series, continuity, and differentiability. Students may not receive credit for both MATH 321-1 and MATH 320-1. Prerequisite: MATH 291-3; or MATH 300-0 and consent of the department. *Formal Studies Distro Area*

MATH 321-2 MENU: Real Analysis (1 Unit) Analysis on metric spaces: the Riemann integral, sequences and series of functions, and functions of several variables, including the inverse and implicit function theorems. Students may not receive credit for both MATH 321-2 and either MATH 320-2 or MATH 320-3. Prerequisite: MATH 321-1. *Formal Studies Distro Area*

MATH 321-3 MENU: Real Analysis (1 Unit) Lebesgue measure and the Lebesgue integral. Additional topics as time permits. Prerequisite: MATH 321-2. *Formal Studies Distro Area*

MATH 325-0 Complex Analysis (1 Unit) Complex numbers. Analytic functions. Cauchy's theorem and the Cauchy integral formula. Series. Residues. Conformal mapping. Students may not receive credit for both MATH 325-0 and ES_APPM 312-0. Prerequisites: MATH 234-0 and MATH 240-0; or MATH 281-3 or MATH 285-3 or MATH 290-3 or MATH 291-3 or ES_APPM 252-2. *Formal Studies Distro Area*

MATH 327-0 Mechanics for Mathematicians (1 Unit) Fundamental mathematical ideas arising in classical mechanics: Newtonian mechanics, Lagrangian formalism and the calculus of variations, motion with constraints, symmetries and conservation laws, and Hamiltonian mechanics, and Liouville's theorem. No prior knowledge of physics required. Students may not receive credit for MATH 327-0 after

taking PHYSICS 330-1. Prerequisites: MATH 234-0 and MATH 240-0; or MATH 281-3 or MATH 285-3 or MATH 290-3 or MATH 291-3 or ES_APPM 252-2. *Formal Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Natural Sciences Distro Area*

MATH 330-1 Abstract Algebra (1 Unit) Group theory. Students may not receive credit for both MATH 330-1 and MATH 331-1. Prerequisite: MATH 291-1 or MATH 300-0. *Formal Studies Distro Area*

MATH 330-2 Abstract Algebra (1 Unit) Ring theory, including polynomial rings. Students may not receive credit for both MATH 330-2 and MATH 331-2. Prerequisite: MATH 330-1 or MATH 331-1 or consent of the instructor. *Formal Studies Distro Area*

MATH 330-3 Abstract Algebra (1 Unit) Field theory and Galois theory. Students may not receive credit for both MATH 330-3 and MATH 331-3. Prerequisite: MATH 330-2 or MATH 331-2 or consent of the instructor. *Formal Studies Distro Area*

MATH 331-1 MENU: Abstract Algebra (1 Unit) Group theory, including the Sylow theorems. Students may not receive credit for both MATH 331-1 and MATH 330-1. Prerequisite: MATH 291-3; or MATH 300-0 and consent of the department. *Formal Studies Distro Area*

MATH 331-2 MENU: Abstract Algebra (1 Unit) Ring theory, including polynomial rings. Module theory, including canonical forms of operators on vector spaces. Students may not receive credit for both MATH 331-2 and MATH 330-2. Prerequisite: MATH 331-1 or consent of the department. *Formal Studies Distro Area*

MATH 331-3 MENU: Abstract Algebra (1 Unit) Field theory and Galois theory. Students may not receive credit for both MATH 331-3 and MATH 330-3. Prerequisite: MATH 331-2 or consent of the department. *Formal Studies Distro Area*

MATH 334-0 Linear Algebra: Second Course (1 Unit) Vector spaces. Linear maps. Eigenvalues, eigenvectors and invariant subspaces. Inner product spaces. Canonical forms of operators on real and complex vector spaces. Prerequisite: MATH 300-0; or MATH 291-2 and consent of the department. *Formal Studies Distro Area*

MATH 336-1 Introduction to the Theory of Numbers (1 Unit) Divisibility and prime numbers. Congruences. Quadratic reciprocity. Diophantine equations. Prerequisite: MATH 230-0 or MATH 281-1 or MATH 285-2 or MATH 290-2 or MATH 291-2 or ES_APPM 252-1. *Formal Studies Distro Area*

MATH 336-2 Introduction to the Theory of Numbers (1 Unit) Topics in analytic and algebraic number theory. Prerequisite: MATH 336-1. *Formal Studies Distro Area*

MATH 340-0 Geometry (1 Unit) Axioms for Euclidean geometry. Non-Euclidean geometry. Projective geometry. Introduction of coordinate systems from the axioms. Quadrics. Erlangen program. Introduction to plane algebraic curves. Prerequisite: MATH 300-0 or MATH 291-1 or consent of the instructor. *Formal Studies Distro Area*

MATH 342-0 Introduction to Differential Geometry (1 Unit) Differential geometry of curves and surfaces in three-dimensional space: curves, regular surfaces, the Gauss map, and additional topics as time permits. Prerequisites: MATH 234-0 or MATH 281-2 or MATH 285-3 or MATH 290-3 or MATH 291-3 or ES_APPM 252-2; and MATH 240-0 or MATH 281-3 or MATH 285-1 or MATH 290-1 or MATH 291-1 or GEN_ENG 205-1 or GEN_ENG 206-1. *Formal Studies Distro Area*

MATH 344-1 Introduction to Topology (1 Unit) Topological spaces, continuity, connectedness, compactness, countability and separation axioms. Prerequisite: MATH 320-1 or MATH 321-1. *Formal Studies Distro Area*

MATH 344-2 Introduction to Topology (1 Unit) The fundamental group. Classification of covering spaces. Additional topics as permits. Prerequisites: MATH 344-1, and either MATH 330-1 or MATH 331-1. *Formal Studies Distro Area*

MATH 351-0 Fourier Analysis and Boundary Value Problems (1 Unit) Fourier series with applications to partial differential equations arising in physics and engineering. Students may not receive credit for both MATH 351-0 and any of MATH 381-0, MATH 360-2, or ES_APPM 311-2. Prerequisite: MATH 250-0 or MATH 281-3 or MATH 360-1 or GEN_ENG 206-4 or GEN_ENG 206-4. *Formal Studies Distro Area*

MATH 353-0 Qualitative Theory of Differential Equations (1 Unit) Qualitative theory of ordinary differential equations: linear systems, phase portraits, periodic solutions, stability theory, Lyapunov functions, and chaos. Students may not receive credit for both MATH 353-0 and MATH 360-2. Prerequisite: MATH 250-0 or MATH 281-3 or MATH 360-1 or GEN_ENG 205-4 or GEN_ENG 206-4. *Formal Studies Distro Area*

MATH 354-1 Chaotic Dynamical Systems (1 Unit) Chaotic phenomena in deterministic discrete dynamical systems, primarily through iteration of functions of one variable. Prerequisite: MATH 240-0 or MATH 281-3 or MATH 285-1 or MATH 290-1 or MATH 291-1 or GEN_ENG 205-1 or GEN_ENG 206-1. *Formal Studies Distro Area*

MATH 354-2 Chaotic Dynamical Systems (1 Unit) Iteration of functions of two or 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 the Mandelbrot set. Prerequisite: MATH 354-1. *Formal Studies Distro Area*

MATH 360-1 MENU: Applied Analysis (1 Unit) Linear ordinary differential equations and their applications. Students may not receive credit for both MATH 360-1 and any of MATH 250-0, MATH 281-3, GEN_ENG 205-4, GEN_ENG 206-4. Prerequisite: MATH 290-3 or MATH 291-3 or consent of the instructor. *Formal Studies Distro Area*

MATH 360-2 MENU: Applied Analysis (1 Unit) Systems of linear ordinary differential equations and qualitative analysis of ordinary differential equations. Laplace transform. Linear partial differential equations. Fourier series and orthogonal functions. Applications. Students may not receive credit for both MATH 360-2 and MATH 381-0, MATH 351-0, or ES_APPM 311-2. Prerequisite: MATH 360-1 or consent of the instructor. *Formal Studies Distro Area*

MATH 366-1 Mathematical Models in Finance (1 Unit) Cash flow computations. Basic financial concepts (stocks, bonds, options, arbitrage, hedging) and put-call parity. Binomial tree models. Risk-neutral valuation. Random walk and Brownian motion as a tool of modeling fluctuations. Options pricing. Applications of the central limit theorem. The Black-Scholes formula and partial differential equation. Numerical approximations. Some familiarity with differential equations is desirable. Prerequisites: MATH 240-0 or MATH 281-3 or MATH 285-1 or MATH 290-1 or MATH 291-1 or GEN_ENG 205-1 or GEN_ENG 206-1; and MATH 310-1 or MATH 311-1 or MATH 314-0 or MATH 385-0 or STAT 320-1 or STAT 383-0 or IEMS 202-0 or EECS 302-0. *Formal Studies Distro Area*

MATH 368-0 Introduction to Optimization (1 Unit) Methods and concepts of optimization theory: linear programming, duality, convexity, and Kuhn-Tucker theory. Prerequisite: MATH 291-3; or MATH 300-0 and one of MATH 234-0, MATH 281-2, MATH 285-3, MATH 290-3, or ES_APPM 252-2. *Formal Studies Distro Area*

MATH 370-0 Mathematical Logic (1 Unit) 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: MATH 300-0 or MATH 291-3 or consent of the instructor. *Formal Studies Distro Area*

MATH 381-0 Fourier Analysis and Boundary Value Problems for ISP (1 Unit) Fourier series. Hilbert spaces and orthogonal functions. Parseval's theorem. Poisson summation formula and lattice points. Fourier integrals: Gaussian functions. Fourier inversion formula. Convolution. Sturm-Liouville theory. Applications to partial differential equations. Heat and wave equations. For ISP students. Students may not receive credit for both MATH 381-0 and any of MATH 351-0, MATH 360-2, or ES_APPM 311-2. Prerequisites: MATH 281-3 and PHYSICS 125-3. *Formal Studies Distro Area*

MATH 382-0 Complex Analysis and Group Theory for ISP (1 Unit) Complex analysis. Elements of group theory. For ISP students only. Students may not receive credit for both MATH 382-0 and any of MATH 325-0 or ES_APPM 311-2. Prerequisites: MATH 281-3 and PHYSICS 125-3. *Formal Studies Distro Area*

MATH 385-0 Probability and Statistics for MMSS (1 Unit) Probability theory and its applications in the social sciences. Students may not receive credit for both MATH 385-0 and any of MATH 310-1, MATH 311-1, MATH 314-0, STAT 320-1, STAT 383-0, IEMS 202-0, or EECS 302-0. Prerequisite: second-year standing in MMSS. *Formal Studies Distro Area*

MATH 386-1 Econometrics for MMSS (1 Unit) Econometric methods. Students may not receive credit for both MATH 386-1 and ECON 381-1. Prerequisite: MATH 385-0. *Formal Studies Distro Area*

MATH 386-2 Econometrics for MMSS (1 Unit) Econometric methods. Students may not receive credit for both MATH 386-2 and ECON 381-2. Prerequisite: MATH 386-1. *Formal Studies Distro Area*

MATH 395-0 Undergraduate Seminar (1 Unit) Topics in modern mathematics and relationships among different branches of mathematics. May be taken for only 1 unit of credit at a time but may be repeated for credit with change of topic. Prerequisite: consent of the department.

MATH 399-0 Independent Study (1 Unit) Independent learning under the direction of a faculty adviser. Students must obtain departmental approval for a plan of study before enrolling in MATH 399-0. Prerequisite: consent of the department.

Mathematics Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Major Requirements

(Units depend on basic courses taken.)

The mathematics major consists of basic courses and 9 upper-level courses.

Basic Courses

Course	Title
MATH 220-0 & MATH 224-0 or MATH 212-0 & MATH 213-0 & MATH 214-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
MATH 230-0 & MATH 234-0 & MATH 240-0 or MATH 281-1 & MATH 281-2 & MATH 281-3 or MATH 285-1 & MATH 285-2 & MATH 285-3 or MATH 290-1 & MATH 290-2 & MATH 290-3 or MATH 291-1 & MATH 291-2 & MATH 291-3	Differential Calculus of Multivariable Functions and Multiple Integration and Vector Calculus and Linear Algebra Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus

Students may count basic courses toward the requirements of more than one major or minor.

Upper-level Courses

Upper-level courses are courses at the 300 level or above. Students must complete 9 upper-level mathematics courses.

- The upper-level courses must include at least 1 of the following course sequences:

Course	Title
MATH 310-1 & MATH 310-2 & MATH 310-3 or MATH 311-1 & MATH 311-2 & MATH 311-3 or MATH 320-1 & MATH 320-2 & MATH 320-3 or MATH 321-1 & MATH 321-2 & MATH 321-3 or MATH 330-1 & MATH 330-2 & MATH 330-3 or MATH 331-1 & MATH 331-2 & MATH 331-3	Probability and Stochastic Processes and Probability and Stochastic Processes and Probability and Stochastic Processes MENU: Probability and Stochastic Processes and MENU: Probability and Stochastic Processes and MENU: Probability and Stochastic Processes Real Analysis and Real Analysis and Real Analysis MENU: Real Analysis and MENU: Real Analysis and MENU: Real Analysis Abstract Algebra and Abstract Algebra and Abstract Algebra MENU: Abstract Algebra and MENU: Abstract Algebra and MENU: Abstract Algebra

- The upper-level courses must include at least 1 of the following courses:

Course	Title
MATH 334-0 or MATH 311-1	Linear Algebra: Second Course MENU: Probability and Stochastic Processes

or MATH 320-1 or MATH 321-1 or MATH 330-1 or MATH 331-1	Real Analysis MENU: Real Analysis Abstract Algebra MENU: Abstract Algebra
--	--

- With the prior approval of the director of undergraduate studies, the upper-level courses may include as many as 3 courses offered by other departments with substantial mathematical content or that focus on serious applications of mathematics. No such course may count simultaneously toward the requirements of another major or minor.

Honors in Mathematics

The Department of Mathematics nominates outstanding mathematics majors for graduation with honors. Mathematics majors interested in pursuing honors should consult with the director of undergraduate studies before the end of junior year. To be eligible for nomination a student must:

- complete 1 of the following course sequences:

Course	Title
MATH 320-1 & MATH 320-2 & MATH 320-3 or MATH 321-1 & MATH 321-2 & MATH 321-3	Real Analysis and Real Analysis and Real Analysis MENU: Real Analysis and MENU: Real Analysis and MENU: Real Analysis

- complete 1 of the following course sequences:

Course	Title
MATH 330-1 & MATH 330-2 & MATH 330-3 or MATH 331-1 & MATH 331-2 & MATH 331-3	Abstract Algebra and Abstract Algebra and Abstract Algebra MENU: Abstract Algebra and MENU: Abstract Algebra and MENU: Abstract Algebra

- have a grade point average greater than or equal to 3.5 in courses which satisfy major requirements,*
- complete 2 quarters of MATH 399-0 Independent Study with distinction, or 2 quarters of a 400 level mathematics sequence with distinction, and
- complete a project culminating in a senior thesis of appropriate quality.

* Basic courses for the major do not count in this calculation.

For more information consult the department website (<http://www.math.northwestern.edu/undergraduate/degree-requirements/departmental-honors.html>) and the director of undergraduate studies, and see Honors in the Major (p. 178).

Graduate Study in Mathematics

Students intending to pursue graduate study in mathematics should take at least the following courses and course sequences:

Course	Title
MATH 321-1 & MATH 321-2 & MATH 321-3	MENU: Real Analysis and MENU: Real Analysis and MENU: Real Analysis

or MATH 320-1 & MATH 320-2 & MATH 320-3	Real Analysis and Real Analysis and Real Analysis
MATH 331-1 & MATH 331-2 & MATH 331-3	MENU: Abstract Algebra and MENU: Abstract Algebra and MENU: Abstract Algebra
or MATH 330-1 & MATH 330-2 & MATH 330-3	Abstract Algebra and Abstract Algebra and Abstract Algebra
MATH 344-1 & MATH 344-2	Introduction to Topology and Introduction to Topology
MATH 325-0	Complex Analysis

Well-prepared students should also consider taking the following graduate course sequences:

Course	Title
MATH 410-1 & MATH 410-2 & MATH 410-3	Analysis and Analysis and Introduction to Modern Analysis
MATH 470-1 & MATH 470-2 & MATH 470-3	Algebra and Algebra and Algebra

Secondary Teaching Licensure in Mathematics

To obtain an Illinois Professional Educator license in mathematics, a Weinberg student majoring in mathematics must apply to the Secondary Teaching program (p. 106) in the School of Education and Social Policy (SESP) (p. 97) by the fall of junior year and complete the requirements of that program as well as the degree requirements of Weinberg College.

Mathematics Minor

Minor requirements

(Units depend on basic courses taken.)

The mathematics minor consists of basic courses and 6 upper-level courses.

Basic courses

Course	Title
MATH 220-0 & MATH 224-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions
or MATH 212-0 & MATH 213-0 & MATH 214-0	Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
MATH 230-0 & MATH 234-0 & MATH 240-0	Differential Calculus of Multivariable Functions and Multiple Integration and Vector Calculus and Linear Algebra
or MATH 281-1 & MATH 281-2 & MATH 281-3	Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year
or MATH 285-1 & MATH 285-2 & MATH 285-3	Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year
or MATH 290-1 & MATH 290-2 & MATH 290-3	MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus

or MATH 291-1 & MATH 291-2 & MATH 291-3	MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus
---	--

Students may count basic courses toward the requirements of more than one major or minor.

Upper-level Courses

Upper-level courses are courses at the 300 level or above. Students must complete 6 upper-level mathematics courses.

- The upper-level courses must include at least 1 of the following course sequences:

Course	Title
MATH 310-1 & MATH 310-2	Probability and Stochastic Processes and Probability and Stochastic Processes
or MATH 311-1 & MATH 311-2	MENU: Probability and Stochastic Processes and MENU: Probability and Stochastic Processes
or MATH 320-1 & MATH 320-2	Real Analysis and Real Analysis
or MATH 321-1 & MATH 321-2	MENU: Real Analysis and MENU: Real Analysis
or MATH 330-1 & MATH 330-2	Abstract Algebra and Abstract Algebra
or MATH 331-1 & MATH 331-2	MENU: Abstract Algebra and MENU: Abstract Algebra
or MATH 344-1 & MATH 344-2	Introduction to Topology and Introduction to Topology
- With the prior approval of the director of undergraduate studies, the upper-level courses may include as many as 2 courses offered by other departments with substantial mathematical content or that focus on serious applications of mathematics. No such course may count simultaneously toward the requirements of another major or minor.

Mathematics Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Students who have completed all of the requirements for the Integrated Science Program (ISP) (p. 278) major will satisfy the requirements for an additional major in mathematics by completing 1 of the following course sequences:

Course	Title
MATH 320-1 & MATH 320-2 & MATH 320-3	Real Analysis and Real Analysis and Real Analysis
or MATH 321-1 & MATH 321-2 & MATH 321-3	MENU: Real Analysis and MENU: Real Analysis and MENU: Real Analysis
or MATH 330-1 & MATH 330-2 & MATH 330-3	Abstract Algebra and Abstract Algebra and Abstract Algebra

or MATH 331-1
& MATH 331-2
& MATH 331-3

MENU: Abstract Algebra
and MENU: Abstract Algebra
and MENU: Abstract Algebra

or MATH 344-2
or MATH 360-1
or MATH 360-2
or MATH 366-1
or MATH 368-0

Introduction to Topology
MENU: Applied Analysis
MENU: Applied Analysis
Mathematical Models in Finance
Introduction to Optimization

Students may not substitute INTG_SCI 398-0 Undergraduate Research for any mathematics or statistics course in the ISP curriculum.

See the Mathematics Major (p. 300) for further information regarding Honors in Mathematics, Graduate Study in Mathematics, and Secondary Teaching Licensure in Mathematics.

Mathematics Second Major or Minor for MMSS Students

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Second Major in Mathematics for MMSS Majors

A student who has completed all of the requirements for an adjunct major in Mathematical Methods in the Social Sciences (MMSS) (p. 294) but *not* a major in a social science must satisfy the standard (p. 300) requirements for the mathematics major (p. 300) to earn an additional major in mathematics. Students may not count any 300 level mathematics course toward both the MMSS adjunct major and the mathematics major.

Third Major in Mathematics for MMSS Majors

A student who has completed all of the requirements for an adjunct major in Mathematical Methods in the Social Sciences (MMSS) (p. 294) *and* a major in a social science will satisfy the requirements for an additional major in mathematics by

- completing 1 of the following course sequences:

Course	Title
MATH 320-1 & MATH 320-2 & MATH 320-3	Real Analysis and Real Analysis and Real Analysis
or MATH 321-1 & MATH 321-2 & MATH 321-3	MENU: Real Analysis and MENU: Real Analysis and MENU: Real Analysis

- and completing 3 of the following courses:

Course	Title
MATH 300-0	Foundations of Higher Mathematics
or MATH 310-2	Probability and Stochastic Processes
or MATH 310-3	Probability and Stochastic Processes
or MATH 311-2	MENU: Probability and Stochastic Processes
or MATH 311-3	MENU: Probability and Stochastic Processes
or MATH 325-0	Complex Analysis
or MATH 330-1	Abstract Algebra
or MATH 330-2	Abstract Algebra
or MATH 330-3	Abstract Algebra
or MATH 331-1	MENU: Abstract Algebra
or MATH 331-2	MENU: Abstract Algebra
or MATH 331-3	MENU: Abstract Algebra
or MATH 334-0	Linear Algebra: Second Course
or MATH 344-1	Introduction to Topology

Students may not count any 300 level mathematics course toward both the MMSS adjunct major and the mathematics major.

See the Mathematics Major (p. 300) for further information regarding Honors in Mathematics, Graduate Study in Mathematics, and Secondary Teaching Licensure in Mathematics.

Minor in Mathematics for MMSS Majors

A student who has completed all of the requirements for an adjunct major in Mathematical Methods in the Social Sciences (MMSS) (p. 294) will satisfy the requirements for a mathematics minor by completing 1 of the following course sequences:

Course	Title
MATH 320-1 & MATH 320-2 & MATH 320-3	Real Analysis and Real Analysis and Real Analysis
or MATH 321-1 & MATH 321-2 & MATH 321-3	MENU: Real Analysis and MENU: Real Analysis and MENU: Real Analysis

Students may not count any 300 level mathematics course toward both the MMSS adjunct major and the mathematics minor.

Middle East and North African Studies

mena.northwestern.edu

Study of the Middle East and North Africa is vital, given the region's centrality in history and politics and a liberal education's focus on the diversity of the human experience. The Middle East and North African Studies Program incorporates the latest critical approaches to social, cultural, political, and economic forces in the region, which stretches roughly from Morocco to Iran and Central Asia, from the Mediterranean into Saharan Africa and the Sudan. The program trains students in languages, histories, literatures, and sociocultural specificities while encouraging consideration of the region's global integration. It advances fresh perspectives on Middle East studies by inquiring how the cultural, political, and economic conditions of globalization influence the region internally and externally.

Drawn from anthropology, art history, history, literature, media studies, political science, religion, and radio/television/film, among other areas, the faculty represent a variety of perspectives, with a focus on the 19th, 20th, and 21st centuries. It reflects Northwestern's strengths in diaspora studies, Islam in trans-Saharan Africa, media studies, cultural production, and North African studies. The program embraces comparative approaches, both cross-regional and cross-disciplinary. Course topics include the Middle East and North Africa in international politics, mass media, migration, digital cultures, arts and literature, law, and religious movements.

The major and the minor prepare students for careers in a variety of fields, including law, government, human rights, international development, and cultural organizations.

Programs of Study

- Middle East and North African Studies Major (p. 306)
- Middle East and North African Studies Minor (p. 306)

See below for Arabic Courses (p. 304), Hebrew Courses (p. 305), Persian Courses (p. 305), Turkish Courses (p. 306).

Courses Taught in English

MENA 101-6 First-Year Seminar (1 Unit) WCAS First Year Seminar. *WCAS First-Year Seminar*

MENA 200-0 Making the Modern Middle East: Culture, Politics, History (1 Unit) The emergence of the Middle East as a world region and its representation in art, literature, and film in relation to geopolitics from the colonial period to the present. *Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area Social Behavioral Sciences Distro Area*

MENA 290-3 Introductory Topics in Middle East and North African Studies (1 Unit) Content and prerequisites vary; within the social and behavioral sciences. May be repeated for credit with change of topic. *Social Behavioral Sciences Distro Area*

MENA 290-4 Introductory Topics in Middle East and North African Studies (1 Unit) Content and prerequisites vary; within historical studies. May be repeated for credit with change of topic. *Historical Studies Distro Area*

MENA 290-5 Introductory Topics in Middle East and North African Studies (1 Unit) Content and prerequisites vary; within ethics and values areas of study. May be repeated for credit with change of topic. *Ethics Values Distro Area*

MENA 290-6 Introductory Topics in Middle East and North African Studies (1 Unit) Content and prerequisites vary; within literature and fine arts areas of study. May be repeated for credit with change of topic. *Literature Fine Arts Distro Area*

MENA 301-1 Seminar in Middle East and North African Studies (1 Unit) Interdisciplinary approaches to the study of the Middle East and North Africa. Content varies with annual theme. May be repeated for credit with a change in topic. Courses need not be taken in sequence.

MENA 301-2 Seminar in Middle East and North African Studies (1 Unit) Interdisciplinary approaches to the study of the Middle East and North Africa. Content varies with annual theme. May be repeated for credit with a change in topic. Courses need not be taken in sequence.

MENA 301-3 Seminar in Middle East and North African Studies (1 Unit) Interdisciplinary approaches to the study of the Middle East and North Africa. Content varies with annual theme. May be repeated for credit with a change in topic. Courses need not be taken in sequence.

MENA 390-3 Advanced Topics in Middle East & North African Studies (1 Unit) Content and prerequisites vary; within the social and behavioral sciences. May be repeated for credit with change of topic. *Social Behavioral Sciences Distro Area*

MENA 390-4 Advanced Topics in Middle East & North African Studies (1 Unit) Content and prerequisites vary; within historical studies. May be repeated for credit with change of topic. *Historical Studies Distro Area*

MENA 390-5 Advanced Topics in Middle East & North African Studies (1 Unit) Content and prerequisites vary; within ethics and values areas of study. May be repeated for credit with change of topic. *Ethics Values Distro Area*

MENA 390-6 Advanced Topics in Middle East & North African Studies (1 Unit) Content and prerequisites vary; within literature and fine arts areas of study. May be repeated for credit with change of topic. *Literature Fine Arts Distro Area*

MENA 399-0 Independent Study (1 Unit) Reading and conferences on special subjects for advanced undergraduates. Prerequisite: consent of director of undergraduate studies and instructor.

Arabic Courses

ARABIC 111-1 Arabic I (1 Unit) Three-course introduction to modern standard Arabic primarily, along with some expo-sure to and familiarization with the main regional spoken varieties. Speaking, reading, listening comprehension, and basic writing skills developed.

ARABIC 111-2 Arabic I (1 Unit) Three-course introduction to modern standard Arabic primarily, along with some expo-sure to and familiarization with the main regional spoken varieties. Speaking, reading, listening comprehension, and basic writing skills developed.

ARABIC 111-3 Arabic I (1 Unit) Three-course introduction to modern standard Arabic primarily, along with some expo-sure to and familiarization with the main regional spoken varieties. Speaking, reading, listening comprehension, and basic writing skills developed.

ARABIC 114-0 Conversation and Culture in the Arab World (1 Unit) Introduction to spoken colloquial Arabic of a country or region-for example, Egyptian, Levantine, or Moroccan. Emphasis on spoken language and conversation. May be repeated for credit with different dialect. Prerequisite: ARABIC 111-2 or equivalent.

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

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

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

ARABIC 125-0 Media Arabic (1 Unit) Introduction to vocabulary, expressions, and terminology used in Arab print and broadcast media. Supplements study in modern standard Arabic. May be repeated for credit with change of topic. Prerequisite: ARABIC 121-2 or equivalent.

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

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

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

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

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

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

ARABIC 316-1 Reading Arabic Poetry (1 Unit) Content varies. May be repeated for credit with different topic.

ARABIC 316-2 Reading Classical Arabic Texts (1 Unit) Content varies. May be repeated for credit with different topic.

ARABIC 316-3 Reading Modern Arabic Prose (1 Unit) Content varies. May be repeated for credit with different topic.

ARABIC 399-0 Independent Study (1 Unit) For students who have advanced with distinction beyond the regular course offerings in Arabic. Prerequisite: consent of instructor.

Hebrew Courses

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

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

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

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

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

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

HEBREW 216-1 Hebrew III: Topics in Hebrew Literature (1 Unit) Reading Hebrew literature, some biblical but mostly modern prose. Compositions and oral presentations. Prerequisite: HEBREW 121-3 or equivalent. *Literature Fine Arts Distro Area*

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

HEBREW 216-3 Hebrew III: Topics in Hebrew Literature (1 Unit) Reading Hebrew literature, some biblical but mostly modern prose. Compositions and oral presentations. Prerequisite: HEBREW 121-3 or equivalent. *Literature Fine Arts Distro Area*

HEBREW 316-1 Hebrew IV: Advanced Topics in Hebrew Literature (1 Unit) Literature Reading 20th-century Hebrew literature. Presentations, discussion, and essays in Hebrew. Prerequisite: HEBREW 216-3 or consent of instructor. *Literature Fine Arts Distro Area*

HEBREW 316-2 Hebrew IV: Advanced Topics In Hebrew Literature (1 Unit) Literature Reading 20th-century Hebrew literature. Presentations, discussion, and essays in Hebrew. Prerequisite: HEBREW 216-3 or consent of instructor. *Literature Fine Arts Distro Area*

HEBREW 316-3 Advanced Topics in Hebrew Literature (1 Unit) Literature Reading 20th-century Hebrew literature. Presentations, discussion, and essays in Hebrew. Prerequisite: HEBREW 216-3 or consent of instructor. *Literature Fine Arts Distro Area*

HEBREW 399-0 Independent Study (1 Unit) For students who have advanced with distinction beyond the regular course offerings in Hebrew. Prerequisite: consent of instructor.

Persian Courses

PERSIAN 111-1 Persian I (1 Unit) Introduction to basic literacy and oral proficiency intended to produce conversational speakers. Emphasizes modern Tehrani dialect of Persian; students also learn to read, write, and speak more formal Persian.

PERSIAN 111-2 Persian I (1 Unit) Introduction to basic literacy and oral proficiency intended to produce conversational speakers. Emphasizes modern Tehrani dialect of Persian; students also learn to read, write, and speak more formal Persian. Prerequisite: PERSIAN 111-1 or equivalent.

PERSIAN 111-3 Persian I (1 Unit) Introduction to basic literacy and oral proficiency intended to produce conversational speakers. Emphasizes modern Tehrani dialect of Persian; students also learn to read, write, and speak more formal Persian. Prerequisite: PERSIAN 111-2 or equivalent.

PERSIAN 121-1 Persian II (1 Unit) Acquisition of vocabulary and language production. Employs authentic written and audiovisual materials, including newspapers, short stories, poems, television, film, and radio. Speaking and writing emphasized. Prerequisite: PERSIAN 111-3 or equivalent.

PERSIAN 121-2 Persian II (1 Unit) Acquisition of vocabulary and language production. Employs authentic written and audiovisual

materials, including newspapers, short stories, poems, television, film, and radio. Speaking and writing emphasized. Prerequisite: PERSIAN 121-1 or equivalent.

PERSIAN 121-3 Persian II (1 Unit) Acquisition of vocabulary and language production. Employs authentic written and audiovisual materials, including newspapers, short stories, poems, television, film, and radio. Speaking and writing emphasized. Prerequisite: PERSIAN 121-2 or equivalent.

PERSIAN 399-0 Independent Study (1 Unit) For students who have advanced with distinction beyond the regular course offerings in Persian. Prerequisite: consent of instructor.

Turkish Courses

TURKISH 111-1 Turkish I (1 Unit) Introduction to basic literacy and oral proficiency; insights into modern Turkish culture through the language. Print and audiovisual materials used to supplement textbook.

TURKISH 111-2 Turkish I (1 Unit) Introduction to basic literacy and oral proficiency; insights into modern Turkish culture through the language. Print and audiovisual materials used to supplement textbook. Prerequisite: TURKISH 111-1 or equivalent.

TURKISH 111-3 Turkish I (1 Unit) Introduction to basic literacy and oral proficiency; insights into modern Turkish culture through the language. Print and audiovisual materials used to supplement textbook. Prerequisite: TURKISH 111-2 or equivalent.

TURKISH 121-1 Turkish II (1 Unit) Continuation of basic grammar instruction; further development of reading, writing, speaking, and listening skills through the use of printed and audiovisual materials. Insights into modern Turkish culture. Prerequisite: TURKISH 111-3 or equivalent.

TURKISH 121-2 Turkish II (1 Unit) Continuation of basic grammar instruction; further development of reading, writing, speaking, and listening skills through the use of printed and audiovisual materials. Insights into modern Turkish culture. Prerequisite: TURKISH 121-1 or equivalent.

TURKISH 121-3 Turkish II (1 Unit) Continuation of basic grammar instruction; further development of reading, writing, speaking, and listening skills through the use of printed and audiovisual materials. Insights into modern Turkish culture. Prerequisite: TURKISH 121-2 or equivalent.

Middle East and North African Studies Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Major Requirements (15 units)

- 6 courses in Arabic, Hebrew, Persian, or Turkish beyond the first year. Native-speaker proficiency, determined by testing, fulfills the language requirement but does not count for course credit. Native speakers may complete this 6-course requirement with courses in a second MENA language or approved disciplinary courses.
- MENA 200-0 Making the Modern Middle East: Culture, Politics, History

- 2 quarters of Seminar in Middle East and North African Studies (MENA 301-1, MENA 301-2, MENA 301-3).
- 6 additional courses, each chosen from the approved program list for the quarter or with the director
 - Distributed among three disciplinary categories
 - 2 in history
 - 2 in social sciences (including anthropology, economics, linguistics, political science, psychology, and sociology)
 - 2 in humanities (including art history, art theory and practice, comparative literary studies, English, humanities, philosophy, and religious studies)
 - At least 5 of the 6 must be primarily focused on the Middle East and/or North Africa.
 - Additional quarters of Seminar in Middle East and North African Studies (MENA 301-1, MENA 301-2, MENA 301-3) count in the disciplinary category of the respective instructor.
- At most 2 courses may be double-counted toward another major.
- The major also requires a study abroad experience in the Middle East or North Africa, either during the summer via intensive language study or other study abroad, or during the academic year; consult the program director for advice and approval. Students may petition for a waiver or modification of this requirement in exceptional cases.

Honors in Middle East and North African Studies

The MENA Program offers exceptional students the opportunity to write a year long Senior Honors Thesis with a faculty adviser drawn from the Core Faculty of the MENA Program. Majors with strong academic records and an interest in pursuing honors should submit an honors application, including a brief research proposal, to the program office by the third week of spring quarter of junior year. Students studying abroad during the spring of their junior year are required to contact the MENA Director about their intentions in writing (email is acceptable). Accepted students complete a thesis, normally through 2 quarters of senior-year independent study (MENA 399-0); the two units must be counted toward different disciplinary categories.

Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information consult the program website (<https://www.mena.northwestern.edu/undergraduate/honors.html>), visit the program office, and see Honors in the Major (p. 178).

Middle East and North African Studies Minor

Minor Requirements (8 units)

- Each course must be chosen from the approved MENA studies list for the quarter or with the director and must relate to the Middle East or North Africa.
- Foreign language study is not required for the minor, and no more than 2 courses may be Arabic, Hebrew, Persian, or Turkish language courses.
- At least 2 courses should be selected in each of the three disciplinary categories: history, social sciences, and humanities.
- Students who satisfactorily complete two years of language study in Arabic, Hebrew, Persian, or Turkish may complete the minor with only 6 disciplinary courses.

- Native-speaker proficiency does not count for course credit; native speakers may count 2 nonnative MENA language courses among the 8 courses.

Molecular Biosciences

The Department of Molecular Biosciences does not offer an undergraduate major. See Biological Sciences (p. 206) for a description of that major.

Neurobiology

neurobiology.northwestern.edu

The Department of Neurobiology offers a major in neuroscience, the study of the nervous system from the level of individual genes and proteins that control neural activity through mechanisms that govern complex human behavior and cognition. Although traditionally associated with biology and psychology, modern neuroscience is highly interdisciplinary and integrates approaches and ideas from many other areas, including chemistry, physics, mathematics, linguistics, communication sciences, computer science, and engineering. The interdisciplinary nature of neuroscience is reflected in the neuroscience curriculum, which provides

- A deep understanding of the structure and function of nervous systems and the mechanisms by which the brain generates behavior, as well as of the history, major ideas, and research approaches used in neuroscience
- Knowledge and experience in an allied field to develop interdisciplinary skills for diverse careers
- A strong foundation in principles of chemistry, mathematics, physics, and physiology, as well as practical knowledge in computer programming and statistics
- Laboratory coursework or independent laboratory research

Interested students typically complete the chemistry and math courses listed under related courses in their first year. Sophomores should take BIOL_SCI 217-0 Physiology in the fall, followed by the core courses NEUROSCI 202-0 Cellular and Molecular Neuroscience and NEUROSCI 206-0 Systems and Behavioral Neuroscience before taking 300-level NEUROSCI courses. Neuroscience electives and allied field courses should be chosen with a faculty adviser.

Students are strongly encouraged to meet with the director of undergraduate studies to develop a course plan that provides exceptional preparation for graduate study in neuroscience or a related field; for medical school; and for careers in science journalism, patent law, and the pharmaceutical, biotech, and other industries.

Practical research experience is highly encouraged. See the department website for many for-credit research opportunities with affiliated world-class faculty.

Neurobiology faculty members also contribute to the major in biological sciences (p. 206).

Programs of Study

- Neuroscience Major (p. 308)
- Neuroscience Second Major for ISP Students (p. 311)

NEUROSCI 202-0 Cellular and Molecular Neuroscience (1 Unit)

Introduction to principles governing nervous system function at the cellular and molecular level. May not receive credit for both NEUROSCI 202-0 and BIOL_SCI 302-0. Prerequisite: BIOL_SCI 217-0. *Natural Sciences Distro Area*

NEUROSCI 206-0 Systems and Behavioral Neuroscience (1 Unit)

Introduction to the organization and function of brain systems and their role in generating behavior. May not receive credit for both this course and the former NEUROSCI 306-0/BIOL_SCI 306-0. Prerequisite: NEUROSCI 202-0 or NEUROSCI 311-0 or BIOL_SCI 302-0. *Natural Sciences Distro Area*

NEUROSCI 303-0 Molecular Mechanisms of Neuropsychopharmacology (1 Unit)

Advanced seminar focusing on molecular mechanisms and aberrations of synaptic signal transduction and drugs that target them. Prerequisite: NEUROSCI 202-0 or NEUROSCI 311-0 or BIOL_SCI 302-0.

NEUROSCI 304-0 Developmental Neurobiology (1 Unit) Embryology and cellular/molecular mechanisms of nervous system development. Topics include patterning of the early nervous system, neurogenesis, neuronal differentiation, wiring of neural circuits, activity and experience-dependent development and sex differences in early and late development. May not receive credit for both this course and the former BIOL_SCI 304-0. Prerequisites: BIOL_SCI 215-0; and NEUROSCI 202-0 or NEUROSCI 311-0 or BIOL_SCI 302-0.

NEUROSCI 311-0 Biophysical Analysis of Neurons for ISP (1 Unit)

Emphasis on quantitative, electrophysiological studies of the nervous system at the level of single neurons. The course examines in detail the mechanisms that permit nerve cells to generate and propagate electrical signals and to communicate these signals chemically to other cells. Prerequisites: Any biology class; and ISP major or Neuroscience major may request permission.

NEUROSCI 320-0 Animal Behavior (1 Unit) Animal behavior from the neuroscience perspective. Neurobiological bases of foraging, communication, migration, predator-prey interactions, mating, and parental care. Prerequisites: NEUROSCI 202-0 and NEUROSCI 206-0; or NEUROSCI 311-0 and NEUROSCI 206-0; or BIOL_SCI 302-0. *Natural Sciences Distro Area*

NEUROSCI 324-0 Neurobiology of Biological Clocks and Sleep (1 Unit) General properties of sleep and circadian rhythms; how sleep and the circadian clock regulate a number of diverse activities at the cell, organ, and organism levels. May not receive credit for both this course and the former BIOL_SCI 324-0. Prerequisite: NEUROSCI 202-0 or NEUROSCI 311-0.

NEUROSCI 326-0 Neurobiology of Learning and Memory (1 Unit)

Molecular and neural bases of memory. Taught with BIOL_SCI 326-0; may not receive credit for both courses. Prerequisites: NEUROSCI 202-0 and NEUROSCI 206-0; or NEUROSCI 311-0 and NEUROSCI 206-0; or BIOL_SCI 302-0.

NEUROSCI 350-0 Advanced Neurophysiology Laboratory (1 Unit)

Learn to record electrophysiological signals (action potentials and post synaptic potentials) from living neural systems using amplifiers and recording equipment commonly found in research labs around the world. Prerequisites: NEUROSCI 202-0 and NEUROSCI 206-0; or NEUROSCI 311-0 and NEUROSCI 206-0; or BIOL_SCI 302-0; and consent of instructor.

NEUROSCI 355-0 Neurogenetics of Behavior Laboratory (1 Unit)

Project-based laboratory investigating the genetic basis of behavior in a simple model system; molecular genetic techniques used in neurobiology. Prerequisites: NEUROSCI 202-0 and NEUROSCI 206-0; or NEUROSCI 311-0 and NEUROSCI 206-0; or BIOL_SCI 302-0.

NEUROSCI 360-0 Neuroscience of Brain Disorders (1 Unit) Survey of brain disorders such as neurodegenerative diseases, developmental disorders, narcolepsy, and migraine. Trace progress from the laboratory to the clinic, evaluate the state of knowledge and understand future directions. Strongly recommend review of basic genetics and molecular biology. Prerequisites: NEUROSCI 202-0 and NEUROSCI 206-0; or NEUROSCI 311-0 and NEUROSCI 206-0; or BIOL_SCI 302-0. *Natural Sciences Distro Area*

NEUROSCI 377-0 Neurobiology of Sensation and Perception (1 Unit)

Analysis of the key concepts underlying the neurobiological mechanisms of vision, hearing, taste, smell, touch, and pain. Neural pathways leading to perception and processing of stimuli will also be discussed. Prerequisite: NEUROSCI 202-0 or NEUROSCI 311-0 or BIOL_SCI 302-0. *Natural Sciences Distro Area*

NEUROSCI 390-0 Topics in Neuroscience (1 Unit) Special Topics in Neuroscience. Topics to be announced. Prerequisites vary. May be repeated for credit with different topic. With approval of the director of undergraduate studies, may be used to fulfill a Neuroscience elective or serve as an Allied Field course. Prerequisites: NEUROSCI 202-0 and other specific prerequisites as set by instructors.

NEUROSCI 398-0 Senior Thesis Seminar (1 Unit) Instruction in writing a scientific thesis, discussion of student projects, instructor and peer feedback on thesis drafts, and continued independent research. Open to seniors pursuing departmental honors. With the approval of the director of undergraduate studies.

NEUROSCI 399-0 Independent Study in Neuroscience (1 Unit)

Supervised laboratory or methods research with a faculty member. With approval of the director of undergraduate studies.

Neuroscience Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Neuroscience major requirements

- 6 Neuroscience units (courses may not be double-counted with Allied Field courses or required Related Courses for the major)
 - 2 200-level NEUROSCI core courses (p. 308)
 - 2 courses with a primary focus on human behavior and the human brain (Group A Elective) (p. 308) at any level
 - 2 300-level courses with a primary focus on molecular, cellular, and systems-level mechanisms of brain function (Group B Elective (p. 308))
- 6 Allied Field units chosen from one of the following areas. Courses may not be double-counted with the 6 Neuroscience units or required Related Courses for the Neuroscience major. No more than two Allied Field courses may be double-counted with another major.
 - Biology (p. 309)
 - Chemistry (p. 309)
 - Computation and Systems Modeling (p. 309)
 - Human Behavior and Cognition (p. 310)

- Language and Human Communication (p. 310)
- Ad hoc Allied Field - some other area chosen with approval from director of undergraduate studies
- Related Courses (units depend on math and science sequences taken)
 - BIOL_SCI 217-0 Physiology
 - General Chemistry sequence (p. 311) (with labs)
 - 1 Computer Programming (p. 310) course from list of approved courses
 - Calculus sequence (p. 310)
 - General Physics sequence (p. 311) (with labs)
 - 1 Statistics course (p. 311) from list of approved courses
- Laboratory Experience (p. 310) requirement
 - Courses that satisfy the laboratory experience requirement may also be used to satisfy another requirement for the major.
 - If two units of Undergraduate Research (398/399) are used for the Laboratory Experience requirement, they may also substitute for one course in an Allied Field.

Neuroscience Course Lists

Required Neuroscience core courses:

Course	Title
NEUROSCI 202-0	Cellular and Molecular Neuroscience
NEUROSCI 206-0	Systems and Behavioral Neuroscience

Neuroscience Group A Electives (students choose 2):

Course	Title
COG_SCI 210-0	Language and the Brain
CSD 303-0	Brain and Cognition
or PSYCH 365-0	Brain and Cognition
CSD 310-0	Biological Foundations of Speech and Music
PSYCH 110-0	Introduction to Psychology
PSYCH 218-0	Developmental Psychology
PSYCH 228-0	Cognitive Psychology
PSYCH 248-0	Health Psychology
PSYCH 324-0	Perception
PSYCH 359-0	Advanced Seminar in Psychology (PSYCH 359-0-20 and others with approval of the director of undergraduate studies)
PSYCH 361-0	Brain Damage and the Mind

Neuroscience Group B Electives (students choose 2):

Course	Title
NEUROSCI 303-0	Molecular Mechanisms of Neuropsychopharmacology
NEUROSCI 304-0	Developmental Neurobiology
NEUROSCI 311-0	Biophysical Analysis of Neurons for ISP (With approval of the director of undergraduate studies, if not used in place of NEUROSCI 202-0)
NEUROSCI 320-0	Animal Behavior
NEUROSCI 324-0	Neurobiology of Biological Clocks and Sleep
NEUROSCI 326-0	Neurobiology of Learning and Memory
NEUROSCI 350-0	Advanced Neurophysiology Laboratory
NEUROSCI 355-0	Neurogenetics of Behavior Laboratory
NEUROSCI 360-0	Neuroscience of Brain Disorders
NEUROSCI 377-0	Neurobiology of Sensation and Perception
NEUROSCI 390-0	Topics in Neuroscience (With approval of the director of undergraduate studies)

BIOL_SCI 305-0	Neurobiology Laboratory
ES_APPM 370-1	Introduction to Computational Neuroscience

Allied Field Course Lists

Biology (any 6 units)

Course	Title
300-level NEUROSCI courses listed under Neuroscience Group B Electives above (except NEUROSCI 398-0 and NEUROSCI 399-0) are eligible if not being used to satisfy other requirements for the major.	
BIOL_SCI 215-0	Genetics and Molecular Biology
BIOL_SCI 219-0	Cell Biology
BIOL_SCI 220-0	Genetics and Molecular Processes Laboratory (0.34 units)
BIOL_SCI 221-0	Cellular Processes Laboratory (0.34 units)
BIOL_SCI 222-0	Investigative Laboratory (0.34 units)
BIOL_SCI 301-0 or BIOL_SCI 308-0	Principles of Biochemistry Biochemistry
BIOL_SCI 305-0	Neurobiology Laboratory
BIOL_SCI 315-0	Advanced Cell Biology
BIOL_SCI 323-0	Bioinformatics: Sequence and Structure Analysis
BIOL_SCI 325-0	Animal Physiology
BIOL_SCI 327-0	Biology of Aging
BIOL_SCI 344-0	Anatomy of Vertebrates
BIOL_SCI 355-0	Immunobiology
BIOL_SCI 361-0	Protein Structure and Function
BIOL_SCI 378-0	Functional Genomics
BIOL_SCI 390-0	Advanced Molecular Biology
BIOL_SCI 391-0	Development and Evolution of Body Plans
BIOL_SCI 395-0	Molecular Genetics
CHEM 210-1	Organic Chemistry
CHEM 210-2	Organic Chemistry
CHEM 210-3	Organic Chemistry
CHEM 230-2	Organic Chemistry Lab I (0.34 units)
CHEM 230-3	Organic Chemistry Lab II (0.34 units)
The five chemistry courses above have substantial overlap with the 212 and 232 series below. Consult with the Chemistry director of undergraduate studies for exact equivalencies.	
CHEM 212-1	Organic Chemistry
CHEM 212-2	Organic Chemistry
CHEM 212-3	Organic Chemistry
CHEM 232-1	Organic Chemistry Laboratory I (0.34 units)
CHEM 232-2	Organic Chemistry Laboratory II (0.34 units)

Chemistry (any 6 units)

Course	Title
CHEM 210-1	Organic Chemistry
CHEM 210-2	Organic Chemistry
CHEM 210-3	Organic Chemistry
CHEM 230-2	Organic Chemistry Lab I (0.34 units)
CHEM 230-3	Organic Chemistry Lab II (0.34 units)
The five courses above have substantial overlap with the 212 and 232 series below. Consult with the Chemistry director of undergraduate studies for exact equivalencies.	
CHEM 212-1	Organic Chemistry
CHEM 212-2	Organic Chemistry
CHEM 212-3	Organic Chemistry
CHEM 232-1	Organic Chemistry Laboratory I (0.34 units)
CHEM 232-2	Organic Chemistry Laboratory II (0.34 units)

also	
CHEM 220-0	Introductory Instrumental Analysis
CHEM 305-0	Chemistry of Life Processes
CHEM 307-0	Materials and Nanochemistry
CHEM 308-0	Design, Synthesis, and Applications of Nanomaterials
CHEM 316-0	Medicinal Chemistry: the Organic Chemistry of Drug Design and Action
CHEM 329-0	Analytical Chemistry
CHEM 342-1	Thermodynamics
CHEM 342-2	Quantum Mechanics and Spectroscopy
CHEM 342-3	Kinetics and Statistical Thermodynamics
CHEM 348-0	Physical Chemistry for ISP
CHEM 350-1	Advanced Laboratory 1

Computation and Systems Modeling (any 6 units)

Course	Title
MATH 230-0	Differential Calculus of Multivariable Functions
MATH 234-0	Multiple Integration and Vector Calculus
MATH 240-0	Linear Algebra
MATH 250-0	Elementary Differential Equations
The four courses above have substantial overlap with the 281, 285, 290, and 291 series below. Consult the Math director of undergraduate studies for exact equivalencies.	
MATH 281-1	Accelerated Mathematics for ISP: First Year
MATH 281-2	Accelerated Mathematics for ISP: First Year
MATH 281-3	Accelerated Mathematics for ISP: First Year
MATH 285-1	Accelerated Mathematics for MMSS: First Year
MATH 285-2	Accelerated Mathematics for MMSS: First Year
MATH 285-3	Accelerated Mathematics for MMSS: First Year
MATH 290-1	MENU: Linear Algebra and Multivariable Calculus
MATH 290-2	MENU: Linear Algebra and Multivariable Calculus
MATH 290-3	MENU: Linear Algebra and Multivariable Calculus
MATH 291-1	MENU: Intensive Linear Algebra and Multivariable Calculus
MATH 291-2	MENU: Intensive Linear Algebra and Multivariable Calculus
MATH 291-3	MENU: Intensive Linear Algebra and Multivariable Calculus

also	
MATH 310-1	Probability and Stochastic Processes
MATH 310-2	Probability and Stochastic Processes
MATH 310-3	Probability and Stochastic Processes
MATH 325-0	Complex Analysis
MATH 351-0	Fourier Analysis and Boundary Value Problems
MATH 353-0	Qualitative Theory of Differential Equations
MATH 354-1	Chaotic Dynamical Systems
MATH 360-1	MENU: Applied Analysis
MATH 360-2	MENU: Applied Analysis
MATH 381-0	Fourier Analysis and Boundary Value Problems for ISP
MATH 382-0	Complex Analysis and Group Theory for ISP
PHYSICS 330-1	Classical Mech
PHYSICS 330-2	Classical Mechanics
PHYSICS 337-0	Physics of Condensed Matter
PHYSICS 339-1	Quantum Mechanics
PHYSICS 339-2	Quantum Mechanics
PHYSICS 339-3	Particle and Nuclear Physics
PHYSICS 352-0	Introduction to Computational Physics

PHYSICS 357-0	Optics Laboratory
PHYSICS 360-0	General Physics Laboratory
PHYSICS 361-0	Classical Optics and Special Relativity
PHYSICS 371-0	Nonlinear Dynamics and Chaos

Human Behavior and Cognition (any 6 units)

Course	Title
COG_SCI 207-0	Introduction to Cognitive Modeling
COG_SCI 210-0	Language and the Brain
COG_SCI 211-0	Learning, Representation & Reasoning
CSD 303-0 or PSYCH 365-0	Brain and Cognition
CSD 310-0	Biological Foundations of Speech and Music
PSYCH 110-0	Introduction to Psychology
PSYCH 205-0	Research Methods in Psychology
PSYCH 218-0	Developmental Psychology
PSYCH 228-0	Cognitive Psychology
PSYCH 248-0	Health Psychology
PSYCH 324-0	Perception
PSYCH 361-0	Brain Damage and the Mind
PSYCH 303-0	Psychopathology
PSYCH 321-0	Neuroscience & Behavior Laboratory
PSYCH 334-0	Language and Thought
PSYCH 336-0	Consciousness
PSYCH 359-0	Advanced Seminar in Psychology
PSYCH 362-0	Cognitive Development
PSYCH 363-0	Images of Cognition
PSYCH 368-0	Human Memory

Language and Human Communication (any 6 units)

Course	Title
COG_SCI 210-0	Language and the Brain
CSD 301-0	Anatomy and Physiology of the Vocal Mechanism
CSD 302-0	Anatomy and Physiology of the Peripheral Hearing Mechanism
CSD 305-0	Phonetics
CSD 306-0	Psychoacoustics
LING 250-0	Sound Patterns in Human Language
LING 260-0	Formal Analysis of Words & Sentences
LING 270-0	Meaning
LING 311-0	Child Language
LING 315-0	Experimental Approaches to Word Form Processing
LING 316-0	Experimental Syntax
LING 317-0	Experimental Pragmatics
LING 321-0	Bilingualism
LING 330-0	Research Methods in Linguistics
LING 334-0	Introduction to Computational Linguistics
LING 336-0	Words, Networks and the Internet
LING 342-0	Structure of Various Languages
LING 350-0	Fundamentals of Laboratory Phonology
LING 360-0	Fundamentals of Syntax
LING 361-0	Morphology
LING 370-0	Fundamentals of Meaning
LING 371-0	Reference
LING 372-0	Pragmatics
LING 373-0	Implicature

Laboratory Experience Options (units depend on option selected):

Two units of credit from 398 or 399 Undergraduate Research in a relevant field:

Course	Title
NEUROSCI 399-0	Independent Study in Neuroscience (multiple registrations)
NEUROSCI 398-0	Senior Thesis Seminar (With approval of the director of undergraduate studies)

Two units of Undergraduate Research (typically numbered 398 or 399) in another relevant field may satisfy this requirement with the approval of the director of undergraduate studies.

Two units of approved 398 or 399 Undergraduate Research may be used in place of one unit of credit in an Allied Field.

One unit of credit from laboratory or methods undergraduate coursework:

Course	Title
Some courses on this list double-count for an Allied Field or Neuroscience Elective.	
NEUROSCI 350-0	Advanced Neurophysiology Laboratory
NEUROSCI 355-0	Neurogenetics of Behavior Laboratory
PSYCH 205-0	Research Methods in Psychology
BIOL_SCI 305-0	Neurobiology Laboratory
BIOL_SCI 220-0	Genetics and Molecular Processes Laboratory (0.34 units)
BIOL_SCI 221-0	Cellular Processes Laboratory (0.34 units)
BIOL_SCI 222-0	Investigative Laboratory (0.34 units)
CHEM 230-2	Organic Chemistry Lab I (0.34 units)
CHEM 230-3	Organic Chemistry Lab II (0.34 units)

Other with the approval of the director of undergraduate studies.

Related Courses Required for the Major in Neuroscience:

1 Biology course:

Course	Title
BIOL_SCI 217-0	Physiology

1 Computer Programming course chosen from:

Course	Title
EECS 110-0	Introduction to Computer Programming
EECS 111-0	Fundamentals of Computer Programming
INTG_SCI 101-1 & INTG_SCI 101-2	Computing Applications and Computing Applications

With approval of the director of undergraduate studies, either BIOL_SCI 323-0 or ES_APPM 370-1 may count in place of a Computer Programming related course for the Neuroscience major, instead of as a Neuroscience Elective or Allied Field course.

Calculus sequence chosen from:

Course	Title
MATH 220-0	Differential Calculus of One-Variable Functions
MATH 224-0	Integral Calculus of One-Variable Functions
or	
MATH 212-0	Single Variable Calculus I
MATH 213-0	Single Variable Calculus II
MATH 214-0	Single Variable Calculus III

Other with approval of the director of undergraduate studies

Chemistry sequence chosen from:

Course	Title
CHEM 110-0	Quantitative Problem Solving in Chemistry
CHEM 131-0	General Chemistry 1
CHEM 141-0	General Chemistry Laboratory 1 (0.34 units)
CHEM 132-0	General Chemistry 2
CHEM 142-0	General Chemistry Laboratory 2 (0.34 units)
or	
CHEM 151-0	Accelerated General Chemistry 1
CHEM 152-0	Accelerated General Chemistry 2
CHEM 161-0	Accelerated General Chemistry Laboratory 1 (0.34 units)
CHEM 162-0	Accelerated General Chemistry Laboratory 2 (0.34 units)
or	
CHEM 171-0	Advanced General Inorganic Chemistry
CHEM 172-0	Advanced General Physical Chemistry
CHEM 181-0	Advanced General Inorganic Chemistry Laboratory (0.34 units)
CHEM 182-0	Advanced General Physical Chemistry Laboratory (0.34 units)

Physics sequence chosen from:

Course	Title
PHYSICS 130-1	College Physics
PHYSICS 136-1	General Physics Laboratory (0.34 units)
PHYSICS 130-2	College Physics
PHYSICS 136-2	General Physics Laboratory (0.34 units)
PHYSICS 130-3	College Physics
PHYSICS 136-3	General Physics Laboratory (0.34 units)
or	
PHYSICS 135-1	General Physics
PHYSICS 136-1	General Physics Laboratory (0.34 units)
PHYSICS 135-2	General Physics
PHYSICS 136-2	General Physics Laboratory (0.34 units)
PHYSICS 135-3	General Physics
PHYSICS 136-3	General Physics Laboratory (0.34 units)
or	
PHYSICS 140-1	Fundamentals of Physics
PHYSICS 136-1	General Physics Laboratory (0.34 units)
PHYSICS 140-2	Fundamentals of Physics
PHYSICS 136-2	General Physics Laboratory (0.34 units)
PHYSICS 140-3	Fundamentals of Physics
PHYSICS 136-3	General Physics Laboratory (0.34 units)

1 Statistics course chosen from:

Course	Title
CSD 304-0	Statistics in Communication Sciences and Disorders
IEMS 201-0	Introduction to Statistics
PSYCH 201-0	Statistical Methods in Psychology
STAT 202-0	Introduction to Statistics
STAT 210-0	Introductory Statistics for the Social Sciences
STAT 383-0	Probability and Statistics for ISP

Other with the approval of the director of undergraduate studies.

Honors in Neuroscience

Majors with strong academic records and significant research accomplishments may pursue honors in neuroscience. Interested

students should contact the director of undergraduate studies by email at the beginning of fall quarter senior year. Considerations for honors include GPA and the quality of a written thesis based on the student's research. Students also must complete at least 1 quarter of NEUROSCI 399-0 Independent Study in Neuroscience, followed by NEUROSCI 398-0 Senior Thesis Seminar in winter of senior year. Students meeting department requirements may be recommended to the college for graduation with honors. For more information consult the department website (<http://www.neurobiology.northwestern.edu>) and see Honors in the Major (p. 178).

Neuroscience Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

The Integrated Science Program is a highly selective BA program in Weinberg College. It is possible to complete a double major in ISP and Neuroscience with an Allied Field of Computation and Systems Modeling by completing the courses below in addition to ISP requirements. Note that NEUROSCI 311-0 is required to be completed by students doing the second major in neuroscience; students completing both majors may **not** substitute INTG_SCI 398-0 or another course for a neuroscience course in the ISP curriculum.

Course	Title
2 required courses:	
BIOL_SCI 217-0	Physiology
NEUROSCI 206-0	Systems and Behavioral Neuroscience
2 Neuroscience Electives with a primary focus on human behavior and the human brain (Group A Elective), chosen from:	
COG_SCI 210-0	Language and the Brain
CSD 303-0	Brain and Cognition
or PSYCH 365-0	Brain and Cognition
CSD 310-0	Biological Foundations of Speech and Music
PSYCH 110-0	Introduction to Psychology
PSYCH 218-0	Developmental Psychology
PSYCH 228-0	Cognitive Psychology
PSYCH 248-0	Health Psychology
PSYCH 324-0	Perception
PSYCH 359-0	Advanced Seminar in Psychology (PSYCH 359-0-20 and others with approval of the director of undergraduate studies)
PSYCH 361-0	Brain Damage and the Mind
2 Neuroscience Electives with a primary focus on molecular, cellular, and systems-level mechanisms of brain function (Group B Elective), chosen from:	
NEUROSCI 303-0	Molecular Mechanisms of Neuropsychopharmacology
NEUROSCI 304-0	Developmental Neurobiology
NEUROSCI 320-0	Animal Behavior
NEUROSCI 324-0	Neurobiology of Biological Clocks and Sleep
NEUROSCI 326-0	Neurobiology of Learning and Memory
NEUROSCI 350-0	Advanced Neurophysiology Laboratory
NEUROSCI 355-0	Neurogenetics of Behavior Laboratory
NEUROSCI 360-0	Neuroscience of Brain Disorders
NEUROSCI 377-0	Neurobiology of Sensation and Perception
NEUROSCI 390-0	Topics in Neuroscience (with approval of the director of undergraduate studies)

BIOL_SCI 305-0	Neurobiology Laboratory
ES_APPM 370-1	Introduction to Computational Neuroscience

Honors in Neuroscience

Majors with strong academic records and significant research accomplishments may pursue honors in neuroscience. Interested students should contact the director of undergraduate studies by email at the beginning of fall quarter senior year. Considerations for honors include GPA and the quality of a written thesis based on the student's research. Students also must complete at least 1 quarter of NEUROSCI 399-0 Independent Study in Neuroscience, followed by NEUROSCI 398-0 Senior Thesis Seminar in winter of senior year. Students meeting department requirements may be recommended to the college for graduation with honors. For more information consult the department website (<http://www.neurobiology.northwestern.edu>) and see Honors in the Major (p. 178).

Neuroscience

The Neuroscience Major (p. 308) is offered by the Department of Neurobiology (p. 307).

Persian

See Middle East and North African Studies (p. 303).

Philosophy

philosophy.northwestern.edu

The Department of Philosophy is committed to exposing students to a broad range of philosophical traditions and issues. With strengths in Anglo-American and continental philosophy, the department provides courses in all systematic areas of philosophy as well as a strong array of courses in ancient, medieval, and modern philosophy. The research interests of members of the department show a similar breadth, and many of them invite interdisciplinary pursuits with relevant scientific or other humanistic disciplines. This pluralism enables students to explore philosophy's application to all areas of life and to appreciate the diversity of approaches possible in philosophy.

Programs of Study

- Philosophy Major (p. 315)
- Philosophy Minor (p. 315)

PHIL 109-6 First-Year Seminar in Philosophy (1 Unit) *WCAS First-Year Seminar*

PHIL 110-0 Introduction to Philosophy (1 Unit) Fundamental problems and methods of philosophy. *Ethics Values Distro Area*

PHIL 150-0 Elementary Logic I (1 Unit) Introduction to the formal study of logical implication. Paraphrase of English sentences into logical schemata. Truth-functional logic. Quantifiers, predicates, and relations. Implication and its general properties. Establishing implication. First quarter of PHIL 150-0; PHIL 250-0; PHIL 350-0 sequence. *Formal Studies Distro Area*

PHIL 151-0 Scientific Reasoning (1 Unit) Introduction to probabilistic calculus and its role in science. Topics may include Bayes's theorem, the Dutch Book theorem, hypothesis and confirmation, problems of induction,

subjective and objective interpretations of probability, causal reasoning. *Formal Studies Distro Area*

PHIL 210-1 History of Philosophy - Ancient (1 Unit) Classical readings from authors of the Western tradition of ancient philosophy, like Plato, Aristotle, Stoics, Epicureans, Cicero, Seneca. *Ethics Values Distro Area*

PHIL 210-2 History of Philosophy - Medieval (1 Unit) Classical readings from authors of the Western tradition of medieval philosophy. *Ethics Values Distro Area*

PHIL 210-3 History of Philosophy - Early Modern (1 Unit) Classical readings from authors of the Western tradition of the early modern age of enlightenment, like Hobbes, Locke, Spinoza, Leibniz, Hume. *Ethics Values Distro Area*

PHIL 216-0 Introduction to Pragmatism (1 Unit) Introduction to classical and contemporary literature in pragmatist philosophy: Peirce, James, Mead, Dewey, and 20th-century neopragmatist authors (Quine, Rorty, Putnam, et al.). *Ethics Values Distro Area*

PHIL 219-0 Introduction to Existentialism (1 Unit) Principal sources of existential philosophy: Kierkegaard, Jaspers, Marcel, Nietzsche, Sartre, Heidegger, Merleau-Ponty, and others. *Ethics Values Distro Area*

PHIL 220-0 Introduction to Critical Theory (1 Unit) Crisis, criticism, and critique in philosophical, political, and cultural contexts. Focus on the philosophical aspects of critical theory with reference to social conditions and art, literary, and/ or political forms. COMP_LIT 207-0 and PHIL 220-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area*

PHIL 225-0 Minds and Machines (1 Unit) Introductory course addressing philosophical issues arising from the study of intelligence, including the possibility of machine intelligence and its relevance to the study of human intelligence. *Social Behavioral Sciences Distro Area*

PHIL 230-0 Gender, Politics, & Philosophy (1 Unit) Role of gender difference in the main political-philosophical traditions: social contract, liberalism, republicanism, socialism-Marxism, critical theory. The classics of feminist political philosophy (Wollstonecraft, Mill, Taylor, Engels), followed by contemporary debates. Taught with GNDR_ST 233-0; may not receive credit for both courses. *Ethics Values Distro Area*

PHIL 240-0 Freedom and Responsibility (1 Unit) Introduction to philosophy through an examination of major theories of freedom and responsibility, with attention to how these may be affected by the scientific worldview. *Ethics Values Distro Area*

PHIL 248-0 Paradoxes (1 Unit) A tour of puzzles, paradoxes, and their neighbors. Possible topics include Zeno's paradox, the sorites paradox, the liar paradox, and paradoxes of confirmation. *Formal Studies Distro Area*

PHIL 250-0 Elementary Logic II (1 Unit) Formal systems of deductive inference and their metalogical properties. Formal semantics. Natural deduction. Completeness and compactness; decidable fragments of first-order logic. Lowenheim-Skolem theorems. Second quarter of PHIL 150-0; PHIL 250-0; PHIL 350-0 sequence. Prerequisite: PHIL 150-0. *Formal Studies Distro Area*

PHIL 253-0 Introduction to the Philosophy of Language (1 Unit) Contemporary themes and theories in the philosophy of language. Topics may include context and semantics, the semantics-pragmatics boundary, implicature, reference, presupposition, speech acts, and the role of

language in shaping conceptions of social and natural reality. *Social Behavioral Sciences Distro Area*

PHIL 254-0 Introduction to Philosophy of the Natural Sciences (1 Unit)

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.

Ethics Values Distro Area

PHIL 255-0 Theory of Knowledge (1 Unit) Basic philosophical questions about human knowledge, focusing on skepticism and competing theories of knowledge. *Ethics Values Distro Area*

PHIL 259-0 Introduction to Metaphysics (1 Unit) Introductory discussion of some debates in contemporary metaphysics. Possible topics include objectivity, time, universals, causations, possible worlds, and material constitution. *Ethics Values Distro Area*

PHIL 260-0 Introduction to Moral Philosophy (1 Unit) Overview of some of the main ideas and most influential writings of moral philosophy. *Ethics Values Distro Area*

PHIL 261-0 Introduction to Political Philosophy (1 Unit) Overview of some of the main ideas and most influential writings of political philosophy. *Ethics Values Distro Area*

PHIL 262-0 Ethical Problems and Public Issues (1 Unit) 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. *Ethics Values Distro Area*

PHIL 266-0 Philosophy of Religion (1 Unit) 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. *Ethics Values Distro Area*

PHIL 267-0 Philosophy, Race, and Racism (1 Unit) Introduction to philosophical discussions of race, race identity, and racism. Readings may be drawn from classical as well as contemporary sources. *Ethics Values Distro Area*

PHIL 268-0 Ethics and the Environment (1 Unit) 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. *Ethics Values Distro Area*

PHIL 269-0 Bioethics (1 Unit) 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. *Ethics Values Distro Area*

PHIL 270-0 Climate Change and Sustainability: Economic and Ethical Dimensions (1 Unit) Interdisciplinary analysis of economic and ethical issues concerning climate change; scientific evidence for anthropogenic global warming; economics and ethics of resource use, conservation practices, and sustainability. ISEN 230-0 taught with PHIL 270-0; students may not earn credit for both courses. *Ethics Values Distro Area*

PHIL 273-1 The Brady Scholars Program: The Good Life (1 Unit) Course asking questions such as what it takes for a human life to go well, the nature of happiness, the role of pleasure, what makes lives meaningful, rich, flourishing, what human dignity consists in. *Ethics Values Distro Area*

PHIL 273-2 The Brady Scholars Program: The Moral Life (1 Unit) Course asking questions that allow determining how we are to treat and interact with others. *Ethics Values Distro Area*

PHIL 273-3 The Brady Scholars Program: The Good Society (1 Unit) Course investigating domestic and international questions, such as whether democracy is the most legitimate form of government, what obligations national states have to others, the role of peace, international inequality. *Ethics Values Distro Area*

PHIL 280-0 Introduction to the Philosophy of Art (1 Unit) Introduction to major themes and theories in the philosophy of art, including questions concerning the nature of taste, beauty, art, and artistic creativity. *Literature Fine Arts Distro Area*

PHIL 310-0 Studies in Ancient Philosophy (1 Unit) Works of one or more important philosophers or movements before 500 CE. May be repeated for credit with change of topic.

PHIL 311-0 Studies in Medieval Philosophy (1 Unit) Works of one or more important philosophers or philosophical movements between 500 and 1500 CE. May be repeated for credit with change of topic.

PHIL 312-0 Studies in Modern Philosophy (1 Unit) 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 Kant's 'Critique of Pure Reason' I (1 Unit) Detailed analysis of Kant's claims to justify human knowledge in The Critique of Pure Reason (the 'Analytic of Pure Reason').

PHIL 313-2 Kant's 'Critique of Pure Reason' II (1 Unit) Detailed analysis of Kant's criticism of traditional metaphysics in The Critique of Pure Reason (the 'Dialectic of Pure Reason').

PHIL 314-0 Studies in German Philosophy (1 Unit) 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 (1 Unit) One or more figures of 20th century or contemporary French philosophy. May be repeated for credit with change of topic.

PHIL 317-0 Studies in 19th and 20th Century Philosophy (1 Unit) 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 (1 Unit) 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 (1 Unit) Intensive study of one or a small number of major contributions to the existentialist tradition.

PHIL 325-0 Philosophy of Mind (1 Unit) 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 (1 Unit) 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?. *Ethics Values Distro Area*

PHIL 327-0 Philosophy of Psychology (1 Unit) 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 (1 Unit) 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 (1 Unit) Theory of decision making, what it is to decide, possible constraints on decisions, how to understand preference reversals, paradoxes of decision making, and actions taken against one's better judgment. Prerequisite: PHIL 150-0.

PHIL 350-0 Advanced Logic (1 Unit) Metalogical limitations of logical theories. Formal arithmetic. Recursive functions. Arithmetization of syntax. Incompleteness and undecidability. Truth-predicates in first and second order logic. The provability predicate. Third quarter of PHIL 150-0; PHIL 250-0; PHIL 350-0 sequence. Prerequisite: PHIL 250-0.

PHIL 351-0 Advanced Topics in Philosophical Logic (1 Unit) Methods of modern formal logic applied to traditional philosophical questions, e.g., modal logic, deontic logic, epistemic logic, many-valued logic, tense logic. Prerequisite: PHIL 250-0.

PHIL 352-0 Philosophy of Mathematics (1 Unit) 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 (1 Unit) The nature and uses of language as presenting philosophical problems, e.g., theory of reference, the modes of meaning, definition, metaphor, problems of syntax, and semantics. May be repeated for credit with change of topic.

PHIL 355-0 Scientific Method in the Social Sciences (1 Unit) Analysis of the philosophical foundations of social inquiry with reference to selected problems, thinkers, and schools, both classical and modern.

PHIL 357-0 Topics in Metaphysics and Epistemology (1 Unit) Examination of current debates in metaphysics and epistemology, broadly understood. Possible topics include skepticism, mental representation, time, the epistemology of testimony, linguistic norms, personal identity, causation, and modality. May be repeated for credit with change of topic.

PHIL 358-0 Epistemology (1 Unit) 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 (1 Unit) 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 (1 Unit) 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 (1 Unit) 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 (1 Unit) Examination of one or more major figures or movements in the history of moral or political philosophy. May be repeated for credit with change of topic.

PHIL 363-0 Kant's Moral Theory (1 Unit) Exploration of the moral and ethical thought of Immanuel Kant through careful study of Groundwork of the Metaphysics of Morals along with readings from the Critique of Practical Reason, Metaphysics of Morals, and Religion within the Bounds of Mere Reason. *Ethics Values Distro Area*

PHIL 364-0 Business and Professional Ethics (1 Unit) Application of ethical theories (Kantianism, utilitarianism, etc.) in a commercial setting. Topics include social responsibilities of corporations, public regulation, moral limits of marketing (e.g., marketing to children, noxious products), social justice versus fair compensation. *Ethics Values Distro Area*

PHIL 366-0 Advanced Studies in the Philosophy of Religion (1 Unit) Central problems in the philosophy of religion.

PHIL 367-0 Studies in African American Philosophy (1 Unit) 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 & Gender (1 Unit) Survey of approaches to sex and gender throughout the history of philosophy.

PHIL 370-0 Philosophy & Literature (1 Unit) Issues involving the relationship between philosophy and literature.

PHIL 373-1 The Brady Scholars Program: The Civically Engaged Life (0.5 Unit) The Brady Scholars Program: Philosophy and the City.

PHIL 373-2 The Brady Scholars Program: The Civically Engaged Life (0.5 Unit)

PHIL 380-0 Philosophy of Art (1 Unit) Topics to be discussed might include the nature and purpose of art, art and perception, the nature of creativity, and the social responsibility of the artist.

PHIL 390-0 Special Topics In Philosophy (1 Unit) May be repeated for credit with change of topic.

PHIL 398-1 Senior Tutorial (1 Unit) Senior thesis. Grade of K given in 398-1. Prerequisite: consent of instructor.

PHIL 398-2 Senior Tutorial (1 Unit) Senior thesis. Grade of K given in 398-1. Prerequisite: consent of instructor.

PHIL 399-0 Independent Study (1 Unit) Open to properly qualified students with consent of instructor. Can only be applied to Major or Minor after approval of DUS upon student's petition with dept form.

Philosophy Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

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 choosing philosophy as a second 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.

Course	Title
Major Requirements (13 units)	
2 core history of philosophy courses: ^{1,2}	
PHIL 210-1 & PHIL 210-3	History of Philosophy - Ancient and History of Philosophy - Early Modern
1 core logic course: ^{1,2}	
PHIL 150-0 or PHIL 250-0	Elementary Logic I Elementary Logic II
1 core course in moral or political philosophy: ²	
PHIL 260-0 or PHIL 261-0	Introduction to Moral Philosophy Introduction to Political Philosophy
9 additional courses: ³	
At least 6 must be at the 300 or 400 level. A student who is admitted to and completes 1 or more 400-level courses may apply such courses toward this requirement.	
Up to 3 of the following courses offered by the Brady Scholars Program in Ethics and Civic Life may be counted: ⁴	
PHIL 273-1 & PHIL 273-2 & PHIL 273-3	The Brady Scholars Program: The Good Life and The Brady Scholars Program: The Moral Life and The Brady Scholars Program: The Good Society
1 of the 9 electives may be from outside the department if it has substantial philosophical content. Course approval must be obtained from the director of undergraduate studies by submitting a petition that includes the course syllabus. ⁴	
At most 2 eligible PHIL 399-0 may count toward the major. See department website for criteria. Approval must be obtained in advance from both the instructor and the director of undergraduate studies.	

¹ Should be completed as early as possible, since the material is required to do well in more advanced work (although not formally prerequisite) and only offered in specific quarters during the academic year.

² **NOTE: Core requirements for the major cannot be replaced by courses taken outside the specified offerings of the Philosophy Department.** This includes courses completed on study abroad programs, online courses, courses transferred from other institutions, and courses offered by other departments at Northwestern. Only in cases of established exceptional hardship will the Philosophy Department undergraduate committee be able to consider a request to substitute a core credit (see department website FAQ for further details). A student who might be facing such circumstances needs to immediately contact the department advisor or the director of undergraduate studies to find out more about the possibilities.

³ None may be a first-year seminar, the ISEN course PHIL 270-0, the Brady Scholars courses PHIL 373-1 and PHIL 373-2, or senior tutorial courses PHIL 398-1 and PHIL 398-2.

⁴ Students who apply courses offered in the Brady Program in Ethics and Civic Life (p. 248) towards the major may not petition to count another course offered outside the department towards the major.

Honors in Philosophy

Majors with strong academic records and an interest in pursuing honors should have project proposals approved by a faculty supervisor and the director of undergraduate studies or the philosophy department honors convenor before the end of winter quarter of junior year. They then take PHIL 398-1 in spring quarter of junior year and PHIL 398-2 in fall quarter of senior year; neither counts toward major requirements. (Students may petition to begin this thesis sequence in fall quarter of senior year, so that their sequence moves forward a quarter, respectively.) Near the end of the second quarter (i.e. PHIL 398-2), students submit completed senior theses, which are evaluated by the undergraduate committee in terms of level of research and philosophical reflection. In the spring, students present their research results at a conference open to the public.

Students whose papers, presentations, and grades meet department criteria are recommended to the college for graduation with honors. For more information see the department website and Honors in the Major (<https://www.weinberg.northwestern.edu/undergraduate/enrichment-opportunities/honors-awards/departmental-honors.html>).

Philosophy Minor

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, only 3 of the 4 remaining courses need be at the 300 or 400 level.

Course	Title
Minor Requirements (8 units)	
4 core courses: ¹	
PHIL 150-0 or PHIL 250-0	Elementary Logic I Elementary Logic II
PHIL 210-1 PHIL 210-3	History of Philosophy - Ancient History of Philosophy - Early Modern
PHIL 260-0 or PHIL 261-0	Introduction to Moral Philosophy Introduction to Political Philosophy
4 additional courses: ²	
At least 3 must be at the 300 or 400 level. A student who is admitted to and completes 1 or more 400-level courses may apply such courses toward this requirement.	
Only 1 from the following courses offered by the Brady Scholars Program in Ethics and Civic Life may be counted: ³	
PHIL 273-1 or PHIL 273-2 or PHIL 273-3	The Brady Scholars Program: The Good Life The Brady Scholars Program: The Moral Life The Brady Scholars Program: The Good Society

No more than 1 eligible PHIL 399-0 may count toward the minor. See department website for criteria. Approval must be obtained in advance from both the instructor and the director of undergraduate studies.

- 1
- NOTE: Core requirements for the minor cannot be replaced by courses taken outside the specified offerings of the Philosophy Department.** This includes courses completed on study abroad programs, online courses, courses transferred from other institutions, and courses offered by other departments at Northwestern. Only in cases of established exceptional hardship will the Philosophy Department undergraduate committee be able to consider a request to substitute a core credit (see department website FAQ for further details). A student who might be facing such circumstances needs to immediately contact the department advisor or the director of undergraduate studies to find out more about the possibilities.
- 2
- None may be a first-year seminar, the ISEN course PHIL 270-0, the Brady Scholars courses PHIL 373-1 and PHIL 373-2, or senior tutorial courses PHIL 398-1 and PHIL 398-2.
- 3
- For more about the Brady Program in Ethics and Civic Life (p. 248) see the relevant section of this catalog.

Physics and Astronomy

physics.northwestern.edu

Physics seeks answers to fundamental questions about the natural world. Physicists study nature at all distance scales, from extremely large (stellar systems, galaxies, and the observable universe) to infinitesimally small (atoms, nuclei, and fundamental particles), as well as everything in between (biological systems, natural and artificial materials).

Many students in physics pursue career paths involving the natural sciences and engineering, both in academia and industry, while others find that the quantitative thinking and problem solving skills that characterize physics and astronomy can be fruitfully applied to many nonscience areas.

Majors normally take:

Course	Title
First Year:	
PHYSICS 140-1 & PHYSICS 140-2 & PHYSICS 140-3 or PHYSICS 135-1 & PHYSICS 135-2 & PHYSICS 135-3	Fundamentals of Physics and Fundamentals of Physics and Fundamentals of Physics General Physics and General Physics and General Physics
PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3	General Physics Laboratory and General Physics Laboratory and General Physics Laboratory
Sophomore year:	
PHYSICS 239-0	Foundations of Modern Physics

Majors also take a sequence of mathematics courses in their first and second years. The remaining requirements are a set of 300-level courses that depend on the chosen concentration, taken during sophomore, junior, and senior years.

While there is no formal major in astronomy, students may select the astronomy concentration within the physics major.

Students intending to study physics or astronomy in graduate school should choose the advanced physics or astronomy concentrations. They

should also consider taking 2 or 3 units of PHYSICS 398-0 Independent Thesis Research or PHYSICS 399-0 Independent Study under the supervision of a faculty member, consisting of a research project in the student’s area of concentration and, if possible, introductory graduate courses. Students intending graduate study in a subject other than physics or not planning to go to graduate school may select the flexible concentration, which can be tailored to their interests. All declared and prospective majors should meet with the director of undergraduate studies before the end of sophomore year, if not earlier.

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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Advanced Placement

First-year students 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 C (Mechanics) examination will give the student credit for PHYSICS 135-1 General Physics and lab course credit.
- A score of 5 on the College Board Advanced Placement Physics C (Electricity and Magnetism) examination will give the student credit for PHYSICS 135-2 General Physics and lab course credit.
- A score of 5 on the College Board Advanced Placement Physics 1 exam will give the student credit for PHYSICS 130-1 College Physics and lab course credit.
- A score of 5 on the College Board Advanced Placement Physics 2 exam will give the student credit for PHYSICS 130-2 College Physics and lab course credit.
- A passing score on the departmental placement examinations, given during Wildcat Welcome, is NOT reflected on the transcript as college credit but will allow a student to place out of any or all parts of:

Course	Title
PHYSICS 130-1 & PHYSICS 130-2 & PHYSICS 130-3 or PHYSICS 135-1 & PHYSICS 135-2 & PHYSICS 135-3	College Physics and College Physics and College Physics General Physics and General Physics and General Physics
plus relevant labs	

- Students who took 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.

Programs of Study

- Physics Major (p. 319)
- Physics Minor (p. 321)
- Physics Second Major for ISP Students (p. 321)

Note: The laboratory components of first-year physics sequences require separate registration and bear separate credit. When a course in such a sequence is listed as a prerequisite for another course, the associated lab is also a prerequisite.

See below for Astronomy Courses (p. 319).

Physics Courses

PHYSICS 103-0 Ideas of Physics (1 Unit) 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 non-science majors. *Natural Sciences Distro Area*

PHYSICS 105-0 Music, Sound, Timbre (1 Unit) 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. *Natural Sciences Distro Area*

PHYSICS 110-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

PHYSICS 125-1 General Physics ISP (1 Unit) General physics course relying extensively on calculus. Similar to PHYSICS 135-1 but more advanced and intended for ISP students. A concurrent advanced calculus course, MATH 281-1 is offered by the mathematics department. Prerequisite: first-year standing in ISP or consent of the department and concurrent enrollment in PHYSICS 126-1. *Natural Sciences Distro Area*

PHYSICS 125-2 General Physics for ISP (1 Unit) General physics course relying extensively on calculus. Similar to PHYSICS 135-2 but more advanced and intended for ISP students. A concurrent advanced calculus course, MATH 281-2, is offered by the mathematics department. Prerequisite: first-year standing in ISP or consent of the department and concurrent enrollment in PHYSICS 126-2. *Natural Sciences Distro Area*

PHYSICS 125-3 General Physics for ISP (1 Unit) General physics course relying extensively on calculus. Similar to PHYSICS 135-3 but more advanced and intended for ISP students. A concurrent advanced calculus course, MATH 281-3 is offered by the mathematics department. Prerequisite: first-year standing in ISP or consent of the department and concurrent enrollment in PHYSICS 126-3. *Natural Sciences Distro Area*

PHYSICS 126-1 Physics for ISP Laboratory (0.34 Unit) Introductory physics laboratory for students taking PHYSICS 125-1, with which it must be taken concurrently.

PHYSICS 126-2 Physics for ISP Laboratory (0.34 Unit) Introductory physics laboratory for students taking PHYSICS 125-2, with which it must be taken concurrently.

PHYSICS 126-3 Physics for ISP Laboratory (0.34 Unit) Introductory physics laboratory for students taking PHYSICS 125-3, with which it must be taken concurrently.

PHYSICS 130-1 College Physics (1 Unit) Algebra-based physics primarily for premedical students who do not need to take calculus-based physics. Topics covered are similar to those of PHYSICS 135-1. Students with credit for a quarter of Physics 135 may not later receive credit for the comparable quarter of Physics 130. Prerequisites: algebra, trigonometry, and concurrent enrollment in PHYSICS 136-1. *Natural Sciences Distro Area*

PHYSICS 130-2 College Physics (1 Unit) Algebra-based physics primarily for premedical students who do not need to take calculus-based

physics. Topics covered are similar to those of PHYSICS 135-2. Students with credit for a quarter of Physics 135 may not later receive credit for the comparable quarter of Physics 130. Prerequisites: PHYSICS 130-1, PHYSICS 136-1, and concurrent enrollment in PHYSICS 136-2. *Natural Sciences Distro Area*

PHYSICS 130-3 College Physics (1 Unit) Algebra-based physics primarily for premedical students who do not need to take calculus-based physics. Topics covered are similar to those of PHYSICS 135-3. Students with credit for a quarter of Physics 135 may not later receive credit for the comparable quarter of Physics 130. Prerequisites: PHYSICS 130-2, PHYSICS 136-2, and concurrent enrollment in PHYSICS 136-3. *Natural Sciences Distro Area*

PHYSICS 135-1 General Physics (1 Unit) Calculus-based physics for science and engineering majors and premedical students. Mechanics. Prerequisites: MATH 220-0, MATH 224-0; concurrent enrollment in PHYSICS 136-1 and MATH 230-0. *Natural Sciences Distro Area*

PHYSICS 135-2 General Physics (1 Unit) Calculus-based physics for science and engineering majors and premedical students. Electricity and magnetism. Prerequisite: PHYSICS 135-1, PHYSICS 136-1 and concurrent enrollment in PHYSICS 136-2. *Natural Sciences Distro Area*

PHYSICS 135-3 General Physics (1 Unit) Calculus-based physics for science and engineering majors and premedical students. Introduction to modern physics; wave phenomena. Prerequisite: PHYSICS 135-2, PHYSICS 136-2 and concurrent enrollment in PHYSICS 136-3. *Natural Sciences Distro Area*

PHYSICS 136-1 General Physics Laboratory (0.34 Unit) Introductory physics laboratory for students taking PHYSICS 130-1 or PHYSICS 135-1, with which it must be taken concurrently.

PHYSICS 136-2 General Physics Laboratory (0.34 Unit) Introductory physics laboratory for students taking PHYSICS 130-2 or PHYSICS 135-2, with which it must be taken concurrently.

PHYSICS 136-3 General Physics Laboratory (0.34 Unit) Introductory physics laboratory for students taking PHYSICS 130-3 or PHYSICS 135-3, with which it must be taken concurrently.

PHYSICS 140-1 Fundamentals of Physics (1 Unit) Introduction to fundamentals topics in classical mechanics for physics majors and minors and students with a strong interest in physics. Prerequisites: MATH 220-0, MATH 224-0; concurrent enrollment in PHYSICS 136-1 and MATH 230-0. *Natural Sciences Distro Area*

PHYSICS 140-2 Fundamentals of Physics (1 Unit) Introduction to fundamentals topics in electricity and magnetism for physics majors and minors and students with a strong interest in physics. Prerequisites: PHYSICS 140-1, PHYSICS 136-1; concurrent enrollment in PHYSICS 136-2. *Natural Sciences Distro Area*

PHYSICS 140-3 Fundamentals of Physics (1 Unit) Introduction to fundamentals topics in wave phenomena and modern physics for physics majors and minors and students with a strong interest in physics. Prerequisites: PHYSICS 140-2, PHYSICS 136-2; concurrent enrollment in PHYSICS 136-3. *Natural Sciences Distro Area*

PHYSICS 211-1 Mathematical Tools for Physical Sciences (1 Unit) Introduction to the tools necessary to solve physics problems, including integral calculus, complex numbers and complex algebra, matrices and

vector spaces, differential equations, and Fourier analysis. Prerequisites: MATH 230-0 and MATH 234-0. *Formal Studies Distro Area*

PHYSICS 211-2 Mathematical Tools for Physical Sciences (1 Unit)

Introduction to the tools necessary to solve physics problems, including integral calculus, complex numbers and complex algebra, matrices and vector spaces, differential equations, and Fourier analysis. Prerequisites: MATH 230-0 and MATH 234-0. *Formal Studies Distro Area*

PHYSICS 239-0 Foundations of Modern Physics (1 Unit)

Principles of waves, probability, quantum theory, and selected topics from special relativity, statistical mechanics, optics, and atomic structure. Prerequisites: PHYSICS 135-1, PHYSICS 135-2, and PHYSICS 135-3 or equivalent; MATH 250-0 or equivalent or concurrent enrollment. *Natural Sciences Distro Area*

PHYSICS 311-1 Mathematical Tools for the Physical Sciences (1 Unit)

Introduction to tools for solving physics problems, including integral calculus, complex numbers and complex algebra, matrices and vector spaces, differential equations, and Fourier analysis. Prerequisites: PHYSICS 135-1 and PHYSICS 135-2 or equivalent (concurrent enrollment in PHYSICS 135-2 is sufficient); MATH 230-0. *Formal Studies Distro Area*

PHYSICS 311-2 Mathematical Tools for the Physical Sciences (1 Unit)

Introduction to tools for solving physics problems, including integral calculus, complex numbers and complex algebra, matrices and vector spaces, differential equations, and Fourier analysis. Prerequisites: PHYSICS 135-3 (or concurrent enrollment); PHYSICS 311-1 or equivalent. *Formal Studies Distro Area*

PHYSICS 330-1 Classical Mech (1 Unit) Newtonian mechanics, oscillations, the Lagrangian and Hamiltonian formalisms, central-force motion.

PHYSICS 330-2 Classical Mechanics (1 Unit) Motion in a non-inertial reference frame, kinematics of rigid bodies, systems with many degrees of freedom. Prerequisites: PHYSICS 135-1 or equivalent and MATH 234-0 and PHYSICS 311-1 and PHYSICS 311-2; or MATH 240-0, MATH 250-0; or equivalent.

PHYSICS 332-0 Statistical Mechanics (1 Unit) Ideal gas, Boltzmann distribution, transport phenomena, fluctuation theory, Bose-Einstein and Fermi-Dirac statistics. Prerequisites: PHYSICS 135-1, PHYSICS 135-2, and PHYSICS 135-3; MATH 234-0 or equivalent.

PHYSICS 333-1 Advanced Electricity & Magnetism (1 Unit)

Electrostatics and magnetostatics, multipole expansion, solutions of Laplace's equation, images, analytic functions.

PHYSICS 333-2 Advanced Electricity & Magnetism (1 Unit) Maxwell's equations, electromagnetic equations, electromagnetic wave propagation and radiation, microwave cavities, diffraction. Prerequisites: PHYSICS 135-1, PHYSICS 135-2, and PHYSICS 135-3 and MATH 234-0 and PHYSICS 311-1 and PHYSICS 311-2; or MATH 240-0, MATH 250-0; or equivalent.

PHYSICS 335-0 Physics of Magic (1 Unit) Magic tricks, illusion, and deception used to discuss the rarely explored but often surprisingly flexible boundaries of what is physically possible. Does not fulfill 300-level requirement for majors or minors. Prerequisites: PHYSICS 135-1; MATH 220-0, MATH 224-0, or equivalent.

PHYSICS 337-0 Physics of Condensed Matter (1 Unit) Emergent properties and collective descriptions when simple components of

matter are combined into larger systems with varying degrees of order. Prerequisite: PHYSICS 339-1; PHYSICS 332-0 recommended.

PHYSICS 339-1 Quantum Mechanics (1 Unit)

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 PHYSICS 135-1, PHYSICS 135-2, and PHYSICS 135-3 or equivalent; PHYSICS 239-0; PHYSICS 330-1; PHYSICS 311-1 or MATH 240-0.

PHYSICS 339-2 Quantum Mechanics (1 Unit)

Introduction to quantum theory. Applications to atomic and molecular systems. The harmonic oscillator, the one-electron atom, the hydrogen molecule, barrier penetration. Prerequisites: PHYSICS 339-1, second-year standing in ISP or PHYSICS 311-2 or MATH 250-0, MATH 351-0.

PHYSICS 339-3 Particle and Nuclear Physics (1 Unit)

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: PHYSICS 339-1 and PHYSICS 339-2.

PHYSICS 345-0 Introduction to General Relativity (1 Unit)

Review of special relativity and Newtonian gravity; curved space-time; geodesics and conservation laws; Schwarzschild geometry; tests of general relativity; black holes; linearized gravity and gravitational waves; and big bang cosmology. Prerequisites: PHYSICS 330-1 and PHYSICS 330-2 or consent of instructor.

PHYSICS 352-0 Introduction to Computational Physics (1 Unit)

Application of computing to physics: Monte Carlo simulation, numerical integration of equations of motion, discrete element methods in electromagnetism. Prerequisites: PHYSICS 135-1, PHYSICS 135-2, and PHYSICS 135-3 or equivalent; MATH 250-0 or equivalent (concurrent enrollment is sufficient); EECS 110-0 or equivalent prior programming experience.

PHYSICS 357-0 Optics Laboratory (1 Unit)

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. *Natural Sciences Distro Area*

PHYSICS 358-0 Nanolithography (1 Unit)

Advanced lab involving fabrication of metallic nanometer-scale structures by electron-beam lithography. Characterization of these structures by atomic force microscopy. Prerequisite: PHYSICS 135-1, PHYSICS 135-2, and PHYSICS 135-3 or equivalent.

PHYSICS 359-0 Electronics (1 Unit)

Introduction to modern electronics, construction of elementary analog and digital circuits. Prerequisites: PHYSICS 333-1 and PHYSICS 333-2 or consent of instructor.

PHYSICS 360-0 General Physics Laboratory (1 Unit)

Classic experiments in atomic, nuclear, and solid-state physics using modern electronics and microcomputers. Independent work. Prerequisites: PHYSICS 333-1 and PHYSICS 333-2 or consent of instructor.

PHYSICS 361-0 Classical Optics and Special Relativity (1 Unit)

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: PHYSICS 333-1 and PHYSICS 333-2.

PHYSICS 371-0 Nonlinear Dynamics and Chaos (1 Unit) 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: PHYSICS 330-1 and PHYSICS 330-2.

PHYSICS 398-0 Independent Thesis Research (1-2 Units) Individual study under the direction of a faculty member. Open only to advanced students pursuing departmental honors.

PHYSICS 399-0 Independent Study (1-2 Units) 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 (1 Unit) Modern views on the structure of the universe, its past, present, and future. For nonscience majors who want to take a more detailed course after completing ASTRON 120-0. *Natural Sciences Distro Area*

ASTRON 102-0 Milky Way Galaxy (1 Unit) Structure of the galaxy, star formation, interstellar clouds and dust, star clusters, neutron stars and black holes, the galactic center. For nonscience majors who want to take a more detailed course after completing ASTRON 120-0. *Natural Sciences Distro Area*

ASTRON 103-0 Solar System (1 Unit) The planets and their moons, the sun, comets, asteroids. For nonscience majors who want to take a more detailed course after completing ASTRON 120-0. *Natural Sciences Distro Area*

ASTRON 110-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

ASTRON 111-0 Introduction to Astrobiology (1 Unit) 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. *Natural Sciences Distro Area*

ASTRON 120-0 Highlights of Astronomy (1 Unit) Acquaints students with modern ideas about the solar system, stars, galaxies, and the universe. Emphasizes fundamental principles and underlying concepts. *Natural Sciences Distro Area*

ASTRON 220-0 Introduction to Astrophysics (1 Unit) Use of introductory physics (mechanics, electromagnetism, thermodynamics, and modern physics) to cover astrophysical topics starting with the solar system and ending with the largescale structure of the universe and cosmology. Prerequisites: PHYSICS 135-1, PHYSICS 135-2, and PHYSICS 135-3 or equivalent. *Natural Sciences Distro Area*

ASTRON 310-0 Basics of Radio Astronomy (1 Unit) Survey of radio astronomy, emphasizing technical aspects; radiation, antennas, receivers, radio spectroscopy, interferometer arrays and aperture synthesis; radio emission mechanisms and cosmic rays. *Natural Sciences Distro Area*

ASTRON 314-0 Planetary Astrophysics (1 Unit) Methods of exoplanet detection. The observed architecture of exoplanetary systems. Formation and evolution of planetary systems. Modeling exoplanet interiors and

atmospheres. Exoplanet habitability and the search for bio-signatures. Prerequisites: PHYSICS 330-1 and PHYSICS 330-2 or equivalent.

ASTRON 321-0 Observational Astrophysics (1 Unit) 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: ASTRON 220-0.

ASTRON 325-0 Stellar Astrophysics (1 Unit) 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: ASTRON 220-0.

ASTRON 329-0 Extragalactic Astrophysics and Cosmology (1 Unit) Big bang cosmology, thermal history of the universe, primordial nucleosynthesis, microwave background, dark matter, largescale structure, galaxy formation, spiral and elliptical galaxies, groups and clusters of galaxies. Prerequisite: ASTRON 220-0.

ASTRON 331-0 Astrophysics ISP (1 Unit) Stellar structure and evolution: nucleosynthesis, supernova phenomena, white dwarfs, neutron stars, and black holes. Limited to students enrolled in ISP or with consent of the physics department. Prerequisite: PHYSICS 339-3.

ASTRON 390-0 Current Topics in Astronomy (1 Unit) Explores in detail an area of current research interest in astrophysics. Contact the department or instructor for specifics. May be repeated for credit with change of topic. Prerequisites vary. *Natural Sciences Distro Area*

ASTRON 398-0 Honors Independent Study (1-2 Units)

ASTRON 399-0 Independent Study (1-2 Units) Opportunity to study an advanced subject under the individual direction of a faculty member. Open to all advanced students. Consent of instructor required.

Physics Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

The physics major is designed to help students acquire a broad and varied background in physics and related fields; it provides an excellent intellectual foundation for many careers. The three basic steps toward completing the major are fulfilling prerequisites in introductory physics and calculus; taking a core sequence (common to all concentrations) of classical physics, modern physics, and mathematics; and completing a course concentration.

Course	Title
Prerequisites	
MATH 220-0 & MATH 224-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions
or MATH 212-0 & MATH 213-0 & MATH 214-0	Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III

PHYSICS 140-1 & PHYSICS 140-2 & PHYSICS 140-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3 or PHYSICS 135-1 & PHYSICS 135-2 & PHYSICS 135-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3 or PHYSICS 125-1 & PHYSICS 125-2 & PHYSICS 125-3 & PHYSICS 126-1 & PHYSICS 126-2 & PHYSICS 126-3	Fundamentals of Physics and Fundamentals of Physics and Fundamentals of Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory General Physics and General Physics and General Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory General Physics ISP and General Physics for ISP and General Physics for ISP and Physics for ISP Laboratory and Physics for ISP Laboratory and Physics for ISP Laboratory
--	---

Major Requirements (units vary, depending on math courses and concentration selected)

10–11 core courses (depending on math concentration)

Core mathematics and mathematical tools courses listed below or equivalent courses approved by the department:

MATH 230-0 & MATH 234-0	Differential Calculus of Multivariable Functions and Multiple Integration and Vector Calculus
PHYSICS 311-1 & PHYSICS 311-2 or MATH 240-0 & MATH 250-0 & MATH 351-0	Mathematical Tools for the Physical Sciences and Mathematical Tools for the Physical Sciences Linear Algebra and Elementary Differential Equations and Fourier Analysis and Boundary Value Problems

Core physics courses:

PHYSICS 239-0	Foundations of Modern Physics
PHYSICS 330-1	Classical Mech
PHYSICS 332-0	Statistical Mechanics
PHYSICS 333-1	Advanced Electricity & Magnetism
PHYSICS 339-1	Quantum Mechanics

1 lab course chosen from:

ASTRON 321-0	Observational Astrophysics
PHYSICS 357-0	Optics Laboratory
PHYSICS 358-0	Nanolithography
PHYSICS 359-0	Electronics
PHYSICS 360-0	General Physics Laboratory (may not also count toward the concentration)

5–6 courses in the chosen concentration (A course may not be counted toward more than one requirement.)

Advanced Physics (p. 320)
Astronomy (p. 320)
Flexible (p. 320)

Concentrations

Advanced Physics (6 units)

Course	Title
PHYSICS 330-2	Classical Mechanics
PHYSICS 333-2	Advanced Electricity & Magnetism
PHYSICS 339-2	Quantum Mechanics
1 lab course from:	
ASTRON 321-0	Observational Astrophysics
PHYSICS 357-0	Optics Laboratory
PHYSICS 358-0	Nanolithography
PHYSICS 359-0	Electronics

PHYSICS 360-0	General Physics Laboratory
2 other 300-level physics or astronomy courses other than:	
PHYSICS 311-1 & PHYSICS 311-2	Mathematical Tools for the Physical Sciences and Mathematical Tools for the Physical Sciences
PHYSICS 335-0	Physics of Magic
PHYSICS 398-0	Independent Thesis Research
PHYSICS 399-0	Independent Study
ASTRON 398-0	Honors Independent Study
ASTRON 399-0	Independent Study

Astronomy (6 units)

Course	Title
PHYSICS 330-2	Classical Mechanics
PHYSICS 333-2	Advanced Electricity & Magnetism
PHYSICS 339-2	Quantum Mechanics
ASTRON 220-0	Introduction to Astrophysics

2 other 300-level astronomy classes other than ASTRON 398-0 or ASTRON 399-0

Flexible (5 units)

Course	Title
3 300-level physics or astronomy lecture or lab courses	
2 courses from the following:	
BMD_ENG 305-0	Introduction to Biomedical Signals and Electrical Circuits
BMD_ENG 327-0	Magnetic Resonance Imaging
CHEM 307-0	Materials and Nanochemistry
EECS 360-0	Introduction to Feedback Systems
EECS 381-0	Electronic Materials: Properties and Applications
ES_APPM 322-0	Applied Dynamical Systems
MAT_SCI 315-0	Phase Equilibria & Diffusion of Materials
MAT_SCI 331-0	Soft Materials
MAT_SCI 351-1	Introductory Physics of Materials
MAT_SCI 351-2	Introductory Physics of Materials
MAT_SCI 361-0	Crystallography & Diffraction
MAT_SCI 376-0	Nanomaterials
MATH 354-1	Chaotic Dynamical Systems
MATH 354-2	Chaotic Dynamical Systems
MECH_ENG 346-0	Introduction to Tribology
MECH_ENG 385-0	Nanotechnology
Any 300-level physics or astronomy lecture or lab course that is not otherwise required	

May not count toward any of these requirements:

PHYSICS 311-1 & PHYSICS 311-2	Mathematical Tools for the Physical Sciences and Mathematical Tools for the Physical Sciences
PHYSICS 335-0	Physics of Magic
PHYSICS 398-0	Independent Thesis Research
PHYSICS 399-0	Independent Study
ASTRON 398-0	Honors Independent Study
ASTRON 399-0	Independent Study

Honors in Physics and Astronomy

Majors with strong records in their physics, astronomy, and mathematic courses and an interest in pursuing honors should notify the director of undergraduate studies in October of senior year. Eligible students must enroll for 2 units of PHYSICS 398-0 Independent Thesis Research by the time of graduation. They participate in research culminating in a written report.

Students whose research reports and grades meet department criteria are recommended to the college for graduation with honors. For more information consult the director of undergraduate studies and see Honors in the Major (p. 178).

Physics Minor

The minor in physics gives students an understanding of the most essential concepts in the field and carries the same prerequisites as the major, followed by a lighter set of requirements.

Course	Title
Prerequisites	
MATH 220-0 & MATH 224-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions
or MATH 212-0 & MATH 213-0 & MATH 214-0	Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
PHYSICS 140-1 & PHYSICS 140-2 & PHYSICS 140-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3	Fundamentals of Physics and Fundamentals of Physics and Fundamentals of Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory
or PHYSICS 135-1 & PHYSICS 135-2 & PHYSICS 135-3 & PHYSICS 136-1 & PHYSICS 136-2 & PHYSICS 136-3	General Physics and General Physics and General Physics and General Physics Laboratory and General Physics Laboratory and General Physics Laboratory
or PHYSICS 125-1 & PHYSICS 125-2 & PHYSICS 125-3 & PHYSICS 126-1 & PHYSICS 126-2 & PHYSICS 126-3	General Physics ISP and General Physics for ISP and General Physics for ISP and Physics for ISP Laboratory and Physics for ISP Laboratory and Physics for ISP Laboratory
Minor Requirements (9 units)	
<i>Core mathematics and mathematical tools courses listed below or equivalent courses approved by the department</i>	
MATH 230-0 & MATH 234-0	Differential Calculus of Multivariable Functions and Multiple Integration and Vector Calculus
PHYSICS 311-1 & PHYSICS 311-2	Mathematical Tools for the Physical Sciences and Mathematical Tools for the Physical Sciences
or MATH 240-0 & MATH 250-0	Linear Algebra and Elementary Differential Equations
<i>Core physics courses</i>	
PHYSICS 239-0	Foundations of Modern Physics
PHYSICS 330-1	Classical Mech
PHYSICS 333-1	Advanced Electricity & Magnetism
<i>2 other 300-level physics or astronomy courses other than:</i>	
PHYSICS 311-1 & PHYSICS 311-2	Mathematical Tools for the Physical Sciences and Mathematical Tools for the Physical Sciences
PHYSICS 335-0	Physics of Magic
PHYSICS 398-0	Independent Thesis Research
PHYSICS 399-0	Independent Study
ASTRON 398-0	Honors Independent Study
ASTRON 399-0	Independent Study

Physics Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

The Integrated Science Program is a highly selective BA program in Weinberg College that includes the following as part of its curriculum:

Course	Title
PHYSICS 125-1 & PHYSICS 125-2 & PHYSICS 125-3 & PHYSICS 126-1 & PHYSICS 126-2 & PHYSICS 126-3	General Physics ISP and General Physics for ISP and General Physics for ISP and Physics for ISP Laboratory and Physics for ISP Laboratory and Physics for ISP Laboratory and Physics for ISP Laboratory
PHYSICS 339-1 & PHYSICS 339-2	Quantum Mechanics and Quantum Mechanics
PHYSICS 339-3 or PHYSICS 337-0	Particle and Nuclear Physics Physics of Condensed Matter
ASTRON 331-0	Astrophysics ISP

Application to this program is made directly to ISP.

It is possible to complete a double major in physics and ISP by completing the following 6 additional upper-level courses:

Course	Title
PHYSICS 330-1 & PHYSICS 330-2	Classical Mech and Classical Mechanics
or PHYSICS 333-1 & PHYSICS 333-2	Advanced Electricity & Magnetism and Advanced Electricity & Magnetism
1 lab course from:	
ASTRON 321-0	Observational Astrophysics
PHYSICS 357-0	Optics Laboratory
PHYSICS 358-0	Nanolithography
PHYSICS 359-0	Electronics
PHYSICS 360-0	General Physics Laboratory
plus 3 courses chosen from 300-level physics or astronomy courses other than:	
PHYSICS 311-1 & PHYSICS 311-2	Mathematical Tools for the Physical Sciences and Mathematical Tools for the Physical Sciences
PHYSICS 335-0	Physics of Magic
PHYSICS 398-0	Independent Thesis Research
PHYSICS 399-0	Independent Study
ASTRON 398-0	Honors Independent Study
ASTRON 399-0	Independent Study
and other than those required by ISP.	
PHYSICS 339-1 & PHYSICS 339-2	Quantum Mechanics and Quantum Mechanics
PHYSICS 339-3 or PHYSICS 337-0	Particle and Nuclear Physics Physics of Condensed Matter
ASTRON 331-0	Astrophysics ISP

- Students pursuing an ISP/physics double major may not substitute INTG_SCI 398-0 for any physics or math course in the ISP curriculum. They do not have to choose a physics course concentration.

Honors in Physics and Astronomy

Majors with strong records in their physics, astronomy, and mathematic courses and an interest in pursuing honors should notify the director of

undergraduate studies in October of senior year. Eligible students must enroll for 2 units of PHYSICS 398-0 Independent Thesis Research by the time of graduation. They participate in research culminating in a written report.

Students whose research reports and grades meet department criteria are recommended to the college for graduation with honors. For more information consult the director of undergraduate studies and see Honors in the Major (p. 178).

Political Science

polisci.northwestern.edu

Political science is the study of politics and power from domestic, international, and comparative perspectives. It entails understanding political ideas, ideologies, institutions, public policies, and behavior, as well as groups, classes, government, diplomacy, law, strategy, and war. A background in political science is valuable for citizenship and political action, as well as for future careers in government, law, business, media, or public service.

Northwestern's Department of Political Science offers classes in the four major subfields of the discipline—American politics, comparative politics, international politics, and political theory—but many courses cut across subfields. Political science faculty are closely associated with other departments in Weinberg College, Pritzker School of Law, and the Kellogg School of Management, as well as several interdisciplinary programs, including the Buffett Institute for Global Studies, the Institute for Policy Research, the Program of African Studies, the Gender and Sexuality Studies Program, the Chicago Field Studies Program, the Environmental Policy and Culture Program, and the Center for Civic Engagement.

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 coursework in political science conducted in a foreign language (2 or more courses, usually completed during study abroad) or through the substantial use of foreign language materials in a thesis or other independent study-type (POLI_SCI 399-0) work. Faculty advisers can discuss options with students. The certificate must be approved by the director of undergraduate studies.

Certificate of Achievement in Quantitative Skills

Through this certificate of achievement the department recognizes majors who have sought the quantitative skills that are increasingly important in many careers and in social science research. The certificate requires a grade of B or better in POLI_SCI 312-0 and in 1 more advanced quantitative training course, usually from another department, as well as completion of a research project such as those required for POLI_SCI 395-0, a senior thesis (POLI_SCI 398-1 & POLI_SCI 398-2), POLI_SCI 399-0, or another 300-level political science course that employs quantitative methods. 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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Programs of Study

- Political Science Major (p. 326)
- Political Science Minor (p. 328)

POLI_SCI 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

POLI_SCI 201-0 Introduction to Political Theory (1 Unit) Examination of texts in political theory. Topics vary but often include justice, the Greek polis, the modern state, individualism, representative democracy. *Ethics Values Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Social Behavioral Sciences Distro Area*

POLI_SCI 210-0 Introduction to Empirical Methods in Political Science (1 Unit) Tools political scientists use. How qualitative, quantitative, and experimental research designs help answer difficult descriptive and causal questions. *Formal Studies Distro Area*

POLI_SCI 211-0 Introduction to Interpretive Methods in Political Science (1 Unit) Philosophy of inquiry and interpretive research methods for students of political science. Examines diverse schools of thought on research methods and their relevance for research goals. *Social Behavioral Sciences Distro Area*

POLI_SCI 220-0 American Government and Politics (1 Unit) The structure and process of American politics from competing perspectives. Analysis of representation, voting, interest groups, parties, leadership, and policymaking institutions. The gateway course for the American politics subfield. *Social Behavioral Sciences Distro Area*

POLI_SCI 230-0 Introduction to Law in the Political Arena (1 Unit) Roles of law in society and politics. Police and prisons, law and social change, courts and politics, legal reasoning, Supreme Court decision making, judicial discretion, legal strategies for making change. *Social Behavioral Sciences Distro Area*

POLI_SCI 240-0 Introduction to International Relations (1 Unit) Introduction to the major theories, concepts, and problems of contemporary international relations. Security, political economy, and cooperation. *Social Behavioral Sciences Distro Area*

POLI_SCI 250-0 Introduction to Comparative Politics (1 Unit) Emphasis may be on industrialized and/or developing states. Major issues include regime-society relations, political change and conflict, and policy making. *Social Behavioral Sciences Distro Area*

POLI_SCI 301-0 Classical Political Theory (1 Unit) Political thought of Greece and Rome in historical context and with attention to contemporary theoretical interest. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175)

POLI_SCI 302-0 Subjects, Citizens, Revolutionaries: Early Modern Political Thought (1 Unit) Political philosophers from the 16th, 17th, and 18th centuries. Topics include sources of power and their impact on justice, equality, and law. No prerequisites, but some knowledge of

political theory is desirable. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175)

POLI_SCI 303-0 Modernity and Its Discontents (1 Unit) 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. *Ethics Values Distro Area*

POLI_SCI 304-0 Human Rights Between East and West (1 Unit) In this course, students consider challenges leveled against the declared universalism of human rights. They assess these challenges from the perspective of two non-western traditions: Islam and Confucianism. *Ethics Values Distro Area*

POLI_SCI 306-0 American Political Thought (1 Unit) Advanced introduction to the development of political thought in the United States from the revolutionaries to the 20th century pragmatists. *Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Social Behavioral Sciences Distro Area*

POLI_SCI 307-0 Deportation Law and Politics (1 Unit) Analysis of deportation law and politics from colonial America through today. Requires two visits to Chicago immigration courts. *Ethics Values Distro Area*

POLI_SCI 308-SA Critical Theory and the Study of Politics (1 Unit) Critical theory examines and contests hegemonic thinking about politics and envisages alternate worlds of political possibility. This study abroad course is restricted to students in Northwestern's Paris program in critical theory, literature, and media.

POLI_SCI 309-0 Political Theories of the Rule of Law (1 Unit) Key documents and debates in the development of theories of law and jurisprudence. From Aeschylus to contemporary democratic and legal theories and major court cases on topics ranging from torture to Title IX. POLI_SCI 309-0 and LEGAL_ST 309-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area*

POLI_SCI 310-0 Methods of Political Inference (1 Unit) 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. *Formal Studies Distro Area*

POLI_SCI 311-0 Logics of Political Inquiry (1 Unit) Political science as "science." Identity sources, construction, functions, and validation of social science theory and explanation from varied perspectives. *Formal Studies Distro Area*

POLI_SCI 312-0 Statistical Research Methods (1 Unit) Intermediate coverage of statistical methods appropriate for data in political science research, such as multiple regression, logit and probit, estimation and inference with non-independent or non-identically distributed sampling, basic time series and panel data methods, and causal inference in statistical models. *Formal Studies Distro Area*

POLI_SCI 320-0 The American Presidency (1 Unit) Structural foundations and historical development of the American presidency; predominant scholarly theories of presidential power and leadership; contemporary issues and debates. Prerequisite: POLI_SCI 220-0 or equivalent. *Social Behavioral Sciences Distro Area*

POLI_SCI 321-0 Urban Politics (1 Unit) Structure of local and regional political power and its relation to the social and economic structure of community. *Social Behavioral Sciences Distro Area*

POLI_SCI 322-0 Ideas and Institutions in Urban Politics (1 Unit) Advanced urban politics. Analyzes opportunities for action in local politics and challenges for effective governance in the modern metropolis. *Social Behavioral Sciences Distro Area*

POLI_SCI 323-0 Public Opinion and Voting Behavior (1 Unit) 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: POLI_SCI 220-0 or equivalent.

POLI_SCI 324-0 Political Parties and Elections (1 Unit) Role of political parties in a democratic society. Topics include nomination, national conventions, political funding, campaigns, party organization, and national, state, and local parties. *Social Behavioral Sciences Distro Area*

POLI_SCI 325-0 Congress and the Legislative Process (1 Unit) Organization of legislatures to make public policy; impact of constituents and political parties on legislative decision making; polarization; legislative-executive relations. Emphasis on the US Congress and contemporary politics. Prerequisite: POLI_SCI 220-0 or equivalent. *Social Behavioral Sciences Distro Area*

POLI_SCI 326-0 Race and Public Policy (1 Unit) Analysis of how diversity shapes policy in the United States and how policies contribute to racial and ethnic diversity. Immigration reform, school choice, residential segregation, and criminal justice. *Social Behavioral Sciences Distro Area*

POLI_SCI 327-0 African American Politics (1 Unit) Survey of black politics in the United States, including blacks' relations with government, whites, political parties, public policy, and electoral politics. *Social Behavioral Sciences Distro Area*

POLI_SCI 328-0 Public Policy (1 Unit) The role of government in regulating economic and social behavior; theories of public policy making; sources and effects of public policy.

POLI_SCI 329-0 U.S. Environmental Politics (1 Unit) Political problems associated with human impact on natural environment; pollution, natural resources, public lands, land use, energy, and population. *Social Behavioral Sciences Distro Area*

POLI_SCI 330-0 U.S. Refugee Policy & Localities (1 Unit) Comparative understandings of refugee policies in liberal democracies and their relation to constitutional and human rights. Street level bureaucracy, constitutional governance, federalism, integration, refugee resettlement policy, citizenship and belonging. POLI_SCI 330-0 and LEGAL_ST 330-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

POLI_SCI 331-0 Politics of the Supreme Court (1 Unit) Operation of appellate courts, with emphasis on the US Supreme Court. Decision making by appellate courts and the development of public policy. Prerequisite: POLI_SCI 220-0 or POLI_SCI 230-0.

POLI_SCI 332-0 Constitutional Law I (1 Unit) Introduction to interpretation of the US Constitution by the Supreme Court. Judicial review, federalism, congressional and executive authority, separation of powers. Taught with LEGAL_ST 332-0; may not receive credit for both

courses. Prerequisite: POLI_SCI 220-0 or POLI_SCI 230-0. *Social Behavioral Sciences Distro Area*

POLI_SCI 333-0 Constitutional Law II: Civil and Political Rights (1 Unit) Consideration of US Supreme Court decisions dealing with civil and political rights, including equality, freedom of speech and religion, and criminal procedures. LEGAL_ST 333-0 and POLI_SCI 333-0 are taught together; may not receive credit for both courses. Prerequisite: POLI_SCI 220-0 or POLI_SCI 230-0. *Social Behavioral Sciences Distro Area*

POLI_SCI 334-0 Latino Politics (1 Unit) Implications of Latino politics including contemporary social and political developments of Latino communities in the United States from a comparative urban framework. Focus on Mexican and Cuban Americans and Puerto Ricans. *Social Behavioral Sciences Distro Area*

POLI_SCI 335-0 Political Psychology (1 Unit) Examination of mental processes that underpin political judgments. Origins of political views, influence of parties and news media, decision-making heuristics and biases. Emphasis on ordinary citizens; some attention to elites. *Social Behavioral Sciences Distro Area*

POLI_SCI 340-0 International Relations Theory (1 Unit) Conceptual approaches to international relations, including "national interest," sovereignty, international norms and law, and rationality. Prerequisite: POLI_SCI 240-0 or consent of instructor.

POLI_SCI 341-0 International Political Economy (1 Unit) 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: POLI_SCI 240-0 or consent of instructor.

POLI_SCI 342-0 International Organizations (1 Unit) Institutions that govern the interactions of states, including the WTO, UN, ICJ, and ICC; informal norms, such as international intervention, international criminal law, and sovereignty. POLI_SCI 342-0 and LEGAL_ST 342-0 are taught together; may not receive credit for both courses. Prerequisite: POLI_SCI 240-0 or consent of instructor. *Social Behavioral Sciences Distro Area*

POLI_SCI 343-0 Politics of International Law (1 Unit) Non-utopian political science analysis of how law is used to promote collective goals and regulate international relations. *Social Behavioral Sciences Distro Area*

POLI_SCI 344-0 U.S. Foreign Policy (1 Unit) How US foreign policy is formulated, executed, legitimated, and contested. Topics include 9/11 and its aftermath, covert action, interventionism, trade, US respect for international norms, and US engagement with the Middle East. *Social Behavioral Sciences Distro Area*

POLI_SCI 345-0 National Security (1 Unit) 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. *Social Behavioral Sciences Distro Area*

POLI_SCI 346-0 European Union in International Affairs (1 Unit) Introduction to the institutions and policies of the European Union today. *Historical Studies Distro Area*

POLI_SCI 347-0 Ethics in International Relations (1 Unit) 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. *Ethics Values Distro Area*

POLI_SCI 348-0 Globalization (1 Unit) 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: POLI_SCI 240-0 or equivalent.

POLI_SCI 349-0 International Environmental Politics (1 Unit) 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 350-0 Social Movements (1 Unit) Theory and case studies examining the processes shaping collective challenges to authority. Topics include causes and mechanics of mobilization, the contexts in which movements emerge, repression and violence, strategies, and determinants of movement outcomes. *Social Behavioral Sciences Distro Area*

POLI_SCI 351-0 Politics of the Middle East (1 Unit) Survey of politics and political history of the Middle East and North Africa from World War I to the present. Topics include state building, authoritarianism, political economy, the Israeli-Palestinian conflict, and the causes, trajectories, and aftermath of the 2011 Arab uprisings. *Social Behavioral Sciences Distro Area*

POLI_SCI 353-0 Politics of Latin America (1 Unit) Patterns of socioeconomic development and regime forms in Latin America. Interaction of internal and international economic and political structures and processes. *Social Behavioral Sciences Distro Area*

POLI_SCI 354-0 Politics of Southeast Asia (1 Unit) Political economy of selected Southeast Asian countries, 1945 to present. Important themes include oligarchy and human rights. *Social Behavioral Sciences Distro Area*

POLI_SCI 355-0 Politics of China (1 Unit) Chinese politics since 1949, focusing on social issues and state-society relations since 1989. Basic foundation for the non-specialist as well as preparation for advanced study. *Social Behavioral Sciences Distro Area*

POLI_SCI 356-0 Constitutional Challenges in Comparative Perspective (1 Unit) Constitutional controversies and resolutions in liberal democracies. Constitutional traditions and governance, rule of law, legitimacy and authority in diverse societies, human rights, social transformation. POLI_SCI 356-0 and LEGAL_ST 356-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

POLI_SCI 357-SA Political Economy of Israel (1 Unit) Influence of demographics, political factors, and Israeli-Palestinian conflict on development, economic policy, government spending, public health, and socio-economy. Restricted to students in Northwestern's Israel program. *Social Behavioral Sciences Distro Area*

POLI_SCI 358-SA Contemporary South Africa: A Political Economy/Policy Perspective (1 Unit) Analysis of the political outcomes of South Africa's transition to democracy, democratic consolidation, the state of the South African political economy, and major policy issues, such as gender equality and HIV/AIDS. Restricted to students in Northwestern's South Africa program. *Social Behavioral Sciences Distro Area*

POLI_SCI 359-0 Politics of Africa (1 Unit) Political structures and relation of cultural factors to political stability and change; development of modern political systems. *Social Behavioral Sciences Distro Area*

POLI_SCI 361-0 Democratic Transitions (1 Unit) Theories of the emergence and breakdown of democracy with a focus on cases from Europe, Latin America, Africa, and Asia. *Social Behavioral Sciences Distro Area*

POLI_SCI 361-SA Democratic Transitions (1 Unit) Theories of the emergence and breakdown of democracy with a focus on cases from Europe, Latin America, Africa, and Asia. *Social Behavioral Sciences Distro Area*

POLI_SCI 362-0 Politics of Europe (1 Unit) Impact of historical development on contemporary institutions, political and political-economic institutions, interest groups and parties, policy making, and social and economic policy. *Social Behavioral Sciences Distro Area*

POLI_SCI 363-SA The Political Economy of the European Union (1 Unit) The political production, structure, and regulation of economic activity in the EU. Restricted to students in Northwestern's Paris program.

POLI_SCI 364-SA France: Politics, Culture, and Society (1 Unit) Introduction to French politics in the framework of European integration. Covers French efforts to promote integration and France's role in the international system and adaptation to the EU. Restricted to students in Northwestern's Paris program.

POLI_SCI 365-SA Decision Making in the European Union (1 Unit) Analysis, by lecture and simulation, of the EU's complicated institutional structure for political decision making. Restricted to students in Northwestern's Paris program.

POLI_SCI 366-SA The Dynamics of Law Making in the European Union (1 Unit) Examination of the dynamics of law making in the EU and conflict/balance between domestic and regional law. Restricted to students in Northwestern's Paris program.

POLI_SCI 368-0 Political Economy of Development (1 Unit) Major analytical perspectives of modern political economy seen through concrete problems of development and underdevelopment in the least developed countries. *Social Behavioral Sciences Distro Area*

POLI_SCI 369-0 Politics of Post-Soviet Russia (1 Unit) Analysis of Russia's political and economic revolutions after the collapse of the Soviet Union. Examines key concepts in comparative politics, such as revolution, regime change, market formation, nationalism, and state building. *Social Behavioral Sciences Distro Area*

POLI_SCI 372-0 The Middle East in International Politics (1 Unit) 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 US-led occupation of Iraq, relations between Turkey and the European Union. Recommended but not required: POLI_SCI 240-0. *Social Behavioral Sciences Distro Area*

POLI_SCI 373-0 Chinese Foreign Policy (1 Unit) Basic dynamics of Chinese foreign policy toward a variety of countries and regions. *Social Behavioral Sciences Distro Area*

POLI_SCI 374-0 Politics of Capitalism (1 Unit) Effects of politics on the economy and vice versa, especially in advanced industrial economies.

The welfare state, varieties of capitalism, and neoliberalism. *Social Behavioral Sciences Distro Area*

POLI_SCI 376-0 Civil Wars (1 Unit) Focus on post-Cold War increase in civil wars, including causes and consequences of internal wars, and theories of conflict. Examines recent and contemporary civil wars to illustrate applications of theories and better understand current events.

POLI_SCI 377-0 Drugs and Politics (1 Unit) Analysis of the links between illegal drugs and politics, from the politics of local communities to international public policy. Regional focus on North, Central, and South America. *Social Behavioral Sciences Distro Area*

POLI_SCI 378-0 America and the World (1 Unit) Key debates and developments in the history and politics of American foreign relations. Domestic politics and foreign policy, political culture, interventionism, legal globalization, international institutions. *Social Behavioral Sciences Distro Area*

POLI_SCI 379-SA China in Transition: Ideology, Political Economy, Law, and Relations with the US (1 Unit) Broad issues confronting China in its long, tumultuous transition. For students with no background as well as those with extensive prior knowledge of China. Restricted to students in Northwestern's program in China. *Social Behavioral Sciences Distro Area*

POLI_SCI 380-0 Refugee Crises and Human Rights (1 Unit) Development of international human rights. Comparative state and regional responses to forced migration due to war, conflict, and generalized violence. Humanitarian intervention, international law, and policy issues, such as gender-based violence, migrants at sea, and human trafficking. *Social Behavioral Sciences Distro Area*

POLI_SCI 381-SA Political Economy of Contemporary China (1 Unit) State capitalism, the role of state-owned enterprises in China's economic development, China as a regulatory state, social consequences, financial reforms. Restricted to students in Northwestern's program in China. *Social Behavioral Sciences Distro Area*

POLI_SCI 382-0 Politics of Religious Diversity (1 Unit) Intersection of religion, law, and politics in comparative and global perspective. Legal, political, and religious history; discrimination and identity; religion, race, indigeneity, empire; religious liberalization; rule of law; national security. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

POLI_SCI 383-0 War and Change in International Politics (1 Unit) Historical and contemporary forms of international order. Western and non-Eurocentric systems; how international order emerges; whether the post-1945 order will change. *Social Behavioral Sciences Distro Area*

POLI_SCI 388-0 Institutions and Society (1 Unit) Institutions in a broad societal context. How institutional frameworks apply to government, family, education, and the environment; implications of institutions. POLI_SCI 388-0 and SOCIOL 288-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

POLI_SCI 389-0 Understanding Genocide (1 Unit) Key debates in the comparative study of genocide. Why genocide occurs, why people become killers, how these processes relate to each other. POLI_SCI 389-0 and SOCIOL 379-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

POLI_SCI 390-0 Special Topics in Political Science (1 Unit) Designed for investigation of topics of interest to students and faculty that are not

covered by other course offerings. May be repeated for credit with change of topic.

POLI_SCI 390-SA Special Topics in Political Science (1 Unit) Designed for investigation of topics of interest to students and faculty that are not covered by other course offerings. May be repeated for credit with change of topic.

POLI_SCI 395-0 Political Research Seminar (1 Unit) Required of all political science majors; ordinarily taken during junior year or in fall quarter of senior year.

POLI_SCI 398-1 Senior Thesis Seminar (1 Unit) Two consecutive quarters (fall and winter) during which students work on their senior theses. Prerequisite: POLI_SCI 395-0 and admission to the honors program.

POLI_SCI 398-2 Senior Thesis Seminar (1 Unit) Two consecutive quarters (fall and winter) during which students work on their senior theses. Prerequisite: POLI_SCI 395-0 and admission to the honors program.

POLI_SCI 399-0 Independent Study (1 Unit) 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.

Political Science Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

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 two subfields: American politics, comparative politics, international politics, and political theory.

While some students choose courses from within one or two subfields, most take a wide variety across different areas. Concentrations are not required; however, majors may consult with department advisers to design programs of study. Students might design concentrations around, for instance, themes such as race, ethnicity, and politics; global transformation; representation and law; social and economic inequalities; terrorism and national security; and citizenship studies.

Students planning to major in political science are advised to complete the 200-level gateway courses and at least 1 300-level course in political science by the end of sophomore year. Majors should complete their methodology requirement by the end of junior year and before taking the POLI_SCI 395-0 Political Research Seminar. Students should plan to take POLI_SCI 395-0 in junior year or early in senior year. Those who plan to pursue honors must take POLI_SCI 395-0 in junior year.

Course	Title
Major Requirements (12 units)	
3 gateway courses chosen from:	
POLI_SCI 201-0	Introduction to Political Theory
POLI_SCI 220-0	American Government and Politics
POLI_SCI 230-0	Introduction to Law in the Political Arena
POLI_SCI 240-0	Introduction to International Relations

POLI_SCI 250-0	Introduction to Comparative Politics
1 methodology course in political science chosen from:	
POLI_SCI 210-0	Introduction to Empirical Methods in Political Science
POLI_SCI 211-0	Introduction to Interpretive Methods in Political Science
POLI_SCI 310-0	Methods of Political Inference
POLI_SCI 311-0	Logics of Political Inquiry
POLI_SCI 312-0	Statistical Research Methods
1 Political Research Seminar	
POLI_SCI 395-0	Political Research Seminar
7 additional 300-level courses in political science ¹	

- ¹ Restrictions on eligible credits and substitutions include the following:
- At most 1 unit of Chicago Field Studies (chosen from CFS 391-0, CFS 394-1, CFS 396-0 or CFS 397-0) may substitute for one course.
 - At most two units of POLI_SCI 399-0 may count toward the 300-level requirement for the major.
 - Only one additional POLI_SCI 395-0 credit beyond the one credit required may count towards the 300-level requirement for the major.
 - Honors thesis seminars POLI_SCI 398-1 and POLI_SCI 398-2 do not count toward the major.

Notes about substitutions and restrictions:

- At most two political science courses taken abroad may count toward the major, but courses taken abroad may not replace any of the 200-level gateway courses.
- Courses taken P/N cannot be counted toward the major (this is a Weinberg College rule; for details see Grade Requirements (p. 175)).
- Receiving a 5 on an AP exam (either American Government or Comparative Politics) can place students out of the equivalent 200-level course, but test credit awarded cannot be substituted for the courses (12) required to complete the major. Thus, instead of taking POLI_SCI 220-0 or POLI_SCI 250-0, the student must take an additional 300-level course. Students wishing to use their AP credit in this fashion must meet with the Director of Undergraduate Studies and place the request.

Honors in Political Science

Majors (including students studying abroad) with strong academic records and an interest in pursuing honors should submit an application to the honors program by March of junior year. Interested students should complete at least 7 of the courses required for the major, including the methodology and research seminar requirements, before senior year. Accepted students enroll in the 2-quarter seminar POLI_SCI 398-1 & POLI_SCI 398-2, which provides guidance in writing a senior thesis; these courses do not count toward the major. Students interested in pursuing honors in more than one major are encouraged to pursue interdisciplinary honors.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information see Honors in the Major (p. 178).

Courses

American Politics Courses

These courses examine political behavior, power, and politics in American society and in the institutions of US government at the national, state, and local levels.

Course	Title
POLI_SCI 220-0	American Government and Politics
POLI_SCI 230-0	Introduction to Law in the Political Arena
POLI_SCI 320-0	The American Presidency
POLI_SCI 321-0	Urban Politics
POLI_SCI 322-0	Ideas and Institutions in Urban Politics
POLI_SCI 323-0	Public Opinion and Voting Behavior
POLI_SCI 324-0	Political Parties and Elections
POLI_SCI 325-0	Congress and the Legislative Process
POLI_SCI 326-0	Race and Public Policy
POLI_SCI 327-0	African American Politics
POLI_SCI 328-0	Public Policy
POLI_SCI 329-0	U.S. Environmental Politics
POLI_SCI 330-0	U.S. Refugee Policy & Localities
POLI_SCI 331-0	Politics of the Supreme Court
POLI_SCI 332-0	Constitutional Law I
POLI_SCI 333-0	Constitutional Law II: Civil and Political Rights
POLI_SCI 334-0	Latino Politics

Comparative Politics Courses

Some of these courses concentrate on understanding the politics of specific national systems, while others focus on certain types of political phenomena and make cross-national comparisons.

Course	Title
POLI_SCI 250-0	Introduction to Comparative Politics
POLI_SCI 350-0	Social Movements
POLI_SCI 351-0	Politics of the Middle East
POLI_SCI 353-0	Politics of Latin America
POLI_SCI 354-0	Politics of Southeast Asia
POLI_SCI 355-0	Politics of China
POLI_SCI 357-SA	Political Economy of Israel
POLI_SCI 358-SA	Contemporary South Africa: A Political Economy/Policy Perspective
POLI_SCI 359-0	Politics of Africa
POLI_SCI 361-0	Democratic Transitions
POLI_SCI 362-0	Politics of Europe
POLI_SCI 363-SA	The Political Economy of the European Union
POLI_SCI 364-SA	France: Politics, Culture, and Society
POLI_SCI 365-SA	Decision Making in the European Union
POLI_SCI 366-SA	The Dynamics of Law Making in the European Union
POLI_SCI 368-0	Political Economy of Development
POLI_SCI 369-0	Politics of Post-Soviet Russia
POLI_SCI 373-0	Chinese Foreign Policy
POLI_SCI 374-0	Politics of Capitalism
POLI_SCI 379-SA	China in Transition: Ideology, Political Economy, Law, and Relations with the US
POLI_SCI 381-SA	Political Economy of Contemporary China
POLI_SCI 388-0	Institutions and Society
POLI_SCI 389-0	Understanding Genocide

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.

Course	Title
POLI_SCI 240-0	Introduction to International Relations
POLI_SCI 340-0	International Relations Theory
POLI_SCI 341-0	International Political Economy
POLI_SCI 342-0	International Organizations
POLI_SCI 343-0	Politics of International Law
POLI_SCI 344-0	U.S. Foreign Policy
POLI_SCI 345-0	National Security
POLI_SCI 346-0	European Union in International Affairs
POLI_SCI 347-0	Ethics in International Relations
POLI_SCI 348-0	Globalization
POLI_SCI 349-0	International Environmental Politics
POLI_SCI 372-0	The Middle East in International Politics
POLI_SCI 376-0	Civil Wars
POLI_SCI 377-0	Drugs and Politics
POLI_SCI 378-0	America and the World
POLI_SCI 380-0	Refugee Crises and Human Rights
POLI_SCI 382-0	Politics of Religious Diversity
POLI_SCI 383-0	War and Change in International Politics

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.

Course	Title
POLI_SCI 201-0	Introduction to Political Theory
POLI_SCI 301-0	Classical Political Theory
POLI_SCI 302-0	Subjects, Citizens, Revolutionaries: Early Modern Political Thought
POLI_SCI 303-0	Modernity and Its Discontents
POLI_SCI 306-0	American Political Thought
POLI_SCI 307-0	Deportation Law and Politics
POLI_SCI 308-SA	Critical Theory and the Study of Politics
POLI_SCI 309-0	Political Theories of the Rule of Law

Research Methodology Courses

Courses in this field help students engage in the research they may encounter in their 300 level courses and help 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.

Course	Title
POLI_SCI 210-0	Introduction to Empirical Methods in Political Science
POLI_SCI 211-0	Introduction to Interpretive Methods in Political Science
POLI_SCI 310-0	Methods of Political Inference
POLI_SCI 311-0	Logics of Political Inquiry
POLI_SCI 312-0	Statistical Research Methods

Seminars and Independent Study

Course	Title
POLI_SCI 390-0	Special Topics in Political Science
POLI_SCI 395-0	Political Research Seminar
POLI_SCI 398-1 & POLI_SCI 398-2	Senior Thesis Seminar and Senior Thesis Seminar
POLI_SCI 399-0	Independent Study

Political Science Minor

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 want to choose courses that complement and deepen their major area of study. For example, an economics major may want to focus on political economy courses. A history major might study contemporary politics in an area on which he or she is focusing. A philosophy major may study political theory. Alternatively, students can choose to broaden their knowledge of political science in areas unrelated to their majors. Students should consult with a member of the departmental undergraduate advising team to develop an individual program of study.

Course	Title
Minor Requirements (6 units)	
At least 2 200-level courses chosen from:	
POLI_SCI 201-0	Introduction to Political Theory
POLI_SCI 220-0	American Government and Politics
POLI_SCI 230-0	Introduction to Law in the Political Arena
POLI_SCI 240-0	Introduction to International Relations
POLI_SCI 250-0	Introduction to Comparative Politics
4 additional political science courses, including at least 3 at the 300 level ¹	

¹ At most 1 unit of Chicago Field Studies (chosen from CFS 391-0, CFS 394-1, CFS 396-0, or CFS 397-0) may substitute for one course.

Notes about substitutions and restrictions:

- At most one course from study abroad may count toward the minor.
- At most two units of POLI_SCI 399-0 Independent Study may count towards the minor.
- Courses taken P/N cannot be counted toward the minor (this is a Weinberg College rule; for details see Grade Requirements (p. 175)).
- Receiving a 5 on an AP exam (either American Government or Comparative Politics) can place students out of the equivalent 200-level course, but test credit awarded cannot be substituted for the courses (6) required to complete the minor. Thus, instead of taking POLI_SCI 220-0 or POLI_SCI 250-0, the student must take an additional 300-level course. Students wishing to use their AP credit in this fashion must meet with the Director of Undergraduate Studies to place the request.

Courses

American Politics Courses

These courses examine political behavior, power, and politics in American society and in the institutions of US government at the national, state, and local levels.

Course	Title
POLI_SCI 220-0	American Government and Politics
POLI_SCI 230-0	Introduction to Law in the Political Arena
POLI_SCI 320-0	The American Presidency
POLI_SCI 321-0	Urban Politics
POLI_SCI 322-0	Ideas and Institutions in Urban Politics
POLI_SCI 323-0	Public Opinion and Voting Behavior
POLI_SCI 324-0	Political Parties and Elections
POLI_SCI 325-0	Congress and the Legislative Process
POLI_SCI 326-0	Race and Public Policy
POLI_SCI 327-0	African American Politics
POLI_SCI 328-0	Public Policy
POLI_SCI 329-0	U.S. Environmental Politics
POLI_SCI 330-0	U.S. Refugee Policy & Localities
POLI_SCI 331-0	Politics of the Supreme Court
POLI_SCI 332-0	Constitutional Law I
POLI_SCI 333-0	Constitutional Law II: Civil and Political Rights
POLI_SCI 334-0	Latino Politics

Comparative Politics Courses

Some of these courses concentrate on understanding the politics of specific national systems, while others focus on certain types of political phenomena and make cross-national comparisons.

Course	Title
POLI_SCI 250-0	Introduction to Comparative Politics
POLI_SCI 350-0	Social Movements
POLI_SCI 351-0	Politics of the Middle East
POLI_SCI 353-0	Politics of Latin America
POLI_SCI 354-0	Politics of Southeast Asia
POLI_SCI 355-0	Politics of China
POLI_SCI 357-SA	Political Economy of Israel
POLI_SCI 358-SA	Contemporary South Africa: A Political Economy/Policy Perspective
POLI_SCI 359-0	Politics of Africa
POLI_SCI 361-0	Democratic Transitions
POLI_SCI 362-0	Politics of Europe
POLI_SCI 363-SA	The Political Economy of the European Union
POLI_SCI 364-SA	France: Politics, Culture, and Society
POLI_SCI 365-SA	Decision Making in the European Union
POLI_SCI 366-SA	The Dynamics of Law Making in the European Union
POLI_SCI 368-0	Political Economy of Development
POLI_SCI 369-0	Politics of Post-Soviet Russia
POLI_SCI 373-0	Chinese Foreign Policy
POLI_SCI 374-0	Politics of Capitalism
POLI_SCI 379-SA	China in Transition: Ideology, Political Economy, Law, and Relations with the US
POLI_SCI 381-SA	Political Economy of Contemporary China
POLI_SCI 388-0	Institutions and Society
POLI_SCI 389-0	Understanding Genocide

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.

Course	Title
POLI_SCI 240-0	Introduction to International Relations
POLI_SCI 340-0	International Relations Theory
POLI_SCI 341-0	International Political Economy
POLI_SCI 342-0	International Organizations
POLI_SCI 343-0	Politics of International Law
POLI_SCI 344-0	U.S. Foreign Policy
POLI_SCI 345-0	National Security
POLI_SCI 346-0	European Union in International Affairs
POLI_SCI 347-0	Ethics in International Relations
POLI_SCI 348-0	Globalization
POLI_SCI 349-0	International Environmental Politics
POLI_SCI 372-0	The Middle East in International Politics
POLI_SCI 376-0	Civil Wars
POLI_SCI 377-0	Drugs and Politics
POLI_SCI 378-0	America and the World
POLI_SCI 380-0	Refugee Crises and Human Rights
POLI_SCI 382-0	Politics of Religious Diversity
POLI_SCI 383-0	War and Change in International Politics

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.

Course	Title
POLI_SCI 201-0	Introduction to Political Theory
POLI_SCI 301-0	Classical Political Theory
POLI_SCI 302-0	Subjects, Citizens, Revolutionaries: Early Modern Political Thought
POLI_SCI 303-0	Modernity and Its Discontents
POLI_SCI 306-0	American Political Thought
POLI_SCI 307-0	Deportation Law and Politics
POLI_SCI 308-SA	Critical Theory and the Study of Politics
POLI_SCI 309-0	Political Theories of the Rule of Law

Research Methodology Courses

Courses in this field help students engage in the research they may encounter in their 300 level courses and help 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.

Course	Title
POLI_SCI 210-0	Introduction to Empirical Methods in Political Science
POLI_SCI 211-0	Introduction to Interpretive Methods in Political Science
POLI_SCI 310-0	Methods of Political Inference
POLI_SCI 311-0	Logics of Political Inquiry
POLI_SCI 312-0	Statistical Research Methods

Seminars and Independent Study

Course	Title
POLI_SCI 390-0	Special Topics in Political Science
POLI_SCI 395-0	Political Research Seminar
POLI_SCI 398-1 & POLI_SCI 398-2	Senior Thesis Seminar and Senior Thesis Seminar
POLI_SCI 399-0	Independent Study

Portuguese

A minor in Portuguese Language and Lusophone Cultures (p. 355) is offered by the Department of Spanish and Portuguese (p. 348).

Psychology

psychology.northwestern.edu

The study of psychology includes a wide range of topics in the natural and social sciences. It provides students an 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, health psychology, and social psychology, psychology is also a useful major for students planning careers in education, medicine, law, or management. It provides knowledge about human behavior and about research methods 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.

Programs of Study

- Psychology Major (p. 332)
- Psychology Minor (p. 334)

PSYCH 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

PSYCH 110-0 Introduction to Psychology (1 Unit) A survey course reviewing primary psychological research and theories of human behavior. Laboratory experience exposes students to psychology as a research science. *Social Behavioral Sciences Distro Area*

PSYCH 201-0 Statistical Methods in Psychology (1 Unit) Measurement; descriptive statistics; probability and sampling; T-test, ANOVA, correlation, and regression. Prerequisite: PSYCH 110-0; some college mathematics recommended. *Formal Studies Distro Area*

PSYCH 204-0 Social Psychology (1 Unit) Psychological processes underlying social behavior; topics include social cognition, attraction, aggression, prejudice, and behavior in groups. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 205-0 Research Methods in Psychology (1 Unit) Methods of psychological research; experimental design; reliability and validity; review and application of statistics; execution and reporting of psychological research. Prerequisite: PSYCH 201-0.

PSYCH 212-0 Introduction to Neuroscience (1 Unit) Designed for students with no prior coursework in neuroscience or biology. Neurophysiology and neuroanatomy; neuroscience of perception, emotion, morality, memory, mental illness, and consciousness. *Natural Sciences Distro Area*

PSYCH 215-0 Psychology of Personality (1 Unit) Nature of personality and its development. Modern theoretical interpretations. Biological and social bases of individual differences. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 218-0 Developmental Psychology (1 Unit) Development of cognitive, social, and other psychological functions. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 228-0 Cognitive Psychology (1 Unit) Introduction to research into mental processes such as memory, reasoning, problem solving, and decision making. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 245-0 Presenting Ideas & Data (1 Unit) Understanding principles of cognitive psychology, data visualization, and graphic design to present ideas and data in an engaging, clear, and memorable manner. PSYCH 245-0 and COG_SCI 245-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

PSYCH 248-0 Health Psychology (1 Unit) Overview of research in health psychology. Stress and coping, biological systems affected by stress, social support and health, health behaviors, adjustment to chronic illnesses. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 249-0 Buddhist Psychology (1 Unit) Buddhist and scientific psychological views of mind and behavior; meditation techniques. Prerequisite: PSYCH 110-0. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

PSYCH 303-0 Psychopathology (1 Unit) Understanding the nature of psychological, emotional, and behavioral disorders. Emphasis on current evidence regarding causes and characteristics of these disorders. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 306-0 Introduction to Clinical Psychology (1 Unit) Definition and history of clinical psychology, personality theory in clinical psychology, diagnosis and classification of disorders, assessment, psychotherapy, and ethical issues. Prerequisite: PSYCH 303-0. *Social Behavioral Sciences Distro Area*

PSYCH 312-1 Selected Topics in Neuroscience and Psychophysiology (1 Unit) Intermediate principles of neuroscience; neurophysiology, neuropharmacology, neuroanatomy, and electrophysiological substrates of psychological processes. Prerequisites: PSYCH 110-0; 1 biological sciences course. *Natural Sciences Distro Area*

PSYCH 312-2 Selected Topics in Neuroscience and Psychophysiology (1 Unit) Applied psychophysiology; brain activity coding of cognitive events, biofeedback, opiate pain control. Prerequisite: PSYCH 312-1 or equivalent; PSYCH 205-0 recommended. *Natural Sciences Distro Area*

PSYCH 314-0 Special Topics in Psychology (1 Unit) Topic to be announced. Prerequisites vary. May be repeated for credit with different topic.

PSYCH 315-0 Special Topics in Social/Clinical/Personality (1 Unit) Topic to be announced. Prerequisites vary. May be repeated for credit with different topic.

PSYCH 316-0 Special Topics in Cognition/Neuroscience (1 Unit) Topic to be announced. Prerequisites vary. May be repeated for credit with different topic.

PSYCH 321-0 Neuroscience & Behavior Laboratory (1 Unit) Classical exercises in the physiological psychology laboratory, including brainwave recording and electrophysiology. Prerequisites: PSYCH 205-0, PSYCH 312-2. *Natural Sciences Distro Area*

PSYCH 323-0 Deception: Processes and Detection (1 Unit) 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: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 324-0 Perception (1 Unit) Human perception, particularly vision but also hearing, taste, smell, and touch. Biological foundations, development, and disorders of perception. The senses in everyday life. Prerequisite: PSYCH 110-0. *Interdisciplinary Distro - See Rules (p. 175) Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 326-0 Social and Personality Development (1 Unit) Research methods, theories, and facts relating to the development and modification of attitudes and behavior. Prerequisites: PSYCH 205-0; and PSYCH 204-0, PSYCH 215-0, or PSYCH 218-0. *Social Behavioral Sciences Distro Area*

PSYCH 332-0 Native Americans and Environmental Decision Making (1 Unit) Focus on Native Americans, culture and cultural processes, and environmental decision making. Emphasis on contemporary Native American cultures and relevant research. ENVR_POL 332-0 and PSYCH 332-0 are taught together; may not receive credit for both courses. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 333-0 Psychology of Thinking (1 Unit) Research methods and recent experimental findings for types of human thinking. Students conduct original research. Prerequisite: PSYCH 228-0. *Social Behavioral Sciences Distro Area*

PSYCH 334-0 Language and Thought (1 Unit) 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: PSYCH 205-0; and PSYCH 228-0 or COG_SCI 211-0. *Social Behavioral Sciences Distro Area*

PSYCH 335-0 Decision Making (1 Unit) Human decision making from both descriptive and prescriptive perspectives. Theories and models of decision making applied to a variety of contexts. Prerequisites: PSYCH 205-0, PSYCH 228-0. *Social Behavioral Sciences Distro Area*

PSYCH 336-0 Consciousness (1 Unit) Examines how psychologists, neuroscientists, computer scientists, and physicists have tackled fundamental questions about consciousness using empirical and theoretical methods. Prerequisites: a course in cognition and/or neuroscience, or instructor permission based on a strong background in neurobiology and/or physics; PSYCH 205-0 strongly recommended. *Interdisciplinary Distro - See Rules (p. 175) Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 339-0 Psychology of Gender (1 Unit) Examination of sex differences and similarities. Evaluation of explanations for differences.

Review of how gender affects achievement, relationships, and mental health. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 340-0 Psychology and Law (1 Unit) Examines the application of psychology to law, including topics such as the insanity defense, criminal profiling, eyewitness testimony, and interrogation. Taught with LEGAL_ST 350-0; may not receive credit for both courses. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 341-0 Positive Psychology: The Science of Well-Being (1 Unit) Key developments in the field of positive psychology. Eudaimonic and hedonic wellbeing, mindfulness and flow, importance of social connections, emotional resilience, positive institutions. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 342-0 Evolutionary Psychology (1 Unit) Theory, methodology, and empirical data related to how evolution has influenced human psychology and behavior. Emphasis on mating. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 343-0 Psychology of Beauty (1 Unit) Theory, methodology, and empirical data related to the psychological impact of human beauty. Emphasis on both cultural and evolutionary perspectives. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 344-0 Cultural Psychology (1 Unit) Introduction to concepts and empirical methods used to study how culture shapes mind, brain, and behavior over multiple time scales, including over generations and the lifespan and across situational contexts. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 346-0 Psychology of Instructional Design and Technology (1 Unit) Introduction to theory and practice in the development of technologies for formal and informal learning. Examines design approaches for developing and implementing effective instructional/training materials for individuals and organizations. Taught with LOC 346-0; may not receive credit for both courses. Prerequisite: PSYCH 110-0; PSYCH 205-0 recommended. *Social Behavioral Sciences Distro Area*

PSYCH 351-0 Advanced Statistics & Experimental Design (1 Unit) Advanced topics in research design and analysis of data. Focus on both theory and applications. Prerequisites: PSYCH 205-0; 2 200-level mathematics courses. *Formal Studies Distro Area*

PSYCH 352-0 Psychology and Food (1 Unit) Social, cultural, cognitive, evolutionary, and biological factors that influence food choice and consumption. Conducting and evaluating research on eating behavior. Prerequisite: PSYCH 205-0. *Social Behavioral Sciences Distro Area*

PSYCH 355-0 Social, Cultural, and Affective Neuroscience (1 Unit) Examines use of neuroscience techniques (e.g., neuroimaging) in research on affective and social processes and their interactions with cognitive processes; empirical findings, foundational topics, and current debates. Prerequisites: PSYCH 205-0; 1 course in cognition and/or neuroscience, e.g., PSYCH 212-0, PSYCH 228-0, PSYCH 312-1, PSYCH 324-0, PSYCH 361-0, COG_SCI 210-0, CSD 303-0. *Interdisciplinary Distro - See Rules (p. 175) Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 357-0 Advanced Seminar in Personality, Clinical, or Social Psychology (1 Unit) 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: PSYCH 205-0; additional prerequisites may apply.

PSYCH 358-0 Advanced Seminar in Cognition or Neuroscience (1 Unit) 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: PSYCH 205-0; additional prerequisites may apply.

PSYCH 359-0 Advanced Seminar in Psychology (1 Unit) 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: PSYCH 205-0; additional prerequisites may apply.

PSYCH 361-0 Brain Damage and the Mind (1 Unit) Survey of human cognition as studied via investigations of brain damage and brain-imaging techniques. Prerequisite: PSYCH 110-0, PSYCH 212-0, or COG_SCI 210-0. *Interdisciplinary Distro - See Rules (p. 175) Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 362-0 Cognitive Development (1 Unit) Development of cognition and perception, including development of memory, concepts, language, and expertise. May focus on one or more age groups. Prerequisites: PSYCH 205-0; PSYCH 218-0 or PSYCH 228-0. *Social Behavioral Sciences Distro Area*

PSYCH 363-0 Images of Cognition (1 Unit) Study of brain processes underlying cognition. Analysis of brain structure and function. Introduction to imaging techniques including fMRI, PET, and ERP. Prerequisites: PSYCH 205-0; a course in cognition and/or neuroscience (e.g., PSYCH 212-0, PSYCH 228-0, PSYCH 312-1, PSYCH 361-0; COG_SCI 210-0) or consent of instructor. *Interdisciplinary Distro - See Rules (p. 175) Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 365-0 Brain and Cognition (1 Unit) Neural bases of cognitive processing with emphases on neuroimaging approaches in the areas of encoding, perception, attention, memory, language, reading, motor control, and executive functioning. Taught with CSD 303-0; may not receive credit for both courses. *Formal Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 368-0 Human Memory (1 Unit) Scientific study of human memory, including memory systems of the brain, amnesia, remembering, forgetting, encoding, consolidation, memory suppression, and memory distortion. Emphasizes original research reports in cognitive neuroscience. Prerequisites: PSYCH 205-0; PSYCH 361-0 or consent of instructor. *Interdisciplinary Distro - See Rules (p. 175) Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 371-0 Personality Research (1 Unit) Research in personality, with emphasis on experimental approaches and methods. Basic concepts of test reliability and validity. Students conduct original research. Prerequisites: PSYCH 205-0, PSYCH 215-0. *Social Behavioral Sciences Distro Area*

PSYCH 375-0 Psychological Tests & Measures (1 Unit) Explores the science of psychological assessment, including its history, test construction and evaluation, and common measures of personality, psychopathology, and ability. Students create and evaluate their own

psychological measures. Prerequisites: PSYCH 205-0; PSYCH 204-0, PSYCH 215-0, or PSYCH 303-0. *Social Behavioral Sciences Distro Area*

PSYCH 376-0 Cognitive Behavior Therapy (1 Unit) Scientific foundations of cognitive behavior therapy for a wide range of disorders. Focus on the rationale for different treatments and evidence of efficacy and process. Comparisons with other scientifically validated treatments. Prerequisite: PSYCH 303-0. *Social Behavioral Sciences Distro Area*

PSYCH 377-0 Child Psychopathology (1 Unit) Major forms of psychopathology present during childhood, including disorders exclusive to childhood and those that may appear during any developmental period. Developmental models of the etiology and course of major psychopathologies. Prerequisites: PSYCH 205-0; PSYCH 218-0 or PSYCH 303-0. *Social Behavioral Sciences Distro Area*

PSYCH 381-0 Children & the Law (1 Unit) Examines from a developmental perspective research on children's involvement in the legal system as decision makers, witnesses, victims, and perpetrators. Taught with LEGAL_ST 381-0; may not receive credit for both courses. Prerequisites: PSYCH 205-0, PSYCH 218-0. *Social Behavioral Sciences Distro Area*

PSYCH 384-0 Close Relationships (1 Unit) Social-psychological analysis of close relationships, with an emphasis on romantic relationships. Interpersonal processes associated with relationship formation, development, and dissolution. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 385-0 Psychology of Attitudes (1 Unit) Survey of social psychological research on attitudes; focus on the formation of attitudes, the relationship between attitudes and behavior, and attitude change. Prerequisite: PSYCH 204-0. *Social Behavioral Sciences Distro Area*

PSYCH 386-0 Stereotyping & Prejudice (1 Unit) Analysis of the causes and consequences of stereotyping and prejudice, as well as methods used to study these issues. Students conduct original research. Prerequisites: PSYCH 204-0, PSYCH 205-0. *Social Behavioral Sciences Distro Area*

PSYCH 387-0 Consumer Psychology and Marketing Research (1 Unit) Application of psychological theories, findings, and methodologies to marketing research questions and problems. Students conduct a marketing research project for an actual client. Prerequisite: PSYCH 205-0. *Social Behavioral Sciences Distro Area*

PSYCH 397-1 Advanced Supervised Research 1 (1 Unit) Design, implementation, and reporting of a psychology research project. Weinberg College limits on 398 and 399 enrollments also apply to 397. Prerequisites: PSYCH 205-0 and consent of instructor; PSYCH 397-2 must be taken with the same professor as PSYCH 397-1.

PSYCH 397-2 Advanced Supervised Research 2 (1 Unit) Design, implementation, and reporting of a psychology research project. Weinberg College limits on 398 and 399 enrollments also apply to 397. Prerequisites: PSYCH 205-0 and consent of instructor; PSYCH 397-2 must be taken with the same professor as PSYCH 397-1.

PSYCH 398-1 Senior Thesis Seminar (1 Unit) Open only to students pursuing departmental honors. They must apply for admission in spring quarter of junior year.

PSYCH 398-2 Senior Thesis Seminar (1 Unit) Open only to students pursuing departmental honors. They must apply for admission in spring quarter of junior year.

PSYCH 398-3 Senior Thesis Seminar (1 Unit) Open only to students pursuing departmental honors. They must apply for admission in spring quarter of junior year.

PSYCH 399-0 Independent Study (1 Unit) Consent of instructor required. Generally limited to juniors and seniors. See department requirements for eligibility.

Psychology Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Department Courses (11 units)	
<i>3 core courses:</i>	
PSYCH 110-0	Introduction to Psychology
PSYCH 201-0	Statistical Methods in Psychology (or approved substitute)
PSYCH 205-0	Research Methods in Psychology
<i>8 additional courses:</i>	
At least 2 must be personality, clinical, or social psychology courses chosen from the list below	
At least 2 must be cognitive psychology or neuroscience courses chosen from the list below	
At least 1 must be a cross-cutting or integrative course chosen from the list below	
At least 1 must be an upper-level research course chosen from the list below	
At least 2 must be at the 200 level; COG_SCI 210-0 and COG_SCI 211-0 may count toward this requirement	
At least 3 must be at the 300 level.	
A course may count toward more than one of these categories, but the total number of courses must be at least 8.	
Related Courses (5 units)	
2 200-level mathematics courses	
3 additional units of credit chosen from the following:	
Any 200-level mathematics course	
COG_SCI 207-0	Introduction to Cognitive Modeling
EECS 110-0	Introduction to Computer Programming
EECS 111-0	Fundamentals of Computer Programming
EECS 130-0	Tools and Technology of the World-Wide Web
Any course outside of psychology and cognitive science counting toward the WCAS Area I natural sciences requirement	
AP credits in biology, chemistry, environmental science, and physics	
With department consent, PSYCH 351-0 may count as a related course	

- First-year seminars do not count toward the major.
- Only 1 quarter total of PSYCH 397-1 or PSYCH 399-0 may count toward the major.
- Only 1 quarter of PSYCH 397-2 may count toward the major.
- See Weinberg College rules about Independent Study and Undergraduate Seminars (p. 178) for further restrictions on enrollments in PSYCH 398-1, PSYCH 398-2, PSYCH 398-3, and PSYCH 399-0; these also apply to PSYCH 397-1 and PSYCH 397-2.

Personality, Clinical, or Social Psychology Courses

Course	Title
PSYCH 204-0	Social Psychology
PSYCH 215-0	Psychology of Personality
PSYCH 303-0	Psychopathology
PSYCH 306-0	Introduction to Clinical Psychology
PSYCH 315-0	Special Topics in Social/Clinical/Personality
PSYCH 326-0	Social and Personality Development
PSYCH 357-0	Advanced Seminar in Personality, Clinical, or Social Psychology
PSYCH 371-0	Personality Research
PSYCH 375-0	Psychological Tests & Measures
PSYCH 376-0	Cognitive Behavior Therapy
PSYCH 377-0	Child Psychopathology
PSYCH 384-0	Close Relationships
PSYCH 385-0	Psychology of Attitudes
PSYCH 386-0	Stereotyping & Prejudice

Cognitive Psychology or Neuroscience Courses

Course	Title
PSYCH 212-0	Introduction to Neuroscience
PSYCH 228-0	Cognitive Psychology
PSYCH 312-1	Selected Topics in Neuroscience and Psychophysiology
PSYCH 312-2	Selected Topics in Neuroscience and Psychophysiology
PSYCH 316-0	Special Topics in Cognition/Neuroscience
PSYCH 321-0	Neuroscience & Behavior Laboratory
PSYCH 324-0	Perception
PSYCH 333-0	Psychology of Thinking
PSYCH 334-0	Language and Thought
PSYCH 335-0	Decision Making
PSYCH 336-0	Consciousness
PSYCH 346-0	Psychology of Instructional Design and Technology
PSYCH 358-0	Advanced Seminar in Cognition or Neuroscience
PSYCH 361-0	Brain Damage and the Mind
PSYCH 362-0	Cognitive Development
PSYCH 363-0	Images of Cognition
PSYCH 365-0	Brain and Cognition
PSYCH 368-0	Human Memory
COG_SCI 210-0	Language and the Brain
COG_SCI 211-0	Learning, Representation & Reasoning

Cross-Cutting or Integrative Courses

Course	Title
PSYCH 218-0	Developmental Psychology
PSYCH 245-0	Presenting Ideas & Data
PSYCH 248-0	Health Psychology
PSYCH 249-0	Buddhist Psychology
PSYCH 314-0	Special Topics in Psychology
PSYCH 323-0	Deception: Processes and Detection
PSYCH 332-0	Native Americans and Environmental Decision Making

PSYCH 339-0	Psychology of Gender
PSYCH 340-0	Psychology and Law
PSYCH 341-0	Positive Psychology: The Science of Well-Being
PSYCH 342-0	Evolutionary Psychology
PSYCH 343-0	Psychology of Beauty
PSYCH 344-0	Cultural Psychology
PSYCH 351-0	Advanced Statistics & Experimental Design
PSYCH 352-0	Psychology and Food
PSYCH 355-0	Social, Cultural, and Affective Neuroscience
PSYCH 359-0	Advanced Seminar in Psychology
PSYCH 381-0	Children & the Law
PSYCH 387-0	Consumer Psychology and Marketing Research

Upper-level Research Courses

Course	Title
PSYCH 321-0	Neuroscience & Behavior Laboratory
PSYCH 326-0	Social and Personality Development
PSYCH 334-0	Language and Thought
PSYCH 335-0	Decision Making
PSYCH 351-0	Advanced Statistics & Experimental Design
PSYCH 352-0	Psychology and Food
PSYCH 355-0	Social, Cultural, and Affective Neuroscience
PSYCH 357-0	Advanced Seminar in Personality, Clinical, or Social Psychology
PSYCH 358-0	Advanced Seminar in Cognition or Neuroscience
PSYCH 359-0	Advanced Seminar in Psychology
PSYCH 362-0	Cognitive Development
PSYCH 363-0	Images of Cognition
PSYCH 368-0	Human Memory
PSYCH 371-0	Personality Research
PSYCH 375-0	Psychological Tests & Measures
PSYCH 377-0	Child Psychopathology
PSYCH 381-0	Children & the Law
PSYCH 386-0	Stereotyping & Prejudice
PSYCH 387-0	Consumer Psychology and Marketing Research
PSYCH 397-2	Advanced Supervised Research 2
PSYCH 398-1	Senior Thesis Seminar
PSYCH 398-2	Senior Thesis Seminar
PSYCH 398-3	Senior Thesis Seminar

Honors in Psychology

Majors with strong academic records and an interest in pursuing honors should submit an application in spring of junior year. Course grades and research experience are both considered in selecting participants. Students typically enroll in PSYCH 398-1 in fall, PSYCH 398-2 in winter, and PSYCH 398-3 in spring of senior year and carry out a yearlong research project; Senior Thesis Seminar credits may count toward requirements for the major. The senior thesis is a report on the research project.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information see the department website (<http://www.psychology.northwestern.edu/undergraduate/research/honors-in-psychology.html>) and Honors in the Major (p. 178).

Psychology Minor

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 requires the introductory course (PSYCH 110-0 Introduction to Psychology), the 2 central methods courses (PSYCH 201-0 Statistical Methods in Psychology and PSYCH 205-0 Research Methods in Psychology), and at least 1 course from each of the two main content areas defined for the major. Note that first-year seminars do not count towards the minor.

Course	Title
Minor Requirements (7 units)	
<i>3 core courses:</i>	
PSYCH 110-0	Introduction to Psychology
PSYCH 201-0	Statistical Methods in Psychology (or approved substitute)
PSYCH 205-0	Research Methods in Psychology
<i>4 additional courses:</i>	
At least 1 personality, clinical, or social psychology course from: ¹	
PSYCH 204-0	Social Psychology
PSYCH 215-0	Psychology of Personality
PSYCH 303-0	Psychopathology
PSYCH 315-0	Special Topics in Social/Clinical/Personality
PSYCH 326-0	Social and Personality Development
PSYCH 357-0	Advanced Seminar in Personality, Clinical, or Social Psychology
PSYCH 384-0	Close Relationships
At least 1 cognitive psychology or neuroscience course from: ¹	
PSYCH 212-0	Introduction to Neuroscience
PSYCH 228-0	Cognitive Psychology
PSYCH 312-1	Selected Topics in Neuroscience and Psychophysiology
PSYCH 316-0	Special Topics in Cognition/Neuroscience
PSYCH 324-0	Perception
PSYCH 333-0	Psychology of Thinking
PSYCH 336-0	Consciousness
PSYCH 346-0	Psychology of Instructional Design and Technology
PSYCH 358-0	Advanced Seminar in Cognition or Neuroscience
PSYCH 361-0	Brain Damage and the Mind
PSYCH 362-0	Cognitive Development
PSYCH 363-0	Images of Cognition
PSYCH 365-0	Brain and Cognition
COG_SCI 210-0	Language and the Brain
COG_SCI 211-0	Learning, Representation & Reasoning
At least 1 200-level psychology department course ²	
At least 2 300-level psychology department courses ³	

¹ A course may count toward more than one of these categories, but the total number of additional courses must be at least 4.

² Or COG_SCI 210-0 Language and the Brain or COG_SCI 211-0 Learning, Representation & Reasoning

³ May not count both PSYCH 399-0 Independent Study and PSYCH 397-1 Advanced Supervised Research 1

Religious Studies

religion.northwestern.edu

The Department of Religious Studies offers undergraduates from across Northwestern the opportunity to study religions as historical and cultural phenomena. This includes the scholarly exploration of religious traditions, histories, cultures, beliefs, practices, sacred texts, sacred stories, and material productions from around the world in their institutional as well as noninstitutional ("on the ground") forms. The department's approach is fundamentally multidisciplinary, drawing from a variety of fields and critical perspectives: anthropology, history, philosophy, ethics, sociology, and literary and cultural studies, among others.

The wide variety of undergraduate courses range from large introductory classes to advanced seminars, and there are also independent studies and a senior thesis program for qualified students. The courses cover aspects of Buddhism, Hinduism, Christianity, Islam, Judaism, African American and Native American religions, new religious movements, and religion and culture in America. Several courses are structured comparatively or thematically and address religious ideas and phenomena across cultures and contexts.

The department offers a major and minor in religious studies and a minor in Catholic studies.

In consultation with a department adviser, students majoring in religious studies select one of four concentrations:

- Global study of religion in comparative perspective
- Religion, health, and medicine
- Religion, law, and politics
- Religion, sexuality, and gender

The concentrations are designed to complement academic interests and enhance professional goals.

The minor in religious studies provides a balanced set of departmental courses, including work on general theories of religion and on the historical development of religions and their social manifestations. In the interdisciplinary minor in Catholic studies, students take courses from both religious studies and other departments and choose an area of focus within Catholic studies.

Programs of Study

- Religious Studies Major (p. 337)
- Religious Studies Minor (p. 337)
- Catholic Studies Minor (p. 337)

RELIGION 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

RELIGION 170-0 Introduction to Religion (1 Unit) Religion as it has appeared in the past and as humans continue to express it in their personal and social lives. *Ethics Values Distro Area*

RELIGION 171-0 Varieties of Religious Tradition (1 Unit) Introduction to a variety of the world's major religious traditions. *Ethics Values Distro Area*

RELIGION 173-0 Religion, Medicine & Suffering in the West (1 Unit) Examination of religious healing ceremonies and Christian perspectives on pain and suffering in light of the meaning of physical pain in people's everyday lives. *Ethics Values Distro Area*

RELIGION 200-0 Introduction to Hinduism (1 Unit) Unity and diversity of Hindu mythology, beliefs, and practices from ancient times to the present. *Ethics Values Distro Area*

RELIGION 210-0 Introduction to Buddhism (1 Unit) The Buddha's life and teachings, traditions that developed from these teachings, and systems of meditation, rituals, and ethics. *Ethics Values Distro Area*

RELIGION 220-0 Introduction to Hebrew Bible (1 Unit) Major genres of Old Testament literature. Basic theological views and the sociopolitical history of ancient Israel. *Ethics Values Distro Area*

RELIGION 221-0 Introduction to the New Testament (1 Unit) Beginning, development, and content of the New Testament; its Jewish and Hellenistic environment. *Ethics Values Distro Area*

RELIGION 230-0 Introduction to Judaism (1 Unit) Main concepts in the theology of Judaism, main rituals and customs, and main institutions. *Ethics Values Distro Area*

RELIGION 240-0 Introduction to Christianity (1 Unit) Doctrine, worship, and institutions in the various branches of Christianity. *Ethics Values Distro Area*

RELIGION 250-0 Introduction to Islam (1 Unit) Principal beliefs and practices of Muslims set against the historic development of the faith. *Ethics Values Distro Area*

RELIGION 260-0 Introduction to Native American Religions (1 Unit) Diversity and common elements of Native American religious traditions; comparative study of sacred story, ritual, spiritual philosophy, and practice. *Ethics Values Distro Area*

RELIGION 261-0 American Religion, Ecology and Culture (1 Unit) The historical rise of environmentalism in American culture and its impact on religious thought and practice. ENVR_POL 261-0 and RELIGION 261-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area*

RELIGION 264-0 American Religious History from 1865 to the Great Depression (1 Unit) Topics include urban religion, African American churches, Christians and foreign policy, immigrant religion, the spiritual crisis of the 1920s, and Pentecostalism. *Historical Studies Distro Area*

RELIGION 265-0 American Religious History from World War II to the Present (1 Unit) Religion and the making of contemporary America, including Cold War religion, the Black Gods of the Great Migration, the rise of the Christian Right, and modern American Catholicism and Judaism. *Historical Studies Distro Area*

RELIGION 270-0 Introduction to Theology (1 Unit) Theology as an academic discipline with a long history of asking-in dialogue with thinkers past and present-fundamental questions about religious experience, texts, practices, and ideas. *Ethics Values Distro Area*

RELIGION 271-0 Theology of Love (1 Unit) The concept of love from theological, historical, philosophical, and biblical perspectives. *Ethics Values Distro Area*

RELIGION 272-0 Luther and the West (1 Unit) Examination of Luther's work in the context of his life and times. Introduces basic dimensions of Western thought, showing how theology relates to broader cultural, political, social, and aesthetic issues. GERMAN 272-0 and RELIGION 272-0 are taught together; may not receive credit for

both courses. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175)*

RELIGION 275-0 Mysticism and Spirituality (1 Unit) Examines mysticism (mystical experience, relationship, prayer, or consciousness) and spirituality (spiritual presence and practice) across religious traditions and outside traditions. *Ethics Values Distro Area*

RELIGION 309-0 Topics in Hinduism (1 Unit) Content varies. May be repeated for credit with change of topic. *Ethics Values Distro Area*

RELIGION 312-0 Buddhism and Gender (1 Unit) Women, men, and gendered symbolism in Buddhism from the time of the Buddha to the present. Draws on canonical texts, narrative literature, autobiography and biography, and ethnography. *Ethics Values Distro Area*

RELIGION 313-0 Tibetan Religion and Culture (1 Unit) Propagation of religions in Tibet in their larger historical, cultural, and political contexts. *Ethics Values Distro Area*

RELIGION 314-0 Buddhism in the Contemporary World (1 Unit) Buddhism's reinterpretation of its thought and practice in response to postcolonial modernizations. *Ethics Values Distro Area*

RELIGION 318-0 Topics in East Asian Religions (1 Unit) Content varies. May be repeated for credit with change of topic. *Ethics Values Distro Area*

RELIGION 319-0 Topics in Buddhism (1 Unit) Content varies. May be repeated for credit with change of topic. *Ethics Values Distro Area*

RELIGION 329-0 Topics in the Bible (1 Unit) Content varies. May be repeated for credit with change of topic. *Ethics Values Distro Area*

RELIGION 330-0 Varieties of Ancient Judaism (1 Unit) Introduction to the Judaisms that flourished from the fifth century BCE to the third century CE. *Ethics Values Distro Area*

RELIGION 332-0 Modern Jewish Thought (1 Unit) How Judaism dealt with modernity and the problems it posed: Spinoza, Mendelssohn, Cohen, Buber, Rosenzweig, and Levinas. *Ethics Values Distro Area*

RELIGION 333-0 Judaism in the Modern World (1 Unit) Radical changes that emancipation and modernity have brought to the religious expression of Judaism. May be repeated for credit. *Ethics Values Distro Area*

RELIGION 339-0 Topics in Judaism (1 Unit) Content varies. May be repeated for credit with change of topic. *Ethics Values Distro Area*

RELIGION 342-0 Christian Mystical Theology (1 Unit) Writings of mystics (e.g., Meister Eckhart, Cloud of Unknowing, Julian of Norwich, Teresa of Avila) in their cultural context. *Ethics Values Distro Area*

RELIGION 344-0 Blood, Sex, and Justice: Issues in Christian Ethics (1 Unit) Four contemporary moral issues viewed from a variety of Christian approaches. Prerequisite: RELIGION 170-0, RELIGION 221-0, RELIGION 240-0, or RELIGION 260-0. *Ethics Values Distro Area*

RELIGION 345-0 Idea of Sainthood in Christianity (1 Unit) Historical and contemporary conceptions of sanctity, especially in Roman Catholicism and Eastern Orthodoxy. *Ethics Values Distro Area*

RELIGION 346-0 Church Architecture (1 Unit) Survey of historical and recent churches: spatial dynamics, centering focus, aesthetic impact, and symbolic resonance. *Ethics Values Distro Area*

RELIGION 349-0 Topics in Christianity (1 Unit) Content varies. May be repeated for credit with change of topic. *Ethics Values Distro Area*

RELIGION 350-0 The Qur'an (1 Unit) Islam's sacred scripture, Muslim understandings of revelation and prophecy, and debates about the Qur'an in the contemporary world. *Ethics Values Distro Area*

RELIGION 351-0 Islamic Law (1 Unit) Evolution of Islamic Law from the Prophet Muhammad to the contemporary world, focusing on the impact of colonialism. *Ethics Values Distro Area*

RELIGION 353-0 Trends in Islamic Thought (1 Unit) Qur'anic, medieval, and modern approaches to problems in faith and social action. *Ethics Values Distro Area*

RELIGION 354-0 Sufism (1 Unit) The historical development of Islamic mystical traditions, with special attention to notions of mystical experience, sainthood, and devotion to the Prophet Muhammad. *Ethics Values Distro Area*

RELIGION 359-0 Topics in Islam (1 Unit) Selected topics in Islamic history and thought. May be repeated for credit with different topic. *Ethics Values Distro Area*

RELIGION 359-SA Topics in Islam (1 Unit) Selected topics in Islamic history and thought. May be repeated for credit with different topic. *Ethics Values Distro Area*

RELIGION 360-0 African American Religions (1 Unit) Exploration of the historical diversity of African American religious experiences and identities. *Ethics Values Distro Area*

RELIGION 363-0 Topics in Women and Religion in America (1 Unit) Topics, figures, events, and dynamics in the history of American women and religion. *Historical Studies Distro Area*

RELIGION 364-0 American Teenage Rites and Passage (1 Unit) Examination of various rites of passage experienced by US teens. *Ethics Values Distro Area*

RELIGION 369-0 Topics in American Religion (1 Unit) Content varies. May be repeated for credit with change of topic. *Ethics Values Distro Area*

RELIGION 371-0 Religion and Film (1 Unit) Content varies (e.g., films of Robert Bresson; Kieslowski's Decalogue; Dreyer and Tarkovsky). May be repeated for credit with change of topic. *Ethics Values Distro Area*

RELIGION 373-0 Religion and Bioethics (1 Unit) Analysis of contemporary dilemmas in medicine and the life sciences; responses to these dilemmas from religious perspectives. *Ethics Values Distro Area*

RELIGION 374-0 Contemporary Religious Thought (1 Unit) Content varies (e.g., convergence between religious paths, science and religion, politics and religion). May be repeated for credit with change of topic. *Ethics Values Distro Area*

RELIGION 375-0 Foundations of Christian Thought (1 Unit) Christian interpretations of salvation, Christ, and God, from Augustine to Julian of Norwich. *Ethics Values Distro Area*

RELIGION 376-0 Christianity and the Making of Modernity (1 Unit) Role of Christian thought in shaping the turbulent history of the West from the 16th to the late-18th centuries. Christianity's engagement with local and global events, from reformation to revolution, reason to romanticism. *Ethics Values Distro Area*

RELIGION 377-0 Christian Thought in Global Perspective (1 Unit) Globalization of Christian thought in the 19th-21st centuries, considering religious differences, colonialism, war, and democracy. Approaches to theology in Asia, Latin America, and Africa. *Ethics Values Distro Area*

RELIGION 378-0 Death: Myth and Meaning (1 Unit) Ideas, beliefs, and practices pertaining to death from a variety of ancient and modern cultures. Immortality, afterlife, care for the dying, suicide, funerary rituals, transhumanism. *Ethics Values Distro Area*

RELIGION 379-0 Topics in Comparative Religion (1 Unit) Content varies. May be repeated for credit with change of topic. *Ethics Values Distro Area*

RELIGION 381-0 Global Catholicism in the Contemporary World (1 Unit) Historical and contemporary global Catholicism. Topics include the church and political modernity; local saints; controversies over worship styles; Catholics and political revolutions; the Vatican; the pontificate of John Paul II. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175)

RELIGION 382-0 Catholicism & Making of the Modern World (1 Unit) 16th-17th century Catholic influences on missions, colonial ventures, science, and the development of non-European history; the effects of these efforts upon Catholicism's understanding of itself and early "global culture." *Ethics Values Distro Area*

RELIGION 383-0 Catholic Social Ethics (1 Unit) Ecclesiastical, academic, and popular Catholic social ethics from 1891 to the present-for example, the living wage and Catholic Worker movements, peace initiatives, liberation ethics, and immigration, environment, sexuality, and gender issues. *Ethics Values Distro Area*

RELIGION 384-0 Soundings in the Catholic Tradition (1 Unit) Topics in Catholic religious thought or religious movements. May be taken multiple times with different content. *Ethics Values Distro Area*

RELIGION 385-0 Topics in United States Catholicism (1 Unit) Historical and contemporary subjects in the study of Catholic culture in the United States. May be taken multiple times with different content. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175)

RELIGION 386-0 Topics in Latin America Catholicism (1 Unit) Historical and contemporary subjects in the study of Catholic culture in Latin America. May be taken multiple times with different content. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro - See Rules* (p. 175)

RELIGION 395-0 Theories of Religion (1 Unit) Ways of critically analyzing religious experience and its meaning. Phenomenology of religion, history of religions, comparative religions. For majors only. *Ethics Values Distro Area*

RELIGION 396-1 Senior Seminar (1 Unit) For honors students writing the senior thesis.

RELIGION 396-2 Senior Seminar (1 Unit) For honors students writing the senior thesis.

RELIGION 399-0 Independent Study (1 Unit) Reading and conferences on special subjects for advanced students. Consent of instructor required.

Religious Studies Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Major Requirements (12 units)

- 1 introductory course: RELIGION 170-0 Introduction to Religion or RELIGION 171-0 Varieties of Religious Tradition
- RELIGION 395-0 Theories of Religion
- For *global study of religion* concentration
 - 10 additional religion courses (up to 2 religion-related courses from outside the department may be counted toward the major with prior approval of the department adviser).
- For concentrations in *religion, health, and medicine; religion, law, and politics; or religion, sexuality, and gender*
 - 8 additional courses in the department, including at least 3 approved for the chosen concentration (please check with department adviser)
 - 2 courses outside the department, approved by the department adviser:
 - 2 global health (https://catalogs.northwestern.edu/undergraduate/courses-az/gbl_hlth) courses for religion, health, and medicine concentration
 - 2 legal studies (https://catalogs.northwestern.edu/undergraduate/courses-az/legal_st) or political science (https://catalogs.northwestern.edu/undergraduate/courses-az/poli_sci) courses for religion, law, and politics concentration
 - 2 gender and sexuality studies (https://catalogs.northwestern.edu/undergraduate/courses-az/gndr_st) courses for religion, gender, and sexuality concentration

First-year seminars do not count toward the major.

Honors in Religious Studies

Majors with strong academic records and an interest in pursuing honors should notify the undergraduate honors coordinator in writing by the end of spring quarter of junior year. Students become eligible for departmental honors by writing a senior thesis in addition to completing the 12 courses required for the major. The thesis is usually accomplished by enrolling in RELIGION 396-1 Senior Seminar during fall quarter of senior year and RELIGION 396-2 Senior Seminar during winter quarter of senior year. These courses do *not* count toward the major.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information consult the undergraduate honors coordinator and see Honors in the Major (p. 178).

Religious Studies Minor

Course	Title
Minor Requirements: Religious Studies (6 units)	
RELIGION 170-0 or RELIGION 171-0	Introduction to Religion Varieties of Religious Tradition
5 other departmental courses (not including first-year seminars)	
At least 3 must be at the 300 or 400 level.	

Catholic Studies Minor

Roman Catholic ways of thinking, living, and organizing the world have been fundamental to cultures since the fifth century of the Common Era, and the story of modernity in all its variations cannot be told without Catholicism. The Catholic studies program offers the opportunity to look at civilizations and cultures through the lens of the interdisciplinary study of Catholicism, using the critical tools of contemporary academic research and conversation.

The minor requires at least 6 courses. These include a core course introducing contextual, interdisciplinary approaches to the subject and the interaction between Catholic ideas and institutions and the broader world.

Five elective courses allow students to explore a particular topic more deeply. Appropriate courses from other departments (such as art history, English, history, political science, and sociology) can count toward the minor with the department adviser's approval.

Minor Requirements

Course	Title
Catholic Studies (6 units)	
At least 1 of the following:	
RELIGION 381-0 or RELIGION 382-0 or RELIGION 383-0	Global Catholicism in the Contemporary World Catholicism & Making of the Modern World Catholic Social Ethics
5 additional courses:	
Must be chosen with the department adviser from:	
RELIGION 381-0 RELIGION 382-0 RELIGION 383-0 RELIGION 384-0 RELIGION 385-0 RELIGION 386-0	Global Catholicism in the Contemporary World Catholicism & Making of the Modern World Catholic Social Ethics Soundings in the Catholic Tradition Topics in United States Catholicism Topics in Latin America Catholicism
Or other relevant courses in religious studies and other departments.	

Russian

See Slavic Languages and Literatures (p. 339).

Science in Human Culture

shc.northwestern.edu

The Science in Human Culture Program prepares students to confront the global impact of science, medicine, and technology on society—and on their own lives. The adjunct major and the minor welcome humanities, social science, and science majors, including premedical students, wishing to surmount modern science's compartmentalization of knowledge. Courses bridge the sciences and the humanities and seek to foster critical thinking about the limits, authority, and impact of science, a mode of understanding and intervening that is often said to be the defining feature of modern culture.

For an up-to-date listing of courses and more information about the adjunct major and minor, consult the program website. Questions may be directed to the program administrator at shc-program@northwestern.edu.

Themes and Eligible Courses

Some of the themes adopted by students have included medicine and society; science, environment, 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 (when offered) the list below. Many other eligible courses are offered periodically and appear in the online quarterly class list posted on the program website.

Anthropology

Course	Title
ANTHRO 308-0	Global Health in Human History
ANTHRO 315-0	Medical Anthropology
ANTHRO 332-0	The Anthropology of Reproduction
ANTHRO 334-0	The Anthropology of HIV/AIDS: Ethnographies
ANTHRO 343-0	Anthropology of Race
ANTHRO 383-0	Environmental Anthropology

Communication Studies

Course	Title
COMM_ST 227-0	Communication & Technology
COMM_ST 229-0	Communication Technology, Community and Personal Identity
COMM_ST 246-0	Intro to Health Communication
COMM_ST 343-0	Health Communication
COMM_ST 351-0	Technology & Human Interaction
COMM_ST 353-0	Collaboration Technology
COMM_ST 378-0	Online Communities and Crowds
COMM_ST 383-0	Media, Communication, and Environment
COMM_ST 385-0	Technology and the American Cultural Landscape
COMM_ST 386-0	Science, Technology, and Society
COMM_ST 388-0	Internet and Society

Economics

Course	Title
ECON 307-0	Economics of Medical Care
ECON 318-0	History of Economic Thought
ECON 323-1	Economic History of the United States Before 1865
ECON 323-2	Economic History of the United States 1865 to Present
ECON 370-0	Environmental & Natural Resource Economics

Environmental Policy and Culture

Course	Title
ENVR_POL 211-0	Food and Society: An Introduction
ENVR_POL 212-0	Environment and Society
ENVR_POL 261-0	American Religion, Ecology and Culture
ENVR_POL 309-0	American Environmental History
ENVR_POL 311-0	Food, Politics and Society
ENVR_POL 312-0	Social Change and the Environment
ENVR_POL 332-0	Native Americans and Environmental Decision Making

ENVR_POL 336-0	Climate Change, Policy, and Society
ENVR_POL 340-0	Global Environments and World History

Global Health

Course	Title
GBL_HLTH 301-0	Introduction to International Public Health
GBL_HLTH 302-0	Global Bioethics
GBL_HLTH 303-0	Gender and Global Health
GBL_HLTH 305-0	Global Health & Indigenous Medicine
GBL_HLTH 306-0	Biomedicine and Culture
GBL_HLTH 307-0	International Perspectives on Mental Health
GBL_HLTH 308-0	Global Health in Human History
GBL_HLTH 309-0	Biomedicine and World History

Gender Studies

Course	Title
GNDR_ST 232-0	Sexuality & Society
GNDR_ST 250-0	Gender Issues in Science and Health
GNDR_ST 332-0	Gender, Sexuality, and Health
GNDR_ST 374-0	Gender, Sexuality, and Digital Technologies

History

Course	Title
HISTORY 275-1	History of Western Science and Medicine: Origins in Early Mod Europe
HISTORY 275-2	History of Western Science and Medicine: In Modern Europe and America
HISTORY 325-0	History of American Technology
HISTORY 376-0	Global Environments and World History
HISTORY 378-0	History of Law and Science
HISTORY 379-0	Biomedicine and World History

Humanities

Course	Title
HUM 220-0	Health, Biomedicine, Culture, and Society

Journalism

Course	Title
JOUR 383-0	Health and Science Reporting

Philosophy

Course	Title
PHIL 151-0	Scientific Reasoning
PHIL 254-0	Introduction to Philosophy of the Natural Sciences
PHIL 268-0	Ethics and the Environment
PHIL 269-0	Bioethics
PHIL 270-0	Climate Change and Sustainability: Economic and Ethical Dimensions
PHIL 326-0	Philosophy of Medicine
PHIL 352-0	Philosophy of Mathematics
PHIL 355-0	Scientific Method in the Social Sciences

Political Science

Course	Title
POLI_SCI 329-0	U.S. Environmental Politics
POLI_SCI 349-0	International Environmental Politics

Psychology

Course	Title
PSYCH 248-0	Health Psychology
PSYCH 332-0	Native Americans and Environmental Decision Making
PSYCH 340-0	Psychology and Law

Religious Studies

Course	Title
RELIGION 173-0	Religion, Medicine & Suffering in the West
RELIGION 373-0	Religion and Bioethics

Sociology

Course	Title
SOCIOL 211-0	Food and Society: An Introduction
SOCIOL 212-0	Environment and Society
SOCIOL 220-0	Health, Biomedicine, Culture, and Society
SOCIOL 232-0	Sexuality and Society
SOCIOL 305-0	Population Dynamics
SOCIOL 311-0	Food, Politics and Society
SOCIOL 312-0	Social Change and the Environment
SOCIOL 319-0	Sociology of Science
SOCIOL 321-0	Numbers, Identity & Modernity: How Calculation Shapes Who We Are & What We Know
SOCIOL 336-0	Climate Change, Policy, and Society
SOCIOL 355-0	Medical Sociology

Programs of Study

- Science in Human Culture Adjunct Major (p. 339)
- Science in Human Culture Minor (p. 339)

SHC 115-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

SHC 398-1 Science in Human Culture Senior Seminar (1 Unit) For students who wish to qualify for honors by writing a senior thesis.

SHC 398-2 Science in Human Culture Senior Seminar (1 Unit) For students who wish to qualify for honors by writing a senior thesis.

SHC 398-3 Science in Human Culture Senior Seminar (1 Unit) For students who wish to qualify for honors by writing a senior thesis.

Science in Human Culture Adjunct Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Adjunct Major Requirements (10 units)

- Courses are chosen from the partial "Themes and Eligible Courses (p. 337)" list or the approved list on the program website and must relate to a theme developed with the program director.
- 3 must be core courses, including at least 1 from each of the following lists:

Course	Title
History core courses	
HISTORY 275-1	History of Western Science and Medicine: Origins in Early Mod Europe

HISTORY 275-2	History of Western Science and Medicine: In Modern Europe and America
HISTORY 325-0	History of American Technology
HISTORY 378-0	History of Law and Science
HISTORY 379-0	Biomedicine and World History

Course	Title
Other core courses	
HUM 220-0	Health, Biomedicine, Culture, and Society
PHIL 268-0	Ethics and the Environment
PHIL 269-0	Bioethics
PHIL 326-0	Philosophy of Medicine
SOCIOL 220-0	Health, Biomedicine, Culture, and Society
SOCIOL 319-0	Sociology of Science

- At least 6 of the 10 courses must be at the 300 level.
- Course substitutions may be allowed with the consent of the program director.
- All adjunct majors require completion of a stand-alone major as well. Up to 2 courses for the science in human culture adjunct major may be counted toward another major.

Honors in Science in Human Culture

Majors with strong academic records and an interest in pursuing honors should submit a proposal to the program director by the end of the sixth week of spring quarter of junior year. To graduate with honors, students must take 9 courses toward the major (not counting the honors sequence) and must satisfy the core course requirements. In addition, they must write a senior thesis of sufficiently high quality while enrolled in the 3-quarter honors sequence

Course	Title
SHC 398-1 & SHC 398-2 & SHC 398-3	Science in Human Culture Senior Seminar and Science in Human Culture Senior Seminar and Science in Human Culture Senior Seminar

Students whose theses and grades meet program criteria are recommended to the college for graduation with honors. For more information see the detailed explanation on the program website, contact the program director, and see Honors in the Major (p. 178).

Science in Human Culture Minor Minor Requirements (7 units)

- Courses are chosen from the Science in Human Culture list of Themes and Eligible Courses (p. 337), or from the approved list on the program website, and must relate to a theme developed with the program director.
- At least 1 must be a 300-level course.
- At least 5 courses must not be double-counted toward a major.
- Course substitutions may be allowed with the consent of the program director.

Slavic Languages and Literatures

slavic.northwestern.edu

The Department of Slavic Languages and Literatures offers a full program of study in Russian language and literature and a range of other courses on the languages, culture, and history of Eastern Europe.

Russian study encompasses a broad discipline that touches on many others. For example, Turgenev, Dostoevsky, Tolstoy, and Chekhov probe philosophical, social, political, and psychological issues that are central to the modern experience and fundamental to Western culture. Courses in Russian literature open up the artistry and ideas of this intellectual tradition. All periods of Russian literature are represented, with emphasis on the 19th through 21st centuries.

Majors may choose to concentrate in "Russian Language, Literature and Culture" or "Russian and East European Studies". Some students seek a deep knowledge of Russian culture and literary tradition, while others are more interested in acquiring international knowledge and language proficiency for use in such fields as government, law, business, or journalism. The major (or minor) may complement study of history, political science, health, or other disciplines. Minors in "Russian and East European Studies" gain a broad understanding of Slavic literature and culture. They may focus on Czech, Russian, or Polish studies with or without a language prerequisite.

The department strongly recommends that students study abroad. Programs take place in Prague, Belgrade, Sarajevo, Krakow, Moscow, St. Petersburg, and Vladimir. Students should consult the undergraduate adviser in the department or an adviser in Undergraduate Learning Abroad (<https://www.northwestern.edu/abroad>) to learn more about study abroad options.

Programs of Study

- Slavic Languages and Literatures Major (p. 342)
- Russian and East European Studies Minor (p. 344)

SLAVIC 101-1 Elementary Russian (1 Unit) Russian language and culture. Basic reading, writing, listening, and speaking. No prerequisite.

SLAVIC 101-2 Elementary Russian (1 Unit) Russian language and culture. Basic reading, writing, listening, and speaking. Must be taken in sequence.

SLAVIC 101-3 Elementary Russian (1 Unit) Russian language and culture. Basic reading, writing, listening, and speaking. Must be taken in sequence.

SLAVIC 102-1 Intermediate Russian (1 Unit) Russian language and culture. Reading, writing, listening, and speaking. Prerequisite: SLAVIC 101-3 or consent of language director.

SLAVIC 102-2 Intermediate Russian (1 Unit) Russian language and culture. Reading, writing, listening, and speaking. Must be taken in sequence.

SLAVIC 102-3 Intermediate Russian (1 Unit) Russian language and culture. Reading, writing, listening, and speaking. Must be taken in sequence.

SLAVIC 105-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

SLAVIC 106-SA Elementary Czech (1 Unit) Czech language and culture. Basic reading, writing, listening, and speaking. No prerequisite.

SLAVIC 108-1 Elementary Polish (1 Unit) Polish language and culture. Basic reading, writing, listening, and speaking. No prerequisite.

SLAVIC 108-2 Elementary Polish (1 Unit) Polish language and culture. Basic reading, writing, listening, and speaking. Must be taken in sequence.

SLAVIC 108-3 Introduction to Polish (1 Unit) Polish language and culture. Basic reading, writing, listening, and speaking. Must be taken in sequence.

SLAVIC 208-1 Intermediate Polish: Language and Culture (1 Unit) Continuation of 108; reading on topics in Polish culture and society. Prerequisite: SLAVIC 108-3 or consent of the instructor.

SLAVIC 208-2 Intermediate Polish: Language and Culture (1 Unit) Continuation of 108; reading on topics in Polish culture and society. Must be taken in sequence.

SLAVIC 208-3 Intermediate Polish: Language and Culture (1 Unit) Continuation of 108; reading on topics in Polish culture and society. Must be taken in sequence.

SLAVIC 210-1 Introduction to Russian Literature (1 Unit) 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. *Literature Fine Arts Distro Area*

SLAVIC 210-2 Introduction to Russian Literature (1 Unit) 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. *Literature Fine Arts Distro Area*

SLAVIC 210-3 Introduction to Russian Literature (1 Unit) 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. *Literature Fine Arts Distro Area*

SLAVIC 211-1 20th-Century Russian Literature (1 Unit) Major works in cultural-historical context, from the revolutions of 1917 through the present. Variable content depending on instructor. 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. *Literature Fine Arts Distro Area*

SLAVIC 211-2 20th-Century Russian Literature (1 Unit) Major works in cultural-historical context, from the revolutions of 1917 through the present. Variable content depending on instructor. Russian literature, film, and visual art in the transition from communism to post-communism. Writers examined may include Pasternak, Bulgakov, Solzhenitsyn, and Sinyavsky/Tertz. *Literature Fine Arts Distro Area*

SLAVIC 255-0 Slavic Civilizations (1 Unit) Culture, history, language, and literature of the Slavs historically and/or in modern periods. Content varies with instructor; may be repeated for credit. *Historical Studies Distro Area*

SLAVIC 255-SA Slavic Civilizations (1 Unit) Culture, history, language, and literature of the Slavs historically and/or in modern periods. Content varies with instructor; may be repeated for credit. Restricted to students

Taught entirely in Polish. Content varies; may be repeated for credit.
Prerequisite: consent of language director. *Literature Fine Arts Distro Area*

SLAVIC 359-1 Russian Prose (1 Unit) Selected works of Russian masters. Early 20th century. Russian modernist prose and socialist realism. *Literature Fine Arts Distro Area*

SLAVIC 359-2 Russian Prose (1 Unit) Selected works of Russian masters. 1940s to the present. Content varies; may be repeated for credit. *Literature Fine Arts Distro Area*

SLAVIC 360-0 Survey of 19th Century Russian Poetry (1 Unit)
Introduction to the wealth of Russian 19th century lyric poetry and basic techniques for its study: Pushkin, Baratynsky, Lermontov, Tyutchev, Fet. *Literature Fine Arts Distro Area*

SLAVIC 361-0 Survey of 20th Century Russian Poetry (1 Unit)
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. *Literature Fine Arts Distro Area*

SLAVIC 367-1 Russian Film (1 Unit) Development of Russian film and film theory from the silent era to the 1980s. Golden Age of Russian cinema (Eisenstein, Pudovkin, Vertov, Protazanov, Vasiliev brothers, Dovzhenko, socialist real-ism). *Literature Fine Arts Distro Area*

SLAVIC 367-2 Russian Film (1 Unit) Development of Russian film and film theory from the silent era to the 1980s. Russian film since World War II (more socialist realism, neorealism, Tarkovsky, Mikhalkov, Paradjanov, Abuladze; criticism and semiotic theory). *Literature Fine Arts Distro Area*

SLAVIC 368-0 Andrei Tarkovsky's Aesthetics and World Cinema (1 Unit)
Major films of Tarkovsky and of Russian and non-Russian directors whose work is related to his (Eisenstein, Wenders, Bergman, Kurosawa). *Literature Fine Arts Distro Area*

SLAVIC 369-0 200 Years of Russian Drama (1 Unit) Dramatic and theatrical traditions of Russia from the 19th century through the rise of the Moscow Art Theater and Russian modernism to contemporary theater. Dramas by Gogol, Ostrovsky, Gorky, Chekhov, Blok, Mayakovsky, Vampilov, and Petrushevskaya; productions of Stanislavsky, Meierkhold, Evreinov. *Literature Fine Arts Distro Area*

SLAVIC 390-0 Literature and Politics in Central and Eastern Europe (1 Unit) Literature has played a central role in defining the political agendas in central and eastern Europe. Course concerns the interaction of literature with cultural and political history. Content varies. May be repeated for credit with consent of director of undergraduate studies. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Literature Fine Arts Distro Area*

SLAVIC 392-0 East European Literature and Visual Arts (1 Unit) Postwar film and visual arts of the Czech Republic, Hungary, Poland, Romania, and the former Yugoslavia; national identity, dissidence, and literary postmodernism. Content varies; may be repeated for credit. *Literature Fine Arts Distro Area*

SLAVIC 393-0 Prague: City of Cultures, City of Conflict (1 Unit)
Examination of the cultural, political, and social transformation of Prague from the 19th century to the present. Cosmopolitan Prague, communist Prague, and capitalist Prague. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Literature Fine Arts Distro Area*

SLAVIC 396-0 Topics in Literature and Arts (1 Unit) Content varies. May be repeated for credit with consent of director of undergraduate studies. *Literature Fine Arts Distro Area*

SLAVIC 399-0 Independent Study (1 Unit) For majors selected as candidates for departmental honors; for other advanced students with consent of instructor.

SLAVIC 399-SA Independent Study (1 Unit) For majors selected as candidates for departmental honors; for other advanced students with consent of instructor.

Slavic Languages and Literatures Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Concentration in Russian Language, Literature, and Culture

This concentration is guided by a focus on 19th- and 20th-century Russian literature. Through language and literature study, students receive an intensive understanding of Russian culture, including political, religious, and cultural ideas.

Course	Title
Prerequisite	
SLAVIC 102-1 & SLAVIC 102-2 & SLAVIC 102-3	Intermediate Russian and Intermediate Russian and Intermediate Russian
or equivalent Russian proficiency	
Department Courses (12 units)	
3-course advanced Russian language sequence:	
SLAVIC 302-1 & SLAVIC 302-2 & SLAVIC 302-3	Russian Language and Culture and Russian Language and Culture and Russian Language & Culture
or SLAVIC 303-1 & SLAVIC 303-2 & SLAVIC 303-3	Modern Russian Readings and Language and Modern Russian Readings and Language and Modern Russian Readings and Language
All courses must come from the same sequence.	
9 additional courses:	
4 Slavic courses chosen from the following:	
200-level Slavic courses taught in English	
200-level courses taught in other departments and co-listed in Slavic	
At most 1 Slavic first-year seminar may count toward this requirement.	
SLAVIC 360-0	Survey of 19th Century Russian Poetry
or SLAVIC 361-0	Survey of 20th Century Russian Poetry
4 Slavic courses at the 300 or 400 level	
Related Courses	
2 courses from outside the department; must be approved by the director of undergraduate studies. Departments and programs offering relevant courses include art history, history, Jewish studies, musicology, political science, and theater. A current list of approved courses is available on the department's website.	

Concentration in Russian and East European Studies

This flexible major concentration is designed for students who wish to combine language and literature with work in other disciplines. It is also

a good choice for students whose primary interest rests in non-Russian Slavic countries.

Prerequisite

- Two years of college-level Czech, Polish, or Russian language, or equivalent proficiency

Department courses (typically 12 units but may vary depending on language option)

- One of the following advanced language options:
 - Czech
 - Individual plan requires approval of the director of undergraduate studies.
 - Equivalent of a full year of advanced study; may include SLAVIC 399-0 Independent Study with readings in Czech and/or study abroad in a language-focused program
- Polish
 - Individual plan requires approval of the director of undergraduate studies.
 - Equivalent of a full year of advanced study; may include SLAVIC 358-1 Polish for Advanced and Native Speakers, SLAVIC 358-2 Polish for Advanced and Native Speakers; SLAVIC 399-0 Independent Study with readings in Polish; and/or study abroad in a language-focused program
- Russian

Course	Title
SLAVIC 302-1 & SLAVIC 302-2 & SLAVIC 302-3	Russian Language and Culture and Russian Language and Culture and Russian Language & Culture
or SLAVIC 303-1 & SLAVIC 303-2 & SLAVIC 303-3	Modern Russian Readings and Language and Modern Russian Readings and Language and Modern Russian Readings and Language
- 9 additional courses
 - 4 100- or 200-level Slavic courses chosen from the following:
 - 200-level Slavic courses taught in English
 - 200-level courses taught in other departments and co-listed in Slavic
 - At most 1 Slavic first-year seminar
 - At most 2 courses in a second Slavic language
 - 3 Slavic courses at the 300 or 400 level
 - 2 electives may be chosen from outside the department

Related Courses

- 2 related courses from outside the department; must be approved by the director of undergraduate studies. Departments and programs offering relevant courses include art history, history, Jewish studies, musicology, political science, and theater. A current list of approved courses is available on the department's website.

Honors in Slavic Languages and Literatures

Majors with strong academic records and an interest in pursuing honors should consult the honors adviser by the end of junior year. Most honors candidates research and write the thesis in 2 quarters of SLAVIC 399-0 Independent Study. Another option is to take a 400-level seminar followed by SLAVIC 399-0 Independent Study, in which the student pursues a topic

arising out of the 400-level course. These courses may be counted for credit in the major.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors.

For more information see the program website (<https://www.slavic.northwestern.edu/undergraduate/honors.html>) and Honors in the Major (p. 178).

Courses

Courses in Language and Linguistics

Course	Title
SLAVIC 101-1 & SLAVIC 101-2 & SLAVIC 101-3	Elementary Russian and Elementary Russian and Elementary Russian
SLAVIC 102-1 & SLAVIC 102-2 & SLAVIC 102-3	Intermediate Russian and Intermediate Russian and Intermediate Russian
SLAVIC 108-1 & SLAVIC 108-2 & SLAVIC 108-3	Elementary Polish and Elementary Polish and Introduction to Polish
SLAVIC 208-1 & SLAVIC 208-2 & SLAVIC 208-3	Intermediate Polish: Language and Culture and Intermediate Polish: Language and Culture and Intermediate Polish: Language and Culture
SLAVIC 302-1 & SLAVIC 302-2 & SLAVIC 302-3	Russian Language and Culture and Russian Language and Culture and Russian Language & Culture
SLAVIC 303-1 & SLAVIC 303-2 & SLAVIC 303-3	Modern Russian Readings and Language and Modern Russian Readings and Language and Modern Russian Readings and Language
SLAVIC 304-1 & SLAVIC 304-2 & SLAVIC 304-3	Advanced Contemporary and Professional Russian and Advanced Contemporary and Professional Russian and Advanced Contemporary and Professional Russian
SLAVIC 340-0	History of the Russian Language
SLAVIC 341-0	Structure of Modern Russian
SLAVIC 358-1 & SLAVIC 358-2	Polish for Advanced and Native Speakers and Polish for Advanced and Native Speakers

Courses with Readings and Discussion in English

Course	Title
SLAVIC 210-1 & SLAVIC 210-2 & SLAVIC 210-3	Introduction to Russian Literature and Introduction to Russian Literature and Introduction to Russian Literature
SLAVIC 211-1 & SLAVIC 211-2	20th-Century Russian Literature and 20th-Century Russian Literature
SLAVIC 255-0	Slavic Civilizations
SLAVIC 261-0	Heart of Europe: Poland in the Twentieth Century
SLAVIC 267-0	Czech Culture: Film, Visual Arts & Music
SLAVIC 278-1 & SLAVIC 278-2	Visual Art in the Context of Russian Culture and Visual Art in the Context of Russian Culture
SLAVIC 310-0	Tolstoy
SLAVIC 311-0	Dostoevsky
SLAVIC 313-0	Nabokov
SLAVIC 314-0	Chekhov
SLAVIC 322-0	Making a Dictionary: The Northwestern Project
SLAVIC 350-0	Folklore, Music, Poetry
SLAVIC 367-1 & SLAVIC 367-2	Russian Film and Russian Film
SLAVIC 368-0	Andrei Tarkovsky's Aesthetics and World Cinema

SLAVIC 369-0	200 Years of Russian Drama
SLAVIC 390-0	Literature and Politics in Central and Eastern Europe
SLAVIC 392-0	East European Literature and Visual Arts
SLAVIC 393-0	Prague: City of Cultures, City of Conflict
SLAVIC 396-0	Topics in Literature and Arts

Courses in Literature with Prerequisite in Russian

The prerequisite for 300-level courses is SLAVIC 302-3 Russian Language & Culture, SLAVIC 303-3 Modern Russian Readings and Language, or consent of instructor.

Course	Title
SLAVIC 359-1 & SLAVIC 359-2	Russian Prose and Russian Prose
SLAVIC 360-0	Survey of 19th Century Russian Poetry
SLAVIC 361-0	Survey of 20th Century Russian Poetry
SLAVIC 399-0	Independent Study

Russian and East European Studies Minor

The minor in Russian and East European Studies offers a broad survey of literature and culture. Students may choose to study a Slavic language, but this is not required. Students are encouraged to meet with the department adviser to select a focus for their courses. Students may focus on Russian literature and culture, Russian language and culture, Czech and East European studies, or Polish and East European studies.

Minor Requirements (8 units)

- At most 4 courses at the 200 level
- At least 4 courses at the 300 level
- The following restrictions also apply:
 - At most 1 Slavic first-year seminar may count toward the requirements.
 - At most 3 courses, chosen with the consent of the undergraduate adviser, may come from outside the department.
 - At most 3 courses may be in an East European language or German at or above the intermediate level.

Sociology

sociology.northwestern.edu

The Department of Sociology offers preparation for careers in a wide range of fields requiring strong research and analytical skills and knowledge of social institutions and diverse cultures. It provides an excellent background for careers in business, advertising, nonprofits, the arts, public administration, law, medicine and health, journalism and communications, and planning, among others. The department also emphasizes the sociological perspective as a fundamental part of a liberal education and a complex understanding of the world.

The department is particularly strong in the areas of organizations and economic sociology; the sociology of law, health, science, and education; urban studies; international, comparative and historical sociology; the sociology of art and culture; and criminology. It offers a wide variety of approaches to social inequality and its origins and consequences, including class, race, ethnicity, gender, and sexuality.

To benefit from the department's strengths, sociology majors may concentrate in one of seven areas:

- economic sociology and global development
- environment and society
- law and society
- social data research
- social inequality: class, gender, and race
- sociology of health, medicine, and science
- urban sociology

Concentrations guide the selection of both sociology and related courses. The department website lists approved courses by concentration. Majors may instead concentrate in general sociology, for which all sociology and related courses fulfill the concentration requirement, or design a concentration area. All concentrations require an adviser's approval.

Unusually good opportunities are available for independent study, field internships, and the use of quantitative and qualitative methods of research. In addition to the courses listed below, the department offers quarterly seminars on special topics of interest.

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 or an undergraduate sociology advisor.

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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP at the earliest opportunity.

Programs of Study

- Sociology Major (p. 347)
- Sociological Research Minor (p. 348)
- Sociological Studies Minor (p. 348)

SOCIOL 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

SOCIOL 110-0 Introduction to Sociology (1 Unit) Broad overview of a wide range of social issues and ways of sociological thinking. Characteristics of group life. Interrelations of society, culture, and personality; major social institutions and processes. *Social Behavioral Sciences Distro Area*

SOCIOL 201-0 Social Inequality: Race, Class, and Power (1 Unit) Origins and functions of stratification. Class, prestige, and esteem. Interaction of racial and cultural groups. Inequality in workplaces, neighborhoods, schools, families, media, and other settings. *Social Behavioral Sciences Distro Area*

SOCIOL 202-0 Social Problems (1 Unit) Emergence of social problems. How the media, politicians, lawmakers, and others define social issues. How lives and self-images are shaped when people are connected to a social problem. *Social Behavioral Sciences Distro Area*

SOCIOL 206-0 Law and Society (1 Unit) Introduction to the role of law in American society. Relationship of law, inequality, and social change. Changes in legal institutions: the courts, the legal profession, and legal services for the poor. SOCIOL 206-0 is taught with LEGAL_ST 206-0; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

SOCIOL 207-0 Cities in Society (1 Unit) Introduction to issues of cities and metropolitan areas, including spatial, economic, and political trends; private and public decision making; class, race, and gender; and possible solutions to inequalities and planning challenges. *Social Behavioral Sciences Distro Area*

SOCIOL 208-0 Race and Society (1 Unit) Critical analysis of the biological myth and social reality of race; factors responsible for persistent racial inequality in the United States; social and political implications of race. *Social Behavioral Sciences Distro Area*

SOCIOL 210-0 Families and Societies (1 Unit) Changes, continuities, and variations in family life in industrialized countries over the past century. Key concepts in sociology and the study of families. Explanations for changes and implications for inequality. *Social Behavioral Sciences Distro Area*

SOCIOL 211-0 Food and Society: An Introduction (1 Unit) Overview of past and present food systems from a sociological perspective, examining the roles of culture, government policy, and social movements in shaping such systems and future alternatives. ENVR_POL 211-0 and SOCIOL 211-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

SOCIOL 212-0 Environment and Society (1 Unit) Key environmental problems, such as climate change and oil spills; how they are shaped by the market, government regulations, and social movements; possible solutions. SOCIOL 212-0 and ENVR_POL 212-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

SOCIOL 215-0 Economy and Society (1 Unit) Introduction to sociological approaches to economic life. Topics include property rights, illegal markets, money, economic inequalities, direct sales, and boycotts. *Social Behavioral Sciences Distro Area*

SOCIOL 216-0 Gender and Society (1 Unit) How our society creates ideas of what gender and gender-appropriate behaviors are. How these ideas are linked to sexuality and relationships, and how they become part of political conflict. *Social Behavioral Sciences Distro Area*

SOCIOL 217-0 Global Perspectives on Education (1 Unit) Global comparison of educational systems and learning experiences, with focus on inequality, trends in literacy and achievement, and social factors shaping schooling worldwide. *Social Behavioral Sciences Distro Area*

SOCIOL 218-0 Education and Inequality: Focus on Chicago (1 Unit) Causes and consequences of educational inequality. History, educational outcomes, and recent reform efforts of Chicago Public Schools. *Social Behavioral Sciences Distro Area*

SOCIOL 220-0 Health, Biomedicine, Culture, and Society (1 Unit) Provides a broad introduction to controversies surrounding health and biomedicine by analyzing culture, politics, values, and social institutions. SOCIOL 220-0 is taught with HUM 220-0; may not receive credit for both courses. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

SOCIOL 221-0 Social and Health Inequalities (1 Unit) Bidirectional relationship between social (e.g., class, gender, and racial/ ethnic) and

health inequalities, including institutional/ structural, individual/family/ psychosocial, and biological mechanisms. SOCIOL 211-0 is taught with ANTHRO 221-0; may not receive credit for both courses.

SOCIOL 226-0 Sociological Analysis (1 Unit) 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 227-0 Legal Studies Research Methods (1 Unit) Introduction to research methodologies used in interdisciplinary legal studies, including jurisprudence and legal reasoning, qualitative and quantitative social science methods, and historical and textual analysis. LEGAL_ST 207-0 and SOCIOL 227-0 are taught together; may not receive credit for both courses. Prerequisite: LEGAL_ST 206-0. *Social Behavioral Sciences Distro Area*

SOCIOL 232-0 Sexuality and Society (1 Unit) Examination of the role of sexuality in the cultural, economic, political, and social organization of the United States. Sex work, sex tourism, sexual migration, LGBT social movements, and moral panics. SOCIOL 232-0 is taught with GNDR_ST 232-0; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

SOCIOL 276-0 Introductory Topics in Sociology (1 Unit) Introduction to different key issues in the field. Topics vary. May be repeated for credit with a different topic. *Social Behavioral Sciences Distro Area*

SOCIOL 277-0 Introduction to Native American Studies (1 Unit) Provides an overview of the culture and history of Native groups and how these histories influence modern Native America. Explores the current economic and social experiences of Indians and tribes. *Social Behavioral Sciences Distro Area*

SOCIOL 288-0 Institutions and Society (1 Unit) Institutions in a broad societal context. How institutional frameworks apply to government, family, education, and the environment; implications of institutions. POLI_SCI 388-0 and SOCIOL 288-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

SOCIOL 301-0 The City: Urbanization and Urbanism (1 Unit) Theories of urbanization, housing, jobs, race and class, segregation, community and social networks politics, reform policies and planning. Research projects. *Social Behavioral Sciences Distro Area*

SOCIOL 302-0 Sociology of Organizations (1 Unit) 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. *Social Behavioral Sciences Distro Area*

SOCIOL 303-0 Analysis and Interpretation of Social Data (1 Unit) Introduction to quantitative methods: the interpretation of descriptive statistics, relationships between variables, multiple regression, and the logic of inferential statistics. *Formal Studies Distro Area*

SOCIOL 304-0 Politics of Racial Knowledge (1 Unit) Major developments in the history of racial knowledge, from Enlightenment philosophy to contemporary genomics. The intersection of politics and science in creating notions of race. Students are encouraged to take SOCIOL 208-0 prior to enrolling. *Social Behavioral Sciences Distro Area*

SOCIOL 305-0 Population Dynamics (1 Unit) Social causes and consequences of population dynamics (fertility, mortality, marriage, divorce, migration) and population structures (age, sex, size, density).

Relationship between population changes and health, environmental, and economic outcomes. *Social Behavioral Sciences Distro Area*

SOCIOL 306-0 Sociological Theory (1 Unit) Sociological perspectives developed by classic theorists. Elucidation and testing of sociological principles in contemporary research. Primarily for sociology majors. Open to others with consent of instructor.

SOCIOL 307-0 School and Society (1 Unit) Reciprocal influences between formal institutions of education and the broader society from different theoretical perspectives. Internal organization of schools, inequality in educational settings and outcomes by gender, class, and race/ethnicity. *Social Behavioral Sciences Distro Area*

SOCIOL 308-0 Crime, Politics, and Society (1 Unit) Politics of defining, counting, explaining, and responding to crime, with emphasis on the social organization of crimes of the streets and crimes of the suites; also, domestic and international war crimes. *Social Behavioral Sciences Distro Area*

SOCIOL 309-0 Political Sociology (1 Unit) Selected topics in political economy and sociology: revolutions, the development of the modern state, third world development, international conflict, politics of memory and civil society. *Social Behavioral Sciences Distro Area*

SOCIOL 310-0 Sociology of the Family (1 Unit) Influence of socioeconomic and other structural and cultural resources and constraints on family structure and dynamics. Historical and comparative perspectives on the modern family. *Social Behavioral Sciences Distro Area*

SOCIOL 311-0 Food, Politics and Society (1 Unit) Social groups, institutions, and policies shaping food production, distribution, and consumption around the world; their social and environmental consequences. Alternatives to existing food systems. SOCIOL 311-0 and ENVR_POL 311-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

SOCIOL 312-0 Social Change and the Environment (1 Unit) The ways social patterns of production and consumption affect the natural environment, such as climate and biodiversity. Roles of social actors and structures in shaping environmental problems and policies. SOCIOL 312-0 and ENVR_POL 312-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

SOCIOL 314-0 Sociology of Religion (1 Unit) Sociological approach to the study of American religion. Communities, practices, race, gender, and politics in the shaping of religion. *Social Behavioral Sciences Distro Area*

SOCIOL 316-0 Economic Sociology (1 Unit) Sociological approach to production, distribution, consumption, and markets. Classic and contemporary approaches to the economy compared across social science disciplines. *Social Behavioral Sciences Distro Area*

SOCIOL 317-0 Global Development (1 Unit) Exploration of the economic and social changes constituting development, focusing on comparison between the historical experience in Europe and more recent processes in Africa, Asia, and Latin America. *Social Behavioral Sciences Distro Area*

SOCIOL 318-0 Sociology of Law (1 Unit) Sociological analysis of legal institutions such as courts, the police, and lawyers. Law, inequality, and social change. SOCIOL 318-0 is taught with LEGAL_ST 308-0; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

SOCIOL 319-0 Sociology of Science (1 Unit) Science as social system. Personality, class, and cultural factors in scientific development,

creativity, choice of role, simultaneous invention, and priority disputes. Social effects on objectivity and bias. *Social Behavioral Sciences Distro Area*

SOCIOL 321-0 Numbers, Identity & Modernity: How Calculation Shapes Who We Are & What We Know (1 Unit) Investigation of how we make and use numbers, how we know ourselves through numbers, the kinds of authority we grant to numbers, and how numbers inform our ethics. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

SOCIOL 322-0 Sociology of Immigration (1 Unit) Sociological approach to immigration addressing such issues as assimilation, race/ethnicity, gender, transnationalism. *Social Behavioral Sciences Distro Area*

SOCIOL 323-0 American Subcultures and Ethnic Groups (1 Unit) 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. *Social Behavioral Sciences Distro Area*

SOCIOL 324-0 Global Capitalism (1 Unit) Sociological aspects of the rise of industrial capitalism. Rise of industrial capitalism in Europe, different forms of capitalism across the world, and consequences for poverty and inequality. Development and underdevelopment. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

SOCIOL 325-0 Global & Local Inequalities (1 Unit) Inequalities in economic and social status, including in income, health, politics, social policy, the family, gender, and race. Contemporary US focus but also historical and global trends. *Social Behavioral Sciences Distro Area*

SOCIOL 326-0 Politics, Society, and Public Policy in the United States from the New Deal (1 Unit) Social and political determinants of public policy in the United States from the New Deal to the present, including industrial relations, social policy, healthcare, and banking and financial regulation. *Historical Studies Distro Area Interdisciplinary Distro - See Rules (p. 175) Social Behavioral Sciences Distro Area*

SOCIOL 327-0 Youth and Society (1 Unit) How modern definitions of childhood and adolescence have evolved. Diversity across the lives of young people today and the development of social networks and transitions to adulthood. *Social Behavioral Sciences Distro Area*

SOCIOL 328-0 Inequality & American Society (1 Unit) Introduction to research on social stratification and inequality, focusing on American society. Theories of distributive justice, trends, intergenerational mobility, gender and race inequality, causes and consequences of inequalities. *Social Behavioral Sciences Distro Area*

SOCIOL 329-0 Field Research and Methods of Data Collection (1 Unit) Practicum in firsthand data collection using observation and structured and unstructured interviewing. Issues of reliability and validity and qualitative analysis.

SOCIOL 330-0 Law, Markets, and Globalization (1 Unit) The role of national and international law in recent economic globalization trends, global convergence in law, legal transplants, globalization and the environment. *Social Behavioral Sciences Distro Area*

SOCIOL 331-0 Markets, Hierarchies & Democracies (1 Unit) The forms and social structures for making economic and political decisions in modern societies. *Social Behavioral Sciences Distro Area*

SOCIOL 331-SA Markets, Hierarchies & Democracies (1 Unit) The forms and social structures for making economic and political decisions in modern societies. *Social Behavioral Sciences Distro Area*

SOCIOL 332-0 Work and Occupations (1 Unit) Sociological perspectives on work. Work, class, status, and power. Society, economy, technology, and occupational structure; organization of workplace. Work in the global economy. *Social Behavioral Sciences Distro Area*

SOCIOL 333-0 Sociology of Gender and Sexuality in the Middle East (1 Unit) Key debates and developments in the history and politics of gender and sexuality in the Middle East, including colonialism, modernization, Islamist mobilization, neoliberalism, family, sexuality, and LGBT issues. *Ethics Values Distro Area Interdisciplinary Distro - See Rules* (p. 175) *Social Behavioral Sciences Distro Area*

SOCIOL 334-0 Social Protest and Social Change Around the World (1 Unit) How and why social protests can initiate major social change within societies and social groups around the world. *Social Behavioral Sciences Distro Area*

SOCIOL 335-0 Sociology of Rational Decision Making (1 Unit) Analysis of the role played by numerical and quantitative information in organizational decision making in the private and public sectors. *Social Behavioral Sciences Distro Area*

SOCIOL 336-0 Climate Change, Policy, and Society (1 Unit) Examination of main impacts of climate change and of different perspectives toward mitigation and adaptation: market-based, institutionalist, bio-environmentalist, social movement, and climate justice. SOCIOL 336-0 and ENVR_POL 336-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

SOCIOL 345-0 Class and Culture (1 Unit) 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. *Social Behavioral Sciences Distro Area*

SOCIOL 348-0 Race, Politics, and the Law (1 Unit) Current role of race and racism from multiple disciplinary perspectives. Application to contemporary legal and political issues. How law deals with racial inequality. LEGAL_ST 348-0 and SOCIOL 348-0 are taught together; may not receive credit for both courses. Prerequisite: LEGAL_ST 206-0, SOCIOL 206-0, SOCIOL 208-0, LEGAL_ST 308-0, or SOCIOL 318-0. *Social Behavioral Sciences Distro Area*

SOCIOL 350-0 Sociology of the Arts (1 Unit) Art as collective activity. Conventions in art and aesthetics. Professionals and audiences and other aspects of culture. *Social Behavioral Sciences Distro Area*

SOCIOL 355-0 Medical Sociology (1 Unit) Social construction of health and illness; inequalities in distribution of illness and health care; organization of health care work and occupations. *Social Behavioral Sciences Distro Area*

SOCIOL 356-0 Sociology of Gender (1 Unit) Gender and issues of social reproduction and social change with sexuality and reproduction emphasized. *Social Behavioral Sciences Distro Area*

SOCIOL 376-0 Topics in Sociological Analysis (1 Unit) Advanced work on special topics in sociological study. May be repeated for credit with different topic.

SOCIOL 379-0 Understanding Genocide (1 Unit) Key debates in the comparative study of genocide. Why genocide occurs, why people become killers, how these processes relate to each other. POLI_SCI 389-0 and SOCIOL 379-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

SOCIOL 398-1 Senior Research Seminar (1 Unit) Independent research projects carried out under faculty supervision.

SOCIOL 398-2 Senior Research Seminar (1 Unit) Independent research projects carried out under faculty supervision. Prerequisite: B- or better in SOCIOL 398-1.

SOCIOL 399-0 Independent Study (1 Unit) Consent of department required. May reenroll for consecutive quarters.

Sociology Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Department Courses (12 units)	
2 sociology courses at the 100 or 200 level ¹	
3 courses in the methods of sociological research:	
SOCIOL 226-0	Sociological Analysis (recommended to be taken by sophomore year)
SOCIOL 303-0	Analysis and Interpretation of Social Data
SOCIOL 329-0	Field Research and Methods of Data Collection
1 course in sociological theory	
SOCIOL 306-0	Sociological Theory
6 sociology courses at the 300 level ²	
Related Courses (4 units)	
4 related courses ³	

¹ This does not include SOCIOL 101-6 First-Year Seminar and SOCIOL 226-0 Sociological Analysis.

² The following applies:

- SOCIOL 398-1 and SOCIOL 398-2 Senior Research Seminars may count as 2 of the 6 courses.
- SOCIOL 376-0 Topics in Sociological Analysis may count multiple times with different topics and advisor approval.
- SOCIOL 399-0 Independent Study may be taken more than once, but only one unit may count toward the major.
- With adviser approval, students may count either 1 Chicago Field Studies (p. 218) unit of credit or 1 Global Engagement Studies Institute (<http://gesi.northwestern.edu>) unit of credit toward their 300-level course requirement. If students wish to count both a CFS and a GESI unit, they will be permitted with adviser approval to count the CFS credit toward the 300-level course requirement and the GESI credit toward the related courses requirement. If students wish to count a 4-credit CFS course as 2 courses toward the 300-level course requirement, they may submit a written appeal to the director of undergraduate studies, who will determine whether the level, amount, and kind of work merits this decision.

³ Related courses may include 300-level courses in African American studies, American studies, anthropology, Asian American studies, communication studies, economics, gender and sexuality studies, global health studies, history, international studies, Latina and Latino studies, legal studies, linguistics, philosophy, political science, psychology, science in human culture, statistics, or other fields. Related courses must be approved by an adviser.

Honors in Sociology

Majors with strong academic records and an interest in pursuing honors should enroll in both quarters of Senior Research Seminar (SOCIO 398-1 and SOCIO 398-2). All sociology majors are eligible to enroll in this sequence of courses and are encouraged to write a thesis. Both courses may count toward the requirements for the major.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information consult the department website (<https://www.sociology.northwestern.edu/undergraduate/research-funding/senior-thesis.html>) and/or the director of undergraduate studies and see Honors in the Major (p. 178).

Sociological Research Minor

The minor concentration in sociological research prepares students to carry out their own research by offering an introduction to the discipline, followed by an array of courses in quantitative and qualitative methods. Students learn about the gathering and preparation of data for analysis as well as a variety of techniques and methods for presenting information, arguments, and conclusions; 2 300-level courses allow students to see how these methods are used in practice.

Course	Title
Minor in Sociological Research Requirements (6 units)	
1 sociology course at the 100 or 200 level ¹	
3 courses on sociological research methods	
SOCIO 226-0	Sociological Analysis
SOCIO 303-0	Analysis and Interpretation of Social Data (or equivalent)
SOCIO 329-0	Field Research and Methods of Data Collection

2 sociology courses at the 300 level ²

¹ This does not include SOCIO 101-6 First-Year Seminar and SOCIO 226-0 Sociological Analysis.

² The following applies:

- SOCIO 399-0 Independent Study may be taken more than once, but only 1 unit may count toward the minor.
- SOCIO 376-0 Topics in Sociological Analysis may count twice with advisor approval if each course addresses different topics.
- Students will be permitted to apply either 1 Chicago Field Studies (p. 218) (CFS) or 1 Global Engagement Studies Institute (<http://gesi.northwestern.edu>) (GESI) unit of credit to their 300-level course requirement, if an advisor deems the course academically sufficient.

Sociological Studies Minor

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.

Course	Title
Minor in Sociological Studies Requirements (7 units)	
2 sociology courses at the 100 or 200 level ¹	
1 course on sociological research methods	
SOCIO 226-0	Sociological Analysis
4 sociology courses at the 300 level, approved by the director of undergraduate studies ²	

¹ This does not include SOCIO 101-6 First-Year Seminar or SOCIO 226-0 Sociological Analysis.

² The following applies:

- SOCIO 399-0 Independent Study may be taken more than once, but only 1 unit may count toward the minor.
- SOCIO 376-0 Topics in Sociological Analysis may count twice with advisor approval if each course addresses different topics.
- Students will be permitted to apply either 1 Chicago Field Studies (p. 218) (CFS) or 1 Global Engagement Studies Institute (<http://gesi.northwestern.edu>) (GESI) unit of credit to their 300-level course requirement, if an advisor deems the course academically sufficient.

Spanish & Portuguese

spanish-portuguese.northwestern.edu

The Department of Spanish & Portuguese offers courses in language, literature, and culture that speak to a variety of interests, whether focused on Latin American, Iberian, US Latino, Lusophone African traditions, or some aspect of literature, language, or culture that cuts across geographic divides. Instruction in most courses is in Spanish or Portuguese, 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 encouraged to also study Portuguese.

The Department of Spanish & 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, the program at Fundação Getúlio Vargas in Rio de Janeiro, or other programs approved by the University's Undergraduate Learning Abroad (<https://www.northwestern.edu/abroad>) Office.

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 (p. 106) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Courses

Spanish Language Classes

Course	Title
SPANISH 101-1 & SPANISH 101-2 & SPANISH 101-3	Elementary Spanish and Elementary Spanish and Elementary Spanish
SPANISH 115-1 & SPANISH 115-2	Accelerated Elementary Spanish and Accelerated Elementary Spanish

SPANISH 121-1 & SPANISH 121-2 & SPANISH 121-3	Intermediate Spanish and Intermediate Spanish and Intermediate Spanish
SPANISH 125-0	Accelerated Intermediate Spanish
SPANISH 127-0	Accelerated Intermediate Spanish for Heritage Language Learners
SPANISH 197-0	Language in Context: Latinos, Language and Culture
SPANISH 199-0	Language in Context: Contemporary Spain
SPANISH 201-0	Conversation on Human Rights: Latin America
SPANISH 202-0	Conversation on Current Topics
SPANISH 203-0	Individual and Society through Written Expression
SPANISH 204-0	Reading and Writing the Art of Protest
SPANISH 205-0	Spanish for Professions: Health Care
SPANISH 206-0	Spanish for Professions: Business
SPANISH 207-0	Spanish for Heritage Speakers
SPANISH 208-0	Spanish and the Community
SPANISH 280-0	Introduction to Spanish Linguistics
SPANISH 281-0	Spanish Phonetics and Phonology
SPANISH 301-0	Topics in Language
SPANISH 302-0	Advanced Grammar

Spanish Literature and Culture Courses

Course	Title
SPANISH 220-0	Introduction to Literary Analysis
SPANISH 250-0	Literature in Spain before 1700
SPANISH 251-0	Literature in Spain since 1700
SPANISH 260-0	Literature in Latin America before 1888
SPANISH 261-0	Literature in Latin America since 1888
SPANISH 280-0	Introduction to Spanish Linguistics
SPANISH 281-0	Spanish Phonetics and Phonology
SPANISH 301-0	Topics in Language
SPANISH 302-0	Advanced Grammar
SPANISH 310-0	Origins of Spanish Civilization
SPANISH 320-0	Golden Age Poetry and Prose
SPANISH 321-0	Golden Age Drama
SPANISH 323-0	Cervantes' Don Quixote
SPANISH 331-0	Realism in Spain: The Problem of Representation
SPANISH 332-0	Avant-Garde Writers and Experimental Fiction in Spain
SPANISH 333-0	The Spanish Civil War: The Good Fight
SPANISH 335-0	Modern Fiction in Spain: Studies in Genre
SPANISH 340-0	Colonial Latin American Literature
SPANISH 341-0	Latin American Modernismo
SPANISH 343-0	Latin American Avant-Gardes
SPANISH 344-0	Borges
SPANISH 345-0	Reading the 'Boom'
SPANISH 346-0	Testimonial Narrative in Latin America
SPANISH 347-0	Literature and Revolution in Latin America
SPANISH 348-0	Readings in Latin American Short Fiction
SPANISH 350-0	Visual Culture in Latin/o America and Spain
SPANISH 360-0	Spain: Studies in Culture and Society
SPANISH 361-0	Latin America: Studies in Culture and Society
SPANISH 362-0	Citizenship and Urban Violence in Latin America
SPANISH 363-0	Topics in US Latino/a Literary and Cultural Studies
SPANISH 364-0	Cultural Borders/Border Cultures
SPANISH 380-0	Topics in Film: The Silver Screen in Latin America and/or Spain

SPANISH 395-0	Topics in Latin American, Latina and Latino, and/or Iberian Cultures
SPANISH 399-0	Independent Study

Spanish Literature and Culture Courses with Readings and Discussion in English

Course	Title
SPANISH 223-0	Cervantes
SPANISH 225-0	Nationalism, Borders, and Immigration in Spain
SPANISH 231-0	The "New" Latin American Narrative
SPANISH 232-0	Discovering Jewish Latin America
SPANISH 277-0	Introduction to Latina/o Literature
SPANISH 397-0	Topics in Latin American, Latina and Latino, and Iberian Literatures and Cultures

Portuguese Language Courses

Course	Title
PORT 101-1 & PORT 101-2 & PORT 101-3	Elementary Portuguese and Elementary Portuguese and Elementary Portuguese
PORT 115-1 & PORT 115-2	Portuguese for Spanish Speakers and Portuguese for Spanish Speakers
PORT 121-1 & PORT 121-2 & PORT 121-3	Intermediate Portuguese and Intermediate Portuguese and Intermediate Portuguese
PORT 201-0	Reading and Speaking Portuguese
PORT 202-0	Reading and Writing Portuguese
PORT 210-0	Icons, Legends, and Myths in Brazil
PORT 303-0	Topics in Advanced Portuguese
PORT 399-0	Independent Study

Portuguese Literature and Culture Courses with Readings and Discussion in English

Course	Title
PORT 210-0	Icons, Legends, and Myths in Brazil
PORT 380-0	Contemporary Brazil: Literature and Film
PORT 396-0	Topics in Lusophone Cultures

Programs of Study

- Spanish Major (p. 354)
- Spanish Minor (p. 354)
- Portuguese Language and Lusophone Cultures Minor (p. 355)

Spanish Courses

SPANISH 101-1 Elementary Spanish (1 Unit) For students who have never studied Spanish or studied Spanish less than two years in high school. Communicative method used for development of speaking, listening, conversation, and grammar skills in a cultural context. Three class meetings a week. Outside online video program.

SPANISH 101-2 Elementary Spanish (1 Unit) For students who have never studied Spanish or studied Spanish less than two years in high school. Communicative method used for development of speaking, listening, conversation, and grammar skills in a cultural context. Three class meetings a week. Outside online video program. Prerequisite: SPANISH 101-1

SPANISH 101-3 Elementary Spanish (1 Unit) For students who have never studied Spanish or studied Spanish less than two years in high

school. Communicative method used for development of speaking, listening, conversation, and grammar skills in a cultural context. Three class meetings a week. Outside online video program. Prerequisite: SPANISH 101-2

SPANISH 105-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

SPANISH 115-1 Accelerated Elementary Spanish (1 Unit) For students with some previous experience in Spanish. Communicative method used for development of speaking, listening, writing, and reading skills in a cultural context. Three class meetings a week. Outside online video program. Offered winter and spring. Prerequisite: sufficient score on Spanish Language Placement Exam.

SPANISH 115-2 Accelerated Elementary Spanish (1 Unit) For students with some previous experience in Spanish. Communicative method used for development of speaking, listening, writing, and reading skills in a cultural context. Three class meetings a week. Outside online video program two or three times a week. Offered winter and spring. Prerequisite: SPANISH 115-1.

SPANISH 121-1 Intermediate Spanish (1 Unit) Communicative method. Further development of grammar, vocabulary, speaking, and writing skills through emphasis on cultural content and functional use of Spanish language. Three class meetings a week. Outside online video program. Prerequisite: SPANISH 101-3, SPANISH 115-2, or sufficient score on Spanish Language Placement Exam.

SPANISH 121-2 Intermediate Spanish (1 Unit) Communicative method. Further development of grammar, vocabulary, speaking, and writing skills through emphasis on cultural content and functional use of Spanish language. Three class meetings a week. Outside online video program. Prerequisite: SPANISH 121-1, or sufficient score on Spanish Language Placement Exam.

SPANISH 121-3 Intermediate Spanish (1 Unit) Communicative method. Further development of grammar, vocabulary, speaking, and writing skills through emphasis on cultural content and functional use of Spanish language. Three class meetings a week. Outside online video program. Prerequisite: SPANISH 121-2, or sufficient score on Spanish Language Placement Exam.

SPANISH 125-0 Accelerated Intermediate Spanish (1 Unit) Communicative method. Further development of grammar, vocabulary, speaking, and writing skills through readings and short films. Three class meetings a week. Outside online video. Offered in fall only. Prerequisite: AP score of 3 or sufficient score on Spanish Language Placement Exam.

SPANISH 127-0 Accelerated Intermediate Spanish for Heritage Language Learners (1 Unit) For Heritage Language Learners. Communicative method. Further development of grammar, vocabulary, speaking, and writing skills through readings and viewing short films. Offered in fall only. Prerequisite: AP score of 3 or sufficient score on Spanish Language Placement Exam.

SPANISH 197-0 Language in Context: Latinos, Language and Culture (1 Unit) For Heritage Language Learners. Development of written and oral discourse by studying sociopolitical and linguistic richness of Spanish-speaking countries and Spanish-speaking communities in the United States. Prerequisite: SPANISH 121-3, SPANISH 125-0, SPANISH 127-0, AP score of 4, or sufficient score on Spanish Language Placement Exam.

SPANISH 199-0 Language in Context: Contemporary Spain (1 Unit) Introduction to the culture and sociopolitical issues of contemporary

Spain, review of some problematic grammatical patterns and skill building in Spanish. Prerequisite: SPANISH 121-3, SPANISH 125-0, AP score of 4, or sufficient score on Spanish Language Placement Exam.

SPANISH 201-0 Conversation on Human Rights: Latin America (1 Unit)

First course of a sequence designed to develop speaking strategies and structures through analysis of modern (20th and 21st century) Latin American culture. Emphasis on accurate informal conversation. Prerequisite: SPANISH 199-0 or sufficient score on Spanish Language Placement Exam.

SPANISH 202-0 Conversation on Current Topics (1 Unit) Second course of sequence designed to develop speaking strategies and structures through examination of culturally related topics in the Spanish-speaking world. Emphasis on formal conversation and specialized vocabulary. Prerequisite: SPANISH 201-0, AP score of 5, or sufficient score on Spanish Language Placement Exam.

SPANISH 203-0 Individual and Society through Written Expression (1 Unit) First course of a sequence that develops writing skills and structures through examination of the relationship between the individual and society. Emphasis on textual analysis and development of descriptive, narrative, and argumentative essays. Prerequisite: SPANISH 201-0, AP score of 5, or sufficient score on Spanish Language Placement Exam.

SPANISH 204-0 Reading and Writing the Art of Protest (1 Unit) Second course of a sequence designed to develop writing skills and structures through analysis of socially committed art. Emphasis on cultural analysis and development of longer essays. Prerequisite: SPANISH 203-0 or SPANISH 207-0.

SPANISH 205-0 Spanish for Professions: Health Care (1 Unit) Advanced course to develop communication skills in Spanish for healthcare purposes. Emphasis on language skills for the medical field, specialized terminology and vocabulary, and cultural nuances. Prerequisite: SPANISH 201-0 or AP score of 5.

SPANISH 206-0 Spanish for Professions: Business (1 Unit) Advanced course to develop communication skills in Spanish for business purposes. Emphasis on language skills for the global marketplace: specialized terminology, writing, comprehension of cultural nuances. Prerequisite: SPANISH 201-0 or AP score of 5.

SPANISH 207-0 Spanish for Heritage Speakers (1 Unit) For Heritage Language Learners. . Emphasis on academic writing and formal modes of the language through socio-political and literary topics. Prerequisite: SPANISH 197-0, AP score of 5, or sufficient score on Spanish Language Placement Exam.

SPANISH 208-0 Spanish and the Community (1 Unit) Development of advanced Spanish communication skills and of a thorough and personal cultural knowledge of the Chicago-area Hispanic community through readings, discussions, writing, and required volunteer commitment (15 hours/quarter). Prerequisite: SPANISH 203-0, SPANISH 207-0 or equivalent.

SPANISH 210-0 Icons, Legends, & Myths in Latin American, Latino and/or Iberian Cultures (1 Unit) Diverse representations of historical, literary, and popular figures, such as the caudillo, the obispo, El Cid, Don Juan, the conquistador, the gaucho, Simón Bolívar, and Evita. Prerequisite: SPANISH 204-0. *Literature Fine Arts Distro Area*

SPANISH 215-SA Introduction to Cuban Culture & Society (1 Unit)

Issues and debates in Cuban society, such as those around gender, race, and class, and their representation in music, architecture, visual arts, and fiction. Restricted to students in Northwestern's Cuba program. Prerequisite: SPANISH 121-3, SPANISH 125-0, AP score of 4, or sufficient score on Spanish Language Placement Exam.

SPANISH 220-0 Introduction to Literary Analysis (1 Unit) 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. Prerequisite: SPANISH 204-0. *Literature Fine Arts Distro Area*

SPANISH 223-0 Cervantes (1 Unit) Study of Don Quixote and other selected works with attention to the historical and cultural context of the 17th century. *Literature Fine Arts Distro Area*

SPANISH 225-0 Nationalism, Borders, and Immigration in Spain (1 Unit) 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 231-0 The "New" Latin American Narrative (1 Unit) 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 Julio Cortázar, Gabriel García Márquez, Manuel Puig, and Luisa Valenzuela. *Literature Fine Arts Distro Area*

SPANISH 232-0 Discovering Jewish Latin America (1 Unit) Exploration of the Jewish presence in Latin America; focus on diverse forms of cultural production (e.g., literature, testimonial writing, film, photography, theater, art, music) throughout the region. *Literature Fine Arts Distro Area*

SPANISH 250-0 Literature in Spain before 1700 (1 Unit) 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): SPANISH 220-0. *Literature Fine Arts Distro Area*

SPANISH 251-0 Literature in Spain since 1700 (1 Unit) 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): SPANISH 220-0. *Literature Fine Arts Distro Area*

SPANISH 260-0 Literature in Latin America before 1888 (1 Unit) Survey of pre-Hispanic, colonial, and romantic traditions in Latin America. Focus on authors and texts such as Popul Vuh, Inca Garcilaso de la Vega, Sor Juana Inés de la Cruz, and Martín Fierro. Prerequisite (may be taken concurrently): SPANISH 220-0. *Literature Fine Arts Distro Area*

SPANISH 261-0 Literature in Latin America since 1888 (1 Unit) 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, Pablo Neruda, and Cristina Peri Rossi. Prerequisite (may be taken concurrently): SPANISH 220-0. *Literature Fine Arts Distro Area*

SPANISH 277-0 Introduction to Latina/o Literature (1 Unit) Survey of major writers and movements from the Spanish colonial era to the present, covering a range of genres and ethnicities. Taught with ENGLISH 277-0 and LATINO 277-0; may receive credit for only 1 of these courses. *Literature Fine Arts Distro Area*

SPANISH 280-0 Introduction to Spanish Linguistics (1 Unit) An introductory course designed to present students with an overview of the phonology, phonetics, morphology, syntax, sociolinguistic and pragmatic elements specific to Spanish language. Prerequisite: SPANISH 204-0 or equivalent.

SPANISH 281-0 Spanish Phonetics and Phonology (1 Unit) This is a foundational linguistics course that introduces students to the theory and practice of Spanish sounds and phonology. Prerequisite: SPANISH 204-0 or equivalent. *Formal Studies Distro Area*

SPANISH 301-0 Topics in Language (1 Unit) Special topics in historical, grammatical, or other linguistic aspects of Spanish. Prerequisite: SPANISH 204-0. *Literature Fine Arts Distro Area*

SPANISH 302-0 Advanced Grammar (1 Unit) Advanced course designed to polish Spanish usage through in-depth study and development in grammar, focusing on items most problematic for nonnative speakers. Prerequisite: SPANISH 204-0 or equivalent.

SPANISH 310-0 Origins of Spanish Civilization (1 Unit) Introduction to Spanish civilization from its origins to 1453. Focus on the Roman, Visigoth, and Muslim conquests and their differences, the Christian reconquest, and the evolution of Spanish from Latin. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 320-0 Golden Age Poetry and Prose (1 Unit) 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 Quijote. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 321-0 Golden Age Drama (1 Unit) Major dramatists of the 17th century, including Lope de Vega, Tirso de Molina, and Calderón de la Barca. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 323-0 Cervantes' Don Quixote (1 Unit) Close reading of Don Quijote, with attention to its historical and cultural context. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 331-0 Realism in Spain: The Problem of Representation (1 Unit) 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: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 332-0 Avant-Garde Writers and Experimental Fiction in Spain (1 Unit) 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 SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 333-0 The Spanish Civil War: The Good Fight (1 Unit) 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 World

War II. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 335-0 Modern Fiction in Spain: Studies in Genre (1 Unit)

Study of literary genres (narrative, poetry, drama) or subgenres (detective fiction, autobiography, the fantastic). May be repeated for credit with different topic. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 340-0 Colonial Latin American Literature (1 Unit) Major texts and writers of the colonial period, including chronicles of discovery and conquest from both indigenous and Hispanic sources. Works by authors such as Inca Garcilaso de la Vega, Bartolomé de las Casas, and Sor Juana Inés de la Cruz. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 341-0 Latin American Modernismo (1 Unit) 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: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 343-0 Latin American Avant-Gardes (1 Unit) Poetry, prose, and visual art by major figures and groups in 20th century vanguard movements. Works by authors such as Roberto Arlt, Alejo Carpentier, Nicolás Guillén, Vicente Huidobro, and César Vallejo. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 344-0 Borges (1 Unit) The poetry, essays, and short fiction of Jorge Luis Borges. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 345-0 Reading the 'Boom' (1 Unit) Historical, literary, and cultural characteristics of the "Boom" in the 1960s and 1970s and the development of the "new" narrative in Latin America. Works by authors such as José Donoso, Carlos Fuentes, Gabriel García Márquez, and Mario Vargas Llosa. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 346-0 Testimonial Narrative in Latin America (1 Unit) 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, Rigoberta Menchú, Elena Poniatowska, Jacobo Timerman, and Rodolfo Walsh. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 347-0 Literature and Revolution in Latin America (1 Unit) Revolutionary practices in Latin American literatures as well as literary representations of revolution. Authors such as Mariano Azuela, Nellie Campobello, Roque Dalton, and Rodolfo Usigli. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 348-0 Readings in Latin American Short Fiction (1 Unit) Theory and practice of Latin American short fiction. Close reading of texts by authors such as Jorge Luis Borges, Alejo Carpentier, Julio Cortázar, Rosario Ferré, and Gabriel García Márquez. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 350-0 Visual Culture in Latin/o America and Spain (1 Unit)

History and materials of Latin American, Spanish, or US Latino visual cultures. Possible topics: photography, exhibitions, video practice, and visual production in popular culture. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 360-0 Spain: Studies in Culture and Society (1 Unit)

Significant issues in the social, political, and cultural development of Spain. May be repeated for credit with different topic. Prerequisite: SPANISH 220-0. *Literature Fine Arts Distro Area*

SPANISH 361-0 Latin America: Studies in Culture and Society (1 Unit)

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. May be repeated for credit with different topic. Prerequisite: SPANISH 220-0. *Literature Fine Arts Distro Area*

SPANISH 362-0 Citizenship and Urban Violence in Latin America (1 Unit)

An investigation of the association between Latin America and the violence that underlies all phases of its history, particularly its urban history, through fictional and theoretical texts, films, and music. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 363-0 Topics in US Latino/a Literary and Cultural Studies (1 Unit)

Analysis of diverse literary and/or cultural productions by and about US Latino/as. Topics may include the politics of representation, cultural and social identity, race, ethnicity and gender, transnationalism and globalization. Case studies vary across cultural practices, media, and literary texts. Prerequisite: SPANISH 220-0. *Interdisciplinary Distro - See Rules* (p. 175) *Literature Fine Arts Distro Area Social Behavioral Sciences Distro Area*

SPANISH 364-0 Cultural Borders/Border Cultures (1-2 Units)

Examining diverse (literary, artistic, and cinematic) representations of border spaces and subjectivities in Latin America (the US-Mexico border; the Caribbean as a border space) in order to study the processes of contact, hybridization, adaptation, and exclusion that are generated, and the modes of self-fashioning that are produced, from within this cultural dislocation. Prerequisite: SPANISH 220-0. *Literature Fine Arts Distro Area*

SPANISH 380-0 Topics in Film: The Silver Screen in Latin America and/or Spain (1 Unit)

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: SPANISH 220-0. *Literature Fine Arts Distro Area*

SPANISH 380-SA Topics in Film: The Silver Screen in Latin America and/or Spain (1 Unit)

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: SPANISH 220-0. *Literature Fine Arts Distro Area*

SPANISH 395-0 Topics in Latin American, Latina and Latino, and/or Iberian Cultures (1 Unit)

Advanced study of topics in the literary traditions of either Latin America or Spain. Possible topics include intellectual history, transatlantic exchanges, literature of the fantastic, feminist traditions, hybrid cultures, and history and fiction. May be

repeated for credit with different topic. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 395-SA Topics in Latin American, Latina and Latino, and/or Iberian Cultures (1 Unit) Advanced study of topics in the literary traditions of either Latin America or Spain. Possible topics include intellectual history, transatlantic exchanges, literature of the fantastic, feminist traditions, hybrid cultures, and history and fiction. May be repeated for credit with different topic. Prerequisite: SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *Literature Fine Arts Distro Area*

SPANISH 397-0 Topics in Latin American, Latina and Latino, and Iberian Literatures and Cultures (1 Unit) 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, the memoir, and travel writing. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

SPANISH 399-0 Independent Study (1 Unit) Independent reading under supervision. Consultation with director of undergraduate studies required.

Portuguese Courses

PORT 101-1 Elementary Portuguese (1 Unit) Introduction to grammar and development of listening, speaking, reading, and writing skills in Brazilian Portuguese, as well as the history and culture of Portuguese-speaking countries.

PORT 101-2 Elementary Portuguese (1 Unit) Introduction to grammar and development of listening, speaking, reading, and writing skills in Brazilian Portuguese, as well as the history and culture of Portuguese-speaking countries. Prerequisite: PORT 101-1 or sufficient score on placement test.

PORT 101-3 Elementary Portuguese (1 Unit) Introduction to grammar and development of listening, speaking, reading, and writing skills in Brazilian Portuguese, as well as the history and culture of Portuguese-speaking countries. Prerequisite: PORT 101-2 or sufficient score on placement examination.

PORT 105-6 First-Year Seminar (1 Unit) WCAS first-year seminar.

PORT 115-1 Portuguese for Spanish Speakers (1 Unit) For students proficient in Spanish. Comparative sociolinguistic and interactive approach to communicative competence emphasizing pronunciation, intonation, sentence structure, and patterns of spoken and written Portuguese. Prerequisite: AP 4 or equivalent on the Spanish Language Placement Exam.

PORT 115-2 Portuguese for Spanish Speakers (1 Unit) For students proficient in Spanish. Comparative sociolinguistic and interactive approach to communicative competence emphasizing pronunciation, intonation, sentence structure, and patterns of spoken and written Portuguese. Prerequisite: AP 4 or equivalent on the Spanish Language Placement Exam.

PORT 121-1 Intermediate Portuguese (1 Unit) Port 121 helps students achieve an intermediate level of proficiency through further development of listening, speaking, reading and writing skills. Grammar, vocabulary and pronunciation of Brazilian Portuguese will continue to be developed through meaningful cultural contexts. The course also offers insights into

the history and culture of the Portuguese speaking countries in Europe, Africa and America. Prerequisite: PORT 101-3 or placement test

PORT 121-2 Intermediate Portuguese (1 Unit) Port 121 helps students achieve an intermediate level of proficiency through further development of listening, speaking, reading and writing skills. Grammar, vocabulary and pronunciation of Brazilian Portuguese will continue to be developed through meaningful cultural contexts. The course also offers insights into the history and culture of the Portuguese speaking countries in Europe, Africa and America. Prerequisite: PORT 121-1 or sufficient score on the Portuguese Language Placement Exam.

PORT 121-3 Intermediate Portuguese (1 Unit) Port 121 helps students achieve an intermediate level of proficiency through further development of listening, speaking, reading and writing skills. Grammar, vocabulary and pronunciation of Brazilian Portuguese will continue to be developed through meaningful cultural contexts. The course also offers insights into the history and culture of the Portuguese speaking countries in Europe, Africa and America. There is no P/N allowed. First class is mandatory. Prerequisite: PORT 121-2 or Placement.

PORT 201-0 Reading and Speaking Portuguese (1 Unit) This intermediate course is designed to expand mastery in reading and speaking Brazilian Portuguese through select cultural videos, readings of literary crônicas, periodicals, and the Internet. Prerequisite: PORT 115-2, PORT 121-3, or sufficient score on placement examination.

PORT 202-0 Reading and Writing Portuguese (1 Unit) Instruction in reading and writing expository and narrative prose. Emphasis on vocabulary, linguistic skills, and syntax appropriate to formal written Portuguese. Prerequisite: PORT 115-2, PORT 121-3, or sufficient score on placement examination.

PORT 210-0 Icons, Legends, and Myths in Brazil (1 Unit) Representations in graphic materials, documentaries, film, theater, folklore, narrative fiction, and popular music of historical, literary, and popular figures in the national imagination. May include English or Portuguese discussion sections. Prerequisite for Portuguese section: PORT 201-0, PORT 202-0, or sufficient score on placement exam. Prerequisite for English section: none. *Ethics Values Distro Area Interdisciplinary Distro - See Rules (p. 175) Literature Fine Arts Distro Area*

PORT 303-0 Topics in Advanced Portuguese (1 Unit) Advanced review of grammar concepts and idiomatic use of spoken and written Portuguese. Deals with a variety of topics in the context of Brazilian culture, history, literature, and current events. May be taken more than once for credit with change of topic. Prerequisite: PORT 202-0 or equivalent.

PORT 380-0 Contemporary Brazil: Literature and Film (1 Unit) Study of the literature and film produced in Brazil during the 21st century. Focus on narrative forms, genres, and sociocultural issues. *Literature Fine Arts Distro Area*

PORT 396-0 Topics in Lusophone Cultures (1 Unit) Aspects of the literatures and cultures of Brazil, Portugal, and Lusophone Africa (Mozambique, Angola, Cape Verde, São Tomé and Príncipe, Guinea-Bissau). Possible topics include Brazilian modernism, Lusophone African literature and film, race and sexuality in Brazilian literature, travel narrative, literature and ethnography, the Portuguese novel, nation and nationalism. May be repeated for credit with different topic. *Literature Fine Arts Distro Area*

PORT 399-0 Independent Study (1 Unit) Independent study under supervision. Consultation with the director of undergraduate studies required.

Spanish Major

The major in Spanish is designed to immerse students in the complexity and diversity of literary and intellectual traditions in Latin American and Iberian cultures while they achieve language fluency. Students are encouraged to focus on particular interests, such as literary and cultural history, Latina and Latino studies, Lusophone studies, race and ethnicity, film, and cultural history. Many students fulfill some of the major requirements through courses taken in study abroad programs.

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Prerequisite	
SPANISH 201-0	Conversation on Human Rights: Latin America
or AP credit	
or placement by the online Spanish Language Placement Exam (www.spanish-portuguese.northwestern.edu/undergraduate/language-placement/spanish/online-placement-test.html)	
Major in Spanish Requirements (15 units)	
<i>3 courses:</i>	
SPANISH 203-0	Individual and Society through Written Expression
or SPANISH 207-0	Spanish for Heritage Speakers
SPANISH 204-0	Reading and Writing the Art of Protest
SPANISH 220-0	Introduction to Literary Analysis
<i>3 literature courses at the 200-level chosen from:</i>	
SPANISH 250-0	Literature in Spain before 1700
SPANISH 251-0	Literature in Spain since 1700
SPANISH 260-0	Literature in Latin America before 1888
SPANISH 261-0	Literature in Latin America since 1888
A 200-level Spanish or Portuguese course chosen from the approved 200-level courses list (below) may substitute for 1 of these courses (p. 354)	
<i>7 300-level courses in the department chosen from: ^{1,2}</i>	
SPANISH 301-0	Topics in Language
or SPANISH 302-0	Advanced Grammar
SPANISH 310-0	Origins of Spanish Civilization
SPANISH 320-0	Golden Age Poetry and Prose
SPANISH 321-0	Golden Age Drama
SPANISH 323-0	Cervantes' Don Quixote
SPANISH 331-0	Realism in Spain: The Problem of Representation
SPANISH 333-0	The Spanish Civil War: The Good Fight
SPANISH 335-0	Modern Fiction in Spain: Studies in Genre
SPANISH 340-0	Colonial Latin American Literature
SPANISH 341-0	Latin American Modernismo
SPANISH 343-0	Latin American Avant-Gardes
SPANISH 344-0	Borges
SPANISH 345-0	Reading the 'Boom'
SPANISH 346-0	Testimonial Narrative in Latin America
SPANISH 347-0	Literature and Revolution in Latin America
SPANISH 348-0	Readings in Latin American Short Fiction
SPANISH 350-0	Visual Culture in Latin/o America and Spain
SPANISH 360-0	Spain: Studies in Culture and Society
SPANISH 361-0	Latin America: Studies in Culture and Society
SPANISH 362-0	Citizenship and Urban Violence in Latin America

SPANISH 363-0	Topics in US Latino/a Literary and Cultural Studies
SPANISH 364-0	Cultural Borders/Border Cultures
SPANISH 380-0	Topics in Film: The Silver Screen in Latin America and/or Spain
SPANISH 395-0	Topics in Latin American, Latina and Latino, and/or Iberian Cultures

2 elective courses at the 200 or 300 level

Electives at the 200 or 300 level related to the Latin American, Iberian, or US Latino/a historical, literary, and/or cultural traditions taken in the department. Courses may be taken in another department or in study abroad programs with prior approval of an undergraduate adviser.

- 1

The 7 300-level courses must include:
 - At least 1 that deals with a period before 1800
 - At least 1 that deals with the literature and/or culture of Latin America
 - At least 1 that deals with the literature and/or culture of Spain
- 2

The 7 300-level courses may include UP TO TWO 300-level Spanish, Portuguese or Comparative Literary Studies courses taught in English that include an important component of Latin American, Iberian, or US Latina/o literatures or cultures.

Approved 200-Level Courses

Course	Title
Current List of approved 200-level courses that may be used in substitution for a required literature course as described above. NOTE: No more than one of these courses can be used in this category:	
SPANISH 210-0	Icons, Legends, & Myths in Latin American, Latino and/or Iberian Cultures
SPANISH 223-0	Cervantes
SPANISH 225-0	Nationalism, Borders, and Immigration in Spain
SPANISH 231-0	The "New" Latin American Narrative
SPANISH 277-0	Introduction to Latina/o Literature
SPANISH 280-0	Introduction to Spanish Linguistics
SPANISH 281-0	Spanish Phonetics and Phonology

Honors in Spanish

Majors with strong academic records and an interest in pursuing honors should apply for the honors program during the quarter before independent study for honors is to begin. Students approved by the department enroll in 2 quarters of SPANISH 399-0 during either fall-winter or winter-spring of senior year and complete a senior thesis; the 2 quarters of SPANISH 399-0 count toward the 15 units required for the major.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information see the department website (<https://www.spanish-portuguese.northwestern.edu/undergraduate/honors-awards/spanish-honors-program.html>), contact a faculty adviser, and see Honors in the Major (p. 178).

Spanish Minor

The minor is designed primarily to enable students to achieve cultural, literary, and linguistic competence in Spanish by exploring the literatures and cultures of Latin America and Spain. Many students fulfill some of the minor requirements through courses taken in study abroad programs.

Course	Title
Prerequisite	
SPANISH 201-0	Conversation on Human Rights: Latin America
or AP credit	
or placement by the online Spanish Language Placement Exam (www.spanish-portuguese.northwestern.edu/undergraduate/language-placement/spanish/online-placement-test.html)	
Minor in Spanish Requirements (8 units) ¹	
<i>Up to 5 courses at the 200 level chosen from:</i>	
SPANISH 203-0	Individual and Society through Written Expression
or SPANISH 207-0	Spanish for Heritage Speakers
SPANISH 204-0	Reading and Writing the Art of Protest
SPANISH 205-0	Spanish for Professions: Health Care
or SPANISH 206-0	Spanish for Professions: Business
SPANISH 210-0	Icons, Legends, & Myths in Latin American, Latino and/or Iberian Cultures
SPANISH 220-0	Introduction to Literary Analysis
SPANISH 250-0	Literature in Spain before 1700
SPANISH 251-0	Literature in Spain since 1700
SPANISH 260-0	Literature in Latin America before 1888
SPANISH 261-0	Literature in Latin America since 1888
SPANISH 280-0	Introduction to Spanish Linguistics
SPANISH 281-0	Spanish Phonetics and Phonology
<i>At least 3 courses at the 300 level chosen from:</i>	
SPANISH 301-0	Topics in Language
or SPANISH 302-0	Advanced Grammar
SPANISH 310-0	Origins of Spanish Civilization
SPANISH 320-0	Golden Age Poetry and Prose
SPANISH 321-0	Golden Age Drama
SPANISH 323-0	Cervantes' Don Quixote
SPANISH 331-0	Realism in Spain: The Problem of Representation
SPANISH 333-0	The Spanish Civil War: The Good Fight
SPANISH 335-0	Modern Fiction in Spain: Studies in Genre
SPANISH 340-0	Colonial Latin American Literature
SPANISH 341-0	Latin American Modernismo
SPANISH 343-0	Latin American Avant-Gardes
SPANISH 344-0	Borges
SPANISH 345-0	Reading the 'Boom'
SPANISH 346-0	Testimonial Narrative in Latin America
SPANISH 347-0	Literature and Revolution in Latin America
SPANISH 348-0	Readings in Latin American Short Fiction
SPANISH 350-0	Visual Culture in Latin/o America and Spain
SPANISH 360-0	Spain: Studies in Culture and Society
SPANISH 361-0	Latin America: Studies in Culture and Society
SPANISH 362-0	Citizenship and Urban Violence in Latin America
SPANISH 363-0	Topics in US Latino/a Literary and Cultural Studies
SPANISH 364-0	Cultural Borders/Border Cultures
SPANISH 380-0	Topics in Film: The Silver Screen in Latin America and/or Spain
SPANISH 395-0	Topics in Latin American, Latina and Latino, and/or Iberian Cultures
SPANISH 397-0	Topics in Latin American, Latina and Latino, and Iberian Literatures and Cultures
SPANISH 399-0	Independent Study

¹ One 200- or 300-level Spanish or Portuguese course on Latin American or Spanish literature or culture taught in English in the Department may be used in place of one of the 8 required courses for the minor.

Portuguese Language and Lusophone Cultures Minor

The minor in Portuguese enables students to acquire competence in oral and written Portuguese and to explore the literatures and cultures of Brazil, Lusophone Africa, and/or Portugal.

The minor draws from faculty and courses in departments and programs such as Spanish, History, and African American studies. Students are encouraged to study abroad in the target cultures and may count up to 3 study abroad courses toward the minor.

Students who meet the prerequisite requirements and wish to declare a minor should meet with a department adviser.

Course	Title
Prerequisite	
PORT 115-2	Portuguese for Spanish Speakers
or PORT 121-3	Intermediate Portuguese
or placement at the 200 level on the Portuguese Language Placement Exam (www.spanish-portuguese.northwestern.edu/undergraduate/language-placement/portuguese.html)	
Minor Requirements (6 units, at least 3 must be at the 300-level)	
<i>2 courses:</i>	
PORT 201-0	Reading and Speaking Portuguese
PORT 202-0	Reading and Writing Portuguese
<i>2 of the following courses, one or both at the 300 level:</i>	
PORT 210-0	Icons, Legends, and Myths in Brazil
PORT 303-0	Topics in Advanced Portuguese
PORT 380-0	Contemporary Brazil: Literature and Film
PORT 396-0	Topics in Lusophone Cultures
<i>2 electives, at least 1 at the 300 level. Choose from:</i>	
Additional courses in the Portuguese program (PORT)	
Courses in Spanish with a significant Brazilian or Portuguese component, provided that the final paper for the course focuses entirely or primarily on a Brazilian or Portuguese topic	
Courses in other departments or programs (e.g., History, Latin American & Caribbean Studies, Comparative Literary Studies) with a significant Brazilian, Portuguese, or Lusophone African component.	

Statistics

statistics.northwestern.edu

Statistics is the scientific discipline that deals with the collection, organization, analysis, and interpretation of numerical data. Statistical methods are widely used in observational studies and for the design and analysis of experiments, sample surveys, and censuses. Such analysis involves both description of the properties of groups of observations and problems of drawing inferences from such data. Applications to the biological, social, and physical sciences are widespread, and statistical analyses are increasingly required in actuarial work, accounting, finance, engineering, medicine, and law.

Programs of Study

- Statistics Major (p. 357)
- Statistics Minor (p. 358)

STAT 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

STAT 202-0 Introduction to Statistics (1 Unit) Data collection, summarization, correlation, regression, probability, sampling, estimation, tests of significance. Does not require calculus and makes minimal use of mathematics. May not receive credit for both STAT 202-0 and STAT 210-0. *Formal Studies Distro Area*

STAT 210-0 Introductory Statistics for the Social Sciences (1 Unit) A mathematical introduction to probability theory and statistical methods, including properties of probability distributions, sampling distributions, estimation, confidence intervals, and hypothesis testing. STAT 210-0 is primarily intended for economics majors. May not receive credit for both STAT 202-0 and STAT 210-0. Prerequisite: strong background in high school algebra (calculus is not required). *Formal Studies Distro Area*

STAT 232-0 Applied Statistics (1 Unit) Basic concepts of using statistical models to draw conclusions from experimental and survey data. Topics include simple linear regression, multiple regression, analysis of variance, and analysis of covariance. Practical application of the methods and the interpretation of the results will be emphasized. Prerequisites: STAT 202-0, STAT 210-0, or equivalent; MATH 220-0. *Formal Studies Distro Area*

STAT 301-1 Data Science 1 (1 Unit) Series aims to develop the practical skills necessary for conducting data science while surveying foundational analytic methods with a focus on application. Substantial data analysis project required in each course. Data Science 1 focuses on data management, manipulation, and visualization skills and techniques for exploratory data analysis. Prerequisite: STAT 202-0 or equivalent *Formal Studies Distro Area*

STAT 301-2 Data Science 2 (1 Unit) Series aims to develop the practical skills necessary for conducting data science while surveying foundational analytic methods with a focus on application. Substantial data analysis project required in each course. Data Science 2 focuses on foundational analytic methods such as linear regression, resampling, and tree-based methods. Prerequisite: STAT 301-1 or consent of instructor. *Formal Studies Distro Area*

STAT 301-3 Data Science 3 (1 Unit) Series aims to develop the practical skills necessary for conducting data science while surveying foundational analytic methods with a focus on application. Substantial data analysis project required in each course. Data Science 3 focuses on methods such as support vector machines, clustering, and neural networks. Prerequisite: STAT 301-2 or consent of instructor. *Formal Studies Distro Area*

STAT 302-0 Data Visualization (1 Unit) Introduction to the knowledge, skills, and tools required to visualize data of various formats across statistical domains and to create quality visualizations for both data exploration and presentation. Prerequisite: STAT 202-0 or equivalent. *Formal Studies Distro Area*

STAT 320-1 Statistical Methods 1 (1 Unit) Sample spaces, computing probabilities, random variables, distribution functions, expected values, variance, correlation, limit theory. May not receive credit for both STAT 320-1 and any of STAT 383-0, MATH 310-1, MATH 311-1,

MATH 314-0, MATH 385-0, EECS 302-0, or IEMS 202-0. Corequisites: STAT 202-0 or STAT 210-0, MATH 234-0. *Formal Studies Distro Area*

STAT 320-2 Statistical Methods 2 (1 Unit) Sampling, parameter estimation, confidence intervals, hypothesis tests. Prerequisite: STAT 320-1 or MATH 310-1. *Formal Studies Distro Area*

STAT 320-3 Statistical Methods 3 (1 Unit) Comparison of parameters, goodness-of-fit tests, regression analysis, analysis of variance, and nonparametric methods. Prerequisites: STAT 320-2, MATH 240-0. *Formal Studies Distro Area*

STAT 325-0 Survey Sampling (1 Unit) Probability sampling, simple random sampling, error estimation, sample size, stratification, systematic sampling, replication methods, ratio and regression estimation, cluster sampling. Prerequisites: MATH 230-0 and 2 quarters of statistics, or consent of instructor. *Formal Studies Distro Area*

STAT 328-0 Causal Inference (1 Unit) Introduction to modern statistical thinking about causal inference. Topics include completely randomized experiments, confounding, ignorability of assignment mechanisms, matching, observational studies, noncompliance, and Bayesian methods. Prerequisites: STAT 320-2, STAT 350-0. *Formal Studies Distro Area*

STAT 330-1 Applied Statistics for Research 1 (1 Unit) First Quarter: Design of experiments and surveys, numerical summaries of data, graphical summaries of data, correlation and regression, probability, sample mean, sample proportion, confidence intervals and tests of significance, one and two sample problems, ANOVA. Second Quarter: Simple linear regression, inference, diagnostics, multiple regression diagnostics, autocorrelation, 1-way ANOVA, power and sample size determination, 2-way ANOVA, ANCOVA, randomized block designs. *Formal Studies Distro Area*

STAT 330-2 Applied Statistics for Research 2 (1 Unit) Second Quarter: Simple linear regression, inference, diagnostics, multiple regression diagnostics, autocorrelation, 1-way ANOVA, power and sample size determination, 2-way ANOVA, ANCOVA, randomized block designs.

STAT 332-0 Statistics for Life Sciences (1 Unit) Application of statistical methods and data analysis techniques to the life sciences. Parametric statistics, nonparametric approaches, resampling-based approaches. Prerequisite: 1 introductory statistics course. *Formal Studies Distro Area*

STAT 342-0 Statistical Data Mining (1 Unit) Methods for modeling binary responses with multiple explanatory variables. Potential topics include statistical decision theory, binary regression models, cluster analysis, probabilistic conditional independence, and graphical models. Prerequisites: courses in probability and statistics comparable to STAT 320-1, STAT 320-2; a course in multiple regression comparable to STAT 350-0; familiarity with statistical computing software such as MINITAB or SPSS. *Formal Studies Distro Area*

STAT 344-0 Statistical Computing (1 Unit) Exploration of theory and practice of computational statistics with emphasis on statistical programming in R. Prerequisite: STAT 320-2 or equivalent. *Formal Studies Distro Area*

STAT 345-0 Statistical Demography (1 Unit) 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: STAT 350-0, MATH 240-0, or equivalent. *Formal Studies Distro Area*

STAT 348-0 Applied Multivariate Analysis (1 Unit) Statistical methods for describing and analyzing multivariate data. Principal component analysis, factor analysis, canonical correlation, clustering. Emphasis on statistical and geometric motivation, practical application, and interpretation of results. Prerequisites: STAT 320-2, MATH 240-0. *Formal Studies Distro Area*

STAT 350-0 Regression Analysis (1 Unit) Simple linear regression and correlation, multiple regression, residual analysis, selection of subsets of variables, multi-collinearity and shrinkage estimation, nonlinear regression. Prerequisite or corequisite: STAT 320-2. *Formal Studies Distro Area*

STAT 351-0 Design and Analysis of Experiments (1 Unit) 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: STAT 320-1 or equivalent. *Formal Studies Distro Area*

STAT 352-0 Nonparametric Statistical Methods (1 Unit) Survey of nonparametric methods, with emphasis on understanding their application. Estimation of a distribution function, density estimation, and nonparametric regression. Prerequisite: STAT 350-0 *Formal Studies Distro Area*

STAT 354-0 Applied Time Series Modeling and Forecasting (1 Unit) Introduction to modern time series analysis. Autocorrelation, time series regression and forecasting, ARIMA and GARCH models. Corequisite: STAT 350-0. Prerequisites: STAT 320-1. *Formal Studies Distro Area*

STAT 355-0 Analysis of Qualitative Data (1 Unit) Introduction to the analysis of qualitative data. Measures of association, loglinear models, logits, and probits. Prerequisite: STAT 320-2 or equivalent. *Formal Studies Distro Area*

STAT 356-0 Hierarchical Linear Models (1 Unit) Introduction to the theory and application of hierarchical linear models. Two and three level linear models, hierarchical generalized linear models, and application of hierarchical models to organizational research and growth models. Prerequisites: STAT 320-2, STAT 350-0. *Formal Studies Distro Area*

STAT 359-0 Topics in Statistics (1 Unit) Topics in theoretical and applied statistics to be chosen by instructor. Prerequisite: consent of instructor. *Formal Studies Distro Area*

STAT 365-0 Introduction to the Analysis of Financial Data (1 Unit) Statistical methods for analyzing financial data. Models for asset returns, portfolio theory, parameter estimation. Prerequisites: STAT 320-3, MATH 240-0. *Formal Studies Distro Area*

STAT 370-0 Human Rights Statistics (1 Unit) Development, analysis, interpretation, use, and misuse of statistical data and methods for description, evaluation, and political action regarding war, disappearances, justice, violence against women, trafficking, profiling, elections, hunger, refugees, discrimination, etc. Prerequisites: Two of STAT 325-0, STAT 350-0, STAT 320-2, STAT 320-3; or ECON 381-1, ECON 381-2; or MATH 386-1, MATH 386-2; or IEMS 303-0, IEMS 304-0. *Formal Studies Distro Area*

STAT 383-0 Probability and Statistics for ISP (1 Unit) Probability and statistics. Ordinarily taken only by students in ISP; permission required otherwise. May not receive credit for both STAT 383-0 and any of STAT 320-1; MATH 310-1, MATH 311-1, MATH 314-0, MATH 385-0; EECS 302-0; or IEMS 202-0. Prerequisites: MATH 281-1, MATH 281-2,

MATH 281-3; PHYSICS 125-1, PHYSICS 125-2, PHYSICS 125-3. *Formal Studies Distro Area*

STAT 398-0 Undergraduate Seminar (1 Unit)

STAT 399-0 Independent Study (1-3 Units) Independent work under the guidance of a faculty member. Consent of department required.

Statistics Major

Students must also complete the Undergraduate Registration Requirement (p. 26) and the degree requirements of their home school.

Course	Title
Department Courses (9 units)	
1 introductory course:	
STAT 202-0	Introduction to Statistics
or STAT 210-0	Introductory Statistics for the Social Sciences
or STAT 232-0	Applied Statistics
Or equivalent	
STAT 320-1 & STAT 320-2 & STAT 320-3	Statistical Methods 1 and Statistical Methods 2 and Statistical Methods 3
STAT 325-0	Survey Sampling
or STAT 351-0	Design and Analysis of Experiments
STAT 350-0	Regression Analysis
3 additional 300-level courses offered by the department ¹	
Related Courses (Units depend on mathematics sequence taken.)	
MATH 220-0 & MATH 224-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions
or MATH 212-0 & MATH 213-0 & MATH 214-0	Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
MATH 230-0 & MATH 234-0 & MATH 240-0	Differential Calculus of Multivariable Functions and Multiple Integration and Vector Calculus and Linear Algebra
or MATH 281-1 & MATH 281-2 & MATH 281-3	Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year
or MATH 285-1 & MATH 285-2 & MATH 285-3	Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year
or MATH 290-1 & MATH 290-2 & MATH 290-3	MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus
or MATH 291-1 & MATH 291-2 & MATH 291-3	MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus

¹ MATH 310-2 Probability and Stochastic Processes, IEMS 315-0 Stochastic Models, IEMS 351-0 Optimization Methods in Data Science, IEMS 365-0 Analytics for Social Good, or IEMS 373-0 Intro to Financial Engineering may substitute for 1 of the 3 STAT 300-level elective courses. Only 1 substitution is permitted.

Honors in Statistics

Majors with strong academic records and an interest in pursuing honors should contact the director of undergraduate studies no later than the start of senior year. Accepted students take 2 quarters of STAT 399-0

Independent Study, during which they develop and write a research paper; these enrollments do not count toward the major.

Students whose theses and grades meet department criteria are recommended to the college for graduation with honors. For more information consult the director of undergraduate studies and see Honors in the Major (p. 178).

Relevant Courses in Other Departments

Industrial Engineering and Management Sciences

See McCormick School (p. 116).

Course	Title
IEMS 202-0	Probability
IEMS 315-0	Stochastic Models
IEMS 351-0	Optimization Methods in Data Science
IEMS 365-0	Analytics for Social Good
IEMS 373-0	Intro to Financial Engineering

Mathematics

Course	Title
MATH 310-1 & MATH 310-2 & MATH 310-3	Probability and Stochastic Processes and Probability and Stochastic Processes and Probability and Stochastic Processes

Statistics Minor

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 the following:

Course	Title
Prerequisites	
MATH 220-0 & MATH 224-0 or MATH 212-0 & MATH 213-0 & MATH 214-0	Differential Calculus of One-Variable Functions and Integral Calculus of One-Variable Functions Single Variable Calculus I and Single Variable Calculus II and Single Variable Calculus III
MATH 230-0 & MATH 234-0 & MATH 240-0 or MATH 281-1 & MATH 281-2 & MATH 281-3 or MATH 285-1 & MATH 285-2 & MATH 285-3 or MATH 290-1 & MATH 290-2 & MATH 290-3 or MATH 291-1 & MATH 291-2 & MATH 291-3	Differential Calculus of Multivariable Functions and Multiple Integration and Vector Calculus and Linear Algebra Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year and Accelerated Mathematics for ISP: First Year Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year and Accelerated Mathematics for MMSS: First Year MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus and MENU: Linear Algebra and Multivariable Calculus MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus

Minor Requirements (6 units)

1 introductory course:

STAT 202-0 or STAT 210-0	Introduction to Statistics Introductory Statistics for the Social Sciences
-----------------------------	---

or STAT 232-0 Or equivalent	Applied Statistics
STAT 320-1 & STAT 320-2 & STAT 320-3	Statistical Methods 1 and Statistical Methods 2 and Statistical Methods 3
STAT 325-0 or STAT 351-0	Survey Sampling Design and Analysis of Experiments
STAT 350-0 or ECON 381-2	Regression Analysis Econometrics

Swahili

See African Studies (p. 185).

Turkish

See Middle East and North African Studies (p. 303).

Urdu

See Asian Languages and Cultures (p. 199).

Writing Program

writingprogram.northwestern.edu

The Bobbie and Stanton Cook Family 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:

Course	Title
ENGLISH 105-0	Expository Writing
ENGLISH 105-6	First-Year Seminar
ENGLISH 106-1 & ENGLISH 106-2	Writing in Special Contexts and Writing in Special Contexts
ENGLISH 205-0	Intermediate Composition
ENGLISH 282-0	Writing and Speaking in Business
ENGLISH 304-0	Practical Rhetoric
ENGLISH 305-0	Advanced Composition

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 Cook Family 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 program helps to oversee writing requirements—and thus provides writing advising—for undergraduates in Weinberg College, the McCormick School, and the Bienen School. Members of the program faculty teach specialized courses and workshops, as needed. The program has collaborated extensively with other University programs

and departments, developing new ways to integrate writing instruction with instruction in other disciplines. For example, faculty from the program and the McCormick School team-teach Design Thinking and Communication (a combination of ENGLISH 106-1 Writing in Special Contexts and DSGN 106-1 Design Thinking and Communication) for first-year engineering students. In this, as in all its courses and special offerings, the 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 (p. 239).

Yiddish

Courses in Yiddish are offered by the Jewish Studies Program (p. 281).

INDEX

A

Academic Calendar	41
Academic Integrity	43
Academic Standing	24
Academic Support	44
Accelerated Bachelors	28
Additional Baccalaureate Options	28
Admission	10
Advanced Asian Languages Minor	205
African American Studies	180
African American Studies Major	182
African American Studies Minor	184
African Studies	185
African Studies Adjunct Major	186
African Studies Minor	186
American Studies	186
American Studies Major	187
Anthropology	187
Anthropology Major	191
Anthropology Minor	193
Applied Mathematics	120
Applied Mathematics Degree	149
Arabic	193
Architectural Engineering and Design Certificate	136
Art History	193
Art History Major	196
Art History Minor	196
Art Theory and Practice	196
Art Theory and Practice Major	197
Asian American Studies	197
Asian American Studies Major	199
Asian American Studies Minor	199
Asian Humanities Minor	204
Asian Languages and Cultures	199
Asian Languages and Cultures Major	204
Asian Studies	205
Asian Studies Major	205
Asian Studies Minor	206
Astronomy	206

B

Bienen Minors	30
Bienen Second Majors	33
Biological Sciences	206
Biological Sciences Major	209
Biological Sciences Second Major for ISP Students	210
Biomedical Engineering	121
Biomedical Engineering Degree	123
Biotechnology and Biochemical Engineering Minor	126
Brady Scholars Program	248
Business German Minor	266
Business Institutions	210
Business Institutions Minor	211

C

Catholic Studies	212
Catholic Studies Minor	337
Certificates	28
Chemical Engineering	124
Chemical Engineering Degree	126
Chemistry	212
Chemistry BA/MS	218
Chemistry Major	215
Chemistry Minor	217
Chemistry Second Major for ISP Students	217
Chicago Field Studies	218
Chinese	219
Civic Engagement Certificate	114
Civil and Environmental Engineering	127
Civil Engineering Degree	134
Classics	219
Classics Major	221
Classics Minor Concentrations	222
Cognitive Science	222
Cognitive Science Major	223
Cognitive Science Minor	225
College Transition Programs	39
Communication Sciences and Disorders	71
Communication Studies	73
Communication Studies Major	77
Comparative Literary Studies	225
Comparative Literary Studies BA/MA	228
Comparative Literary Studies Major	227

Composition and Music Technology	47	English and American Literature Minor	244
Composition Major	48	Enrollment	22
Composition Minor	49	Entrepreneurship Minor	150
Computer Engineering	137	Environmental Engineering	149
Computer Engineering Degree	144	Environmental Engineering Degree	135
Computer Science	137	Environmental Engineering Minor	136
Computer Science	228	Environmental Policy and Culture	244
Computer Science Degree	145	Environmental Policy and Culture Minor	245
Computer Science Major	228	Environmental Sciences	245
Computer Science Minor (McCormick School of Engineering)	148	Environmental Sciences Major	246
Computer Science Minor (Weinberg College)	230	Environmental Sciences Second Major for ISP Students	248
Computer Science Second Major for ISP Students	230	Ethics and Civic Life	248
Conducting and Ensembles	49	Exams and Attendance	22
Courses and Credit	21		
Creative Writing Cross-Genre Minor	244	F	
Creative Writing Major	243	Farley Center for Entrepreneurship	149
Creative Writing Sequence-Based Minor	244	Film and Media Studies Minor	83
Critical Theory	231	Financial Aid	14
Critical Theory Minor	231	Financial Aid Application	14
		Financial Aid Eligibility	14
D		Financial Economics Certificate	28
Dance	78	First-Year Seminars	248
Dance Major	91	French and Italian	248
Dance Minor	92	French BA/MA	256
Design Engineering	137	French Major	253
Disciplinary Actions	25	French Minor	255
Dual Bachelor's Degrees	35		
Dual Graduate & Undergraduate Degrees	34	G	
		Gender and Sexuality Studies	256
E		Gender and Sexuality Studies Major	258
Earth and Planetary Sciences	231	Gender and Sexuality Studies Minor	258
Earth and Planetary Sciences Major	233	General Communication	78
Earth and Planetary Sciences Minor	235	General Engineering	150
Earth and Planetary Sciences Second Major for ISP Students	235	General Liberal Arts	258
Economics	235	Geography	259
Economics BA/MA	239	Geography Adjunct Major	260
Economics Major	238	Geography Minor	260
Economics Minor	239	German	260
Electrical Engineering and Computer Science	137	German Major	264
Electrical Engineering Degree	146	German Minor	265
Engineering Design	148	German Studies Minor	266
Engineering Sciences and Applied Mathematics	148	Global Health Studies	266
English	239	Global Health Studies Adjunct Major	268
English and American Literature Major	243	Global Health Studies Minor	268

Grades	23
Graduation & Degrees	23
Graduation Honors	23
Greek	268

H

Hebrew	268
Hebrew Studies Minor	284
Henry and Leigh Bienen School of Music	45
Hindi	268
History	268
History Major	273
History Minor	276
Honors Program in Medical Education	34
Human Communication Sciences	78
Human Communication Sciences Major	72
Human Communication Sciences Minor	73
Human Development and Psychological Services	99
Human Development and Psychological Services Major	100
Humanities	276
Humanities Minor	278

I

Industrial Engineering and Management Sciences	153
Industrial Engineering Degree	155
Innovation in News and Storytelling	39
Integrated Marketing Communications	169
Integrated Marketing Communications Certificate	170
Integrated Science	278
Integrated Science Major	279
International Studies	279
International Studies Adjunct Major	280
International Studies Minor	281
Italian	281
Italian Literature and Culture Major	255
Italian Minor	256

J

Japanese	281
Jazz	49
Jazz Studies Major	50
Jewish Studies	281
Jewish Studies Major	283
Jewish Studies Minor	284
Journalism	170

Journalism Degree	173
Judd A. and Marjorie Weinberg College of Arts and Sciences	175

K

Kaplan Humanities Scholars Program	278
Kellogg Certificates	28
Korean	284

L

Latin	284
Latin American and Caribbean Studies	284
Latin American and Caribbean Studies Minor	285
Latina and Latino Studies	285
Latina and Latino Studies Major	286
Latina and Latino Studies Minor	287
Leadership	29
Learning and Organizational Change	101
Learning and Organizational Change Major	102
Learning Sciences	103
Learning Sciences Major	105
Legal Studies	287
Legal Studies Major	288
Legal Studies Minor	289
Linguistics	289
Linguistics BA/MA	291
Linguistics Major	291
Linguistics Minor	291

M

Managerial Analytics Certificate	28
Manufacturing and Design Engineering Degree	157
Materials Science	291
Materials Science and Engineering	158
Materials Science and Engineering Degree	161
Materials Science Major	292
Materials Science Minor	293
Materials Science Second Major for ISP Students	293
Mathematical Methods in the Social Sciences	294
Mathematics	295
Mathematics Major	300
Mathematics Minor	302
Mathematics Second Major for ISP Students	302
Mathematics Second Major or Minor for MMSS Students	303
McCormick Certificates	29
McCormick Minors	32

Mechanical Engineering	162	Philosophy Minor	315
Mechanical Engineering Degree	165	Physics and Astronomy	316
Medill Certificates	29	Physics Major	319
Medill School of Journalism, Media, Integrated Marketing Communications	167	Physics Minor	321
Middle East and North African Studies	303	Physics Second Major for ISP Students	321
Middle East and North African Studies Major	306	Piano	59
Middle East and North African Studies Minor	306	Piano Major	60
Military Programs	39	Political Science	322
Minors	30	Political Science Major	326
MMSS Adjunct Major	295	Political Science Minor	328
Molecular Biosciences	307	Portuguese	329
Music Cognition	50	Portuguese Language and Lusophone Cultures Minor	355
Music Cognition Major	56	Premedical Scholars Program	34
Music Cognition Minor	57	Privacy & Disclosures	9
Music Core	51	Programs A-Z	18
Music Education	52	Programs & Centers Certificates	29
Music Education Major	53	Programs & Centers Minors	31
Music Education Minor	54	Psychology	329
Music Studies for Nonmajors	54	Psychology Major	332
Music Technology	56	Psychology Minor	334
Music Technology Minor	49	R	
Music Theatre Certificate	93	Radio/Television/Film	81
Music Theory and Cognition	56	Radio/Television/Film Major	84
Music Theory Major	57	Religious Studies	334
Music Theory Minor	57	Religious Studies Major	337
Musicology	57	Religious Studies Minor	337
Musicology Major	59	Requirements and Policies	21
Musicology Minor	59	Returning to the University	25
N		Robert R. McCormick School of Engineering and Applied Science	116
Naval Science	39	Russian	337
Neurobiology	307	Russian and East European Studies Minor	344
Neuroscience	312	S	
Neuroscience Major	308	School of Communication	67
Neuroscience Second Major for ISP Students	311	School of Education and Social Policy	97
P		Science in Human Culture	337
Performance Studies	78	Science in Human Culture Adjunct Major	339
Performance Studies Major	80	Science in Human Culture Minor	339
Performance Studies Minor	80	Second Majors	33
Persian	312	Secondary Teaching	106
Philosophy	312	Segal Design Certificate	158
Philosophy Major	315	Segal Design Institute	156
		SESP Certificates	30

Slavic Languages and Literatures	339
Slavic Languages and Literatures Major	342
SoC Minors	32
Social Policy	112
Social Policy Major	113
Sociological Research Minor	348
Sociological Studies Minor	348
Sociology	344
Sociology Major	347
Sound Design Minor	84
Spanish & Portuguese	348
Spanish Major	354
Spanish Minor	354
Special Programs & Courses	39
Statistics	355
Statistics Major	357
Statistics Minor	358
String Instruments	61
String Instruments Major	62
Student Status	24
Study Outside Northwestern	37
Summer Field Studies Program	114
Sustainability and Energy	29
Swahili	358

T

Test Credit	25
Theatre	85
Theatre Major	94
Theatre Minor	95
Transcripts	25
Transfer Credit	25
Transfer Types	26
Transportation and Logistics Minor	31
Tuition & Payment	16
Tuition Benefit	16
Turkish	358

U

Undergraduate	6
Undergraduate Registration Requirement	26
Undergraduate Research	38
Urdu	358

V

Voice and Opera	63
Voice and Opera Major	64

W

WCAS Minors	32
WCAS Second Majors	33
Winds and Percussion Instruments	64
Winds and Percussion Instruments Major	65
Withdrawal	22
Withdrawal Refunds	16
World Literature Minor	227
Writing Program	358

Y

Yiddish	359
---------------	-----