Northwestern

Undergraduate Catalog 2022–23

TABLE OF CONTENTS

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 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 (https://www.registrar.northwestern.edu/academic_records/enrollment_and_graduation_statistics.html).

Campuses and Schools

The six undergraduate schools on the Evanston campus offer the programs and courses 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.hlcommission.org (https://www.hlcommission.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 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 integrated engineering studies. 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 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 (https://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 in context, 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 2022 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.

Student Expectations and COVID-19 Code of Conduct

The well-being of our Wildcat community continues to be our highest priority. Northwestern has developed the following expectations for all enrolled students who return to campus or participate in any University program (even remotely). Northwestern University may modify these expectations at any time as guidance from federal, state, and local governments and/or the University evolves. Substantive modifications will be communicated to you. As a reminder, in addition to the expectations set forth below, all students are expected to follow policies applicable to students, including those contained in the Student Handbook or your specific academic program.

To be eligible to enroll, students must agree to the following:

- *I will regularly monitor the University's guidelines related to COVID-19 on the* COVID-19 site *(*https://www.northwestern.edu/coronavirus-covid-19-updates/university-status/expectations/guidelines/*) and stay updated on any guidance provided by the University.*
- *While on campus I will abide by any applicable safety or hygiene standards recommended by Northwestern and any applicable agencies, including the Illinois Department of Public Health or the Centers for Disease Control and Prevention (CDC).*
- *I will monitor and comply with all of Northwestern's expectations regarding the COVID-19 vaccination and exceptions process, including expectations for those who are not fully vaccinated.*
- *I will cooperate with any contact tracing efforts by the University.*
- *I will participate in any additional health screening required by the University.*
- *I will immediately report any exposure to COVID-19 to Northwestern University Health Service or to any other offices/functions required by Northwestern and will not participate in in-person activities until I am cleared by the University.*
- *I will follow the University's guidelines on self-isolation and/or quarantining and any applicable guidelines or requirements from public health agencies.*
- *If I will be residing in University housing, I will review the* Expectations for Residents During COVID-19 *(*https://sites.northwestern.edu/covid19housing/policies/*) and follow the expectations set forth therein.*

I have read and understand this summary of expectations, and agree to follow all Northwestern University guidelines related to reducing the spread of COVID-19. If I do not follow these expectations, I may be referred to the Office of Community Standards or my dean's office for follow up and the consequences of regular noncompliance may include removal from campus. I understand these expectations may change given the evolving nature of the pandemic. I further understand that if I have questions, I can raise them with the appropriate University office.

I understand and acknowledge that while Northwestern is continuing to follow the guidance of public health officials to help prevent the spread of COVID-19, much of the nature of the COVID-19 virus is still unknown (including potential long term health effects), and Northwestern cannot control risks associated with COVID-19 or guarantee that the campus (including any building) is free of the virus, or that I or my belongings will not be exposed to COVID-19, and that such exposure may result in illness and/or a disruption to my student experience. I recognize that individuals with the following conditions may have a higher risk from COVID-19 infection: age 65 or older, HIV, asthma, chronic lung disease, diabetes, serious heart condition, chronic kidney disease being treated with dialysis, severe obesity, immunocompromised, and certain pregnancy related conditions. I also understand that information suggests there may be heart or lung complications affiliated with COVID-19. I understand that if I am diagnosed with COVID-19 or was in close contact with someone with COVID-19 I should seek consultation from a medical provider and receive medical clearance before returning to any athletic activities, including club or intramural sports.

I understand and acknowledge that the University hopes that most instruction and activities will take place in person in the upcoming term. However, the University's ability to do so is dependent upon evolving health guidelines, conditions on campus, and space availability. Accordingly, activities may be cancelled or postponed, and the University may need to reevaluate course modality at some point in the term. The University and its schools and units may also adjust other features of the academic experience, like course offerings and grading. Such changes will be communicated to students by the University, their school, or program. ***Tuition and fees will not be refunded or prorated in these circumstances. Tuition and fees also will not be refunded or prorated if I choose to participate in courses offered remotely.***

I understand and acknowledge that Northwestern may need to make additional sudden changes to the campus environment – including requiring students to leave campus – which may also impact my experience.

I understand and acknowledge that I have informed awareness of these risks and share the responsibility for minimizing risk of exposure to and spread of COVID-19 to myself and others, and that I am voluntarily resuming my academic program. If I decline the option to resume my academic program, I understand that I am making that decision voluntarily and understand any programmatic or financial implications of that decision. If I have questions about this, I will contact my academic program.

If I'm a student with a disability in need of a reasonable accommodation, I understand I should contact AccessibleNU to go through the accommodation process.

All enrolled students must acknowledge via CAESAR that they read and understood this statement and agreed to the terms set forth above.

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.

Requirement to Provide Emergency Information

For the safety and security of our students, Northwestern requires all new students to provide the following emergency information in our student information system, CAESAR (https://caesar.northwestern.edu/) and confirm it annually:

- **Emergency Notification Phone Number** (required): A phone number where the student themselves can be reached in the event of a campus emergency – most likely a cell phone number. The University will send recorded voice and text messages to this number if necessary.
- **Current / Local Address** (required): Where we can find the student in the event of a local emergency.
- **Emergency contact** (required): Someone who can make medical decisions on the student's behalf.
- **Missing Person Contact (optional):** The best person for the University to contact if we believe the student to be missing.

Students must enter, update or confirm the three pieces of required emergency information by the deadline (usually in mid-September) each year to avoid a registration hold. Registration holds prevent students from registering for classes or changing registration until the required three data elements are up to date.

Nondiscrimination Statement

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, reproductive health decision making, or any other classification protected by law in matters of admissions, employment, housing, or services or in the educational programs or activities it operates. Harassment, whether verbal, physical, or visual, that is based on any of these characteristics is a form of discrimination. 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.

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. Title IX requires educational institutions, such as Northwestern, to prohibit discrimination based on sex (including sexual harassment) in the University's educational programs and activities, including in matters of employment and admissions. 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 Office of Equity
1800 Sherman Avenue, Suite 4-500
Evanston, Illinois 60208
847-467-6165
equity@northwestern.edu

Questions specific to sex discrimination (including sexual misconduct and sexual harassment) should be directed to:

Northwestern's Title IX Coordinator in the Office of Equity
1800 Sherman Avenue, Suite 4-500
Evanston, Illinois 60208
847-467-6165
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 (https://www2.ed.gov/about/offices/list/ocr/complaintintro.html) or calling 800-421-3481. Inquiries about the application of Title IX to Northwestern may be referred to Northwestern's Title IX Coordinator, the United States Department of Education's Assistant Secretary for Civil Rights, or both.

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 standardized tests — Northwestern will adopt a test-optional policy for first-year and transfer applicants in the 2022–23 admission cycle. Applicants may submit an SAT and/or ACT score if they wish, but scores are not required. The writing sections for these tests are optional.
- 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 English language proficiency. International applicants whose first language is not English, or whose schooling has not been in English, must submit results from a Duolingo English Test, IELTS/IELTS Indicator, or TOEFL/TOEFL iBT Special Home Edition (TOEFL ITP Plus for China Solution is not accepted).

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]; most 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 applicable standardized tests as outlined in the General Requirements for Admission section and/or the English Proficiency for International Applicants sections in this chapter. Testing deadlines can be found in the Application and Testing Deadlines table. If choosing to submit an SAT and/or ACT score, applicants may

self-report the SAT and ACT scores, taking care to report their highest individual sections of the SAT and/or highest ACT composite/section score(s). Applicants are not obligated to report scores from all test dates, though are welcome to do so. Students who have been admitted with consideration of test scores and who choose to enroll will be required to submit official SAT or ACT test scores that correspond to the highest self-reported 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 music.northwestern.edu/admission/undergraduate/auditions (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/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
- BSED/BMus or BSED/BAMus in Education and Music
- BS/BMus or BS/BAMus in Engineering and Music
- BSJ/BMus in Journalism and Music

**Interested students may apply to the BA/BS program in Liberal Arts and Engineering after enrolling.*

For descriptions of these and other dual bachelor's degree programs, see the Dual Bachelor's Degree Programs (p. 38) chapter of this catalog.

Special Admission Programs

The following undergraduate programs at Northwestern have special application requirements.

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. 309) section in the Weinberg College (p. 198) 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 enter in fall quarter. New undergraduates may not request matriculation for any other quarter.		
Apply by	November 1	January 2
If taking SAT or ACT, take by	November test	December test
To apply for financial aid, file CSS PROFILE by	December 1	February 1
and file FAFSA by	December 1	February 1
Northwestern releases its decision by	Mid-December	March 31
Applicant's reply and nonrefundable tuition and housing deposits due by	February 1	May 1

Transfer Students for Fall Quarter Matriculation

Event	Regular Decision
Transfer students enter in fall quarter. New undergraduates may not request matriculation for any other quarter.	
Apply by	March 15
(Space is limited in some programs; apply well before the deadline.)	
If taking SAT or ACT, take 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 decisions on a rolling basis through the end of May; applicant's reply is due within three weeks of receiving a preliminary credit evaluation.	

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. 27).

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.
- If choosing to submit an SAT and/or ACT score, applicants may self-report the SAT and ACT scores, taking care to report their highest individual sections of the SAT and/or highest ACT composite/section score(s). Applicants are not obligated to report scores from all test dates, though are welcome to do so. Students who have been admitted with consideration of test scores and who choose to enroll will be required to submit official SAT or ACT test scores that correspond to the highest self-reported 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 music.northwestern.edu/admission/undergraduate/auditions/programs (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 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 Non-degree Special Students (NDSS). 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

If we do not receive your transcripts, disciplinary disclosure form, and, for students who included SAT or ACT scores in their application, official test scores by fall move-in, or if your final transcript indicates that your senior-year academic performance faltered seriously, our offer of admission may be withdrawn. Northwestern also reserves the right to take that action if it receives information that, in its judgment, reflects significantly on your character or your fitness for study or participation in the Northwestern community.

FINANCIAL AID

The University provides 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 circumstances are also relatively consistent.

Financial aid is available for a maximum of four years of full-time enrollment or its equivalent. Students admitted to a five-year dual degree program are eligible for a maximum of five years 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 four years. Students pursuing other dual degree opportunities that are not approved for aid would be eligible only for federal and state funding after four years of enrollment.

Regardless of whether a student receives financial aid in a given quarter or year, all enrollment counts toward the maximum time frame. Those needing aid beyond their maximum time frame must submit a request to the Office of Undergraduate Financial Aid. Those requests must 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. 12).

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 amount of financial aid eligibility (4 years in most cases). Each quarter of half-time status counts as .5 quarter toward the 4-year maximum. Any quarter of less than half-time status is not counted toward the maximum.

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 amount 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 maintain a cumulative GPA of 2.0 or better each year 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.

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 Finance 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 Finance website.

Bills and Payments

Student Finance 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 and allows online payments.

Prepayment Plan

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

VA Pending Payment Policy

For Northwestern students using U.S. Department of Veterans Affairs (VA) Post 9/11 GI Bill®[1] (Ch. 33) or Vocational Rehabilitation and Employment (Ch. 31) benefits, the University will not prevent enrollment, assess a late fee, deny access to resources available to other students, or require they secure additional funding while payment from the United States Department of Veterans Affairs is pending to the University.

To qualify for this provision, students may be required to:

- Produce the VA's Certificate of Eligibility by the first day of class;
- Provide written request to be certified;
- Provide additional information needed to properly certify the enrollment as described in other institutional policies

[1] *GI Bill® is a registered trademark of the U.S. Department of Veterans Affairs (VA). More information about education benefits offered by VA is available at the official U.S. government Web site at* https://www.benefits.va.gov/gibill *(*https://www.benefits.va.gov/gibill/*).*

Additional Information

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

Student Finance
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 finance 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 undergraduate education, the University registrar, a senior member of the financial aid staff, and two to three 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/supplemental-enrollment-benefit-appeal.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 Student Finance or the Office of Undergraduate Financial Aid.

PROGRAMS A-Z

A

B

C

D

E

F

G

REQUIREMENTS AND POLICIES

Degrees, Academic Options, and Requirements

Undergraduate degree requirements are established by the faculties of each school. While the requirements consequently differ significantly by school, all students 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. 35), minors (p. 33), certificates (p. 29), 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. 38). 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. 27).

Academic Advising

Academic advising is an essential component of an undergraduate education. All incoming 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 the CAESAR degree progress report and McCormick MAS—to ensure that they are meeting their degree requirements; students should promptly discuss any concerns about progress or discrepancies in the report 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 there is insufficient enrollment.

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 and 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 all grades 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 135-1 General Physics, PHYSICS 135-2 General Physics, PHYSICS 135-3 General Physics 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 (as in the example) denote courses primarily for first-year students and sophomores, usually without college prerequisite.
  - 200—299 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
  - -1,2,3 = three-quarter sequence (as in the example)

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 may not be included in this catalog. Please see The Graduate School Catalog (https://catalogs.northwestern.edu/tgs/courses-az/).

Enrollment

Registration for All Students

Students register for classes using the CAESAR (https://caesar.northwestern.edu/) system.

- 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. Auditing (p. 25) is not permitted.
- 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 or department.

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 drop deadline listed in the academic calendar.
- In courses designated with "Student Option" grading, undergraduate students may typically elect to change from quality grade to the pass/no credit (P/N) option or vice versa through the P/N deadline. Check the current year academic calendar for deadlines and the 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 drop deadline 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. 17) and Change of Registration and Bills (p. 17).

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

- Retrieve a Dual Registration Form from the Office of the Registrar in Evanston.
- Secure the required approvals.
- Submit 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 https://www.registrar.northwestern.edu/calendars/final-exam-schedules/index.html (https://www.registrar.northwestern.edu/calendars/final-exam-schedules/). Summer Session examinations are usually held at the last class meeting. Students are responsible for knowing the time and location of each examination. Early examination policies are determined by each school. Both the instructor and the dean may permit a student to be absent from the final examination for causes beyond the student's control; normally such permission must be secured in advance of the date of the examination, and an incomplete grade is awarded. 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).

Please also see the policy on incomplete grades.

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 after registering for classes, either for a term or permanently, must file a term withdrawal request (https://www.registrar.northwestern.edu/forms/) online, which will be routed automatically to the appropriate school for approval and sent 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 entirely. 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. Tuition is adjusted based on the schedule published on the Student Financial Services website (https://www.northwestern.edu/sfs/payments/withdrawing-from-the-university/).

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 posting on the official and unofficial transcripts.

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. When Thanksgiving or other university holidays

conflict with this deadline, withdrawal petitions must be submitted by the last class/business day of that same week. Detailed procedures can be found at www.registrar.northwestern.edu/registration-graduation/registration/withdrawal.html (https://www.registrar.northwestern.edu/registration-graduation/registration/withdrawal.html).

See also Withdrawal Refunds (p. 17).

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

Incomplete Coursework

Eligibility for Incomplete Grades

Northwestern University expects students to finish their coursework on time or remove themselves by dropping or withdrawing. When situations outside a student's control arise that prevent timely course completion, Northwestern designates two different incomplete grades, X and Y to designate what work is outstanding. X grades indicate that a student missed the final exam or did not submit the final assessment, but all other work in the term was complete. The assignment of Y grades is governed by the policy below.

Northwestern undergraduate students may request an incomplete grade of Y only in a course in which they have substantially completed the work, including any requirements of attendance or engagement. The university minimally requires that more than 50% of the course requirements must be complete in order for the course to be "substantially completed."

Students must also be passing the course based on the materials submitted thus far to be eligible for an incomplete Y grade.

This policy allows but does not compel incomplete Y grades in the above circumstances; Grading is the purview of the faculty, as governed by school policies, and they may choose to deny requests for incomplete grades in cases where this policy allows them.

Individual schools may also require approval by staff in the deans' offices in order for an incomplete grade to be assigned (see the Weinberg College incomplete approval process (https://www.weinberg.northwestern.edu/undergraduate/courses-registration-grades/incompletes.html)). Schools may consider a number of other factors when considering approval or denial of incomplete grades, such as the number of incompletes a student has requested and whether any are outstanding.

Students must consider the school offering the course, not their own school, to determine the process by which an incomplete grade is requested and assigned.

Impact of Incomplete Grades

As the tables above illustrate, both X and Y grades bear 0.00 grade points. As such, schools factor incomplete grades into enrollment, probation and dismissal decisions, and students should be sure they understand how incomplete grades affect academic standing.

Resolving Incomplete Coursework

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). This University deadline to change an incomplete grade is the maximum amount of time allowed: Instructors are free to establish an earlier deadline and students are bound by that agreement.

Students planning to graduate before the standard grade change deadline (the following like term) 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). Grade changes are not permitted after a degree has been conferred.

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.

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 begin the process 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 (https://www.registrar.northwestern.edu/registration-graduation/graduation-preparation/).

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.

Graduation Honors

Honors and Prizes

Graduation with School Latin 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 - 32.99 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 - 21.99 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.

Inter-School Transfers

Undergraduate students who wish to transfer from one school or college of the University to another must have an inter-school transfer approved by the dean's office of the school to which they wish to transfer. A return to the original school must be approved in the same way. Approval of an inter-school transfer is usually contingent on satisfactory performance in the original school. The policy concerning inter-school transfer and application deadlines can be found at www.registrar.northwestern.edu/forms/interschool_transfer.html.

Auditors

Auditors are persons whose engagement in a course is limited to observation and listening only; they are not permitted to enroll, participate in class discussion, submit written or oral assignments, or take examinations. They do not receive academic credit. Auditing is not permitted for undergraduate 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.

Dual Degree Students

Dual degree students are held separately to the academic standing policies of both schools. Therefore, depending on respective performance in the academic work required by each school, students may have different standing up to and including academic dismissal in one school but not the other. School officials communicate each term to ensure colleagues are informed of the standing of all students pursuing degrees in their respective schools.

Disciplinary Actions

Disciplinary Suspension/Expulsion

Students suspended from Northwestern by the University Hearing and Appeals System may not receive Northwestern credit for academic work pursued 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 is recorded on the transcript; suspension is not. Details about disciplinary policies and records are available through the Office of Community Standards (https://www.northwestern.edu/communitystandards/).

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 (https://caesar.northwestern.edu/). 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), students must complete a minimum number of Northwestern credits and quarters 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 applied to a bachelor's degree. Northwestern may also award credit for distinguished performance on certain foreign national examinations. 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 particular degree requirements. Refer to the schools' websites for details.

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 (URR) applies to students seeking a bachelor's degree and must be completed in addition to the degree requirements established by the 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 11 quarters and earn credit for courses worth at least 42 units at the University. See the Dual Bachelor's Degrees (p. 38) section for information on approved dual bachelor's degree programs. This provision does not apply to students completing two BS degrees within McCormick; see Options & Support (p. 133) in McCormick 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 21 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 the Dual Bachelor's Degrees (p. 38) section for information on approved dual bachelor's degree programs. This provision does not apply to students completing two BS degrees within McCormick; see Options & Support (p. 133) in McCormick for the specific requirements covering this situation.
- Students who complete at least 2 full units of study abroad credit designed as "-SA" courses in the class schedule in a given quarter are considered to be registered at Northwestern for that quarter, and this credit will count toward the minimum needed to satisfy the URR. These courses are taught by Northwestern faculty. Transfer credit for study abroad courses that are not taught by Northwestern faculty do not carry Northwestern course numbers or the SA designation will not be counted toward the URR, with the exception of HPME students as detailed below.
- HPME students, who are subject to all other URR provisions for students entering as first-year students in a four-year degree program, have the option to use 1 quarter of study abroad via a program approved by the Global Learning Office toward the 9-quarter URR requirement, if they earn the transferred equivalent of at least 2 units of Northwestern credit. Such students may not use these credits toward the required 32 units of Northwestern credit.
- 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.

Petition for a Undergraduate Registration Requirements Waiver

The Undergraduate Registration Requirement (URR) is established to ensure that a Northwestern degree reflects the scope and depth of learning and the values embodied by a Northwestern education. The Undergraduate Registration Requirement is described in the Undergraduate Catalog and noted in the CAESAR Degree Progress Report (DPR) and MAS. Students have on-demand access to their standing with this requirement throughout their career and are expected to pay attention to the Undergraduate Registration Requirement in addition to their school/major requirements. When students are not on track to meet the URR by their final term, they are notified by the Registrar Degree Audit team via email. Students should consult with their school academic adviser on their academic progress before submitting a petition. Only in extremely rare circumstances will a petition be granted for an exception to this University Policy.

Petition Criteria for Consideration of an Undergraduate Registration Requirements Waiver

- Students must be within two quarters of graduating.
- Petitions for consideration of an exception to the Undergraduate Registration Requirement may only address the number of credits; exceptions would only be considered for the purposes of reducing the number of quarters a student must complete in cases of University error.

Procedure to Submit a Petition for an Undergraduate Registration Requirement Waiver

Students who wish to submit a petition for an Undergraduate Registration Requirement Waiver must meet the criteria above. See Undergraduate Advising for instructions to submit a petition for an Undergraduate Registration Requirement Waiver (https://www.northwestern.edu/undergraduate-advising/for-students/navigating-university-rules-requirements/petitions-for-enrollment-exception/undergraduate-registration-requirement-waiver-instructions.html).

ADDITIONAL BACCALAUREATE OPTIONS

Undergraduate degree requirements are established by the faculties of each school. While the requirements consequently differ significantly by school, all students 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. 35), minors (p. 33), certificates (p. 29), 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. 38). 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. 309) 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. 12). For a description of the program, see the Integrated Science (p. 309) 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 uniquely counted, not also applied to any other academic plan or credential. Such coursework may fulfill other degree requirements such as distribution or required electives. 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

Overview

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.

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.

Application and Program Requirements

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. Program prerequisites include advanced calculus and microeconomics. Additional program corequisites include intermediate probability & statistics and advanced econometrics & statistics.

Certificate Prerequisites

The program prerequisites should be completed prior to applying to the program. One prerequisite course may be taken during the Winter Quarter of the year you apply. All other program prerequisites should be completed no later than the fall of the year you apply.

Course	Title
Calculus Prerequisite	
Option 1: Regular Math	
MATH 230-1	Multivariable Differential Calculus
MATH 230-2	Multivariable Integral Calculus
Option 2: MENU	
MATH 290-2	MENU: Linear Algebra and Multivariable Calculus
MATH 290-3	MENU: Linear Algebra and Multivariable Calculus
Option 3: MENU Accelerated	
MATH 291-2	MENU: Intensive Linear Algebra and Multivariable Calculus
MATH 291-3	MENU: Intensive Linear Algebra and Multivariable Calculus
Option 4: ISP	
MATH 281-1	Accelerated Mathematics for ISP. First Year
MATH 281-2	Accelerated Mathematics for ISP. First Year
Option 5: MMSS	
MATH 285-2	Accelerated Mathematics for MMSS: First Year
MATH 285-3	Accelerated Mathematics for MMSS: First Year
Option 6: McCormick	
MATH 228-1	Multivariable Differential Calculus for Engineering
MATH 228-2	Multivariable Integral Calculus for Engineering
Option 7: McCormick Honors	
ES_APPM 252-1	Honors Calculus for Engineers
ES_APPM 252-2	Honors Calculus for Engineers
Microeconomics Prerequisite	
Complete one of the following courses:	
Option 1	
ECON 310-1	Microeconomics *
Option 2: MMSS	
MMSS 211-1	Social Science Theories & Meth-First Yr

*Please note that ECON 201-0 and ECON 202-0 are prerequisites

Certificate Corequisites

Program corequisites must be completed within a year of entering the program. Please note that program corequisites may be prerequisites for

individual certificate courses. Take this into account when planning your course schedule.

Course	Title
Probability Corequisite	
Option 1	
MATH 314-0	Probability and Statistics for Econometrics *
Option 2	
MATH 310-1	Probability and Stochastic Processes *
Option 3: MENU	
MATH 311-1	MENU: Probability and Stochastic Processes *
Option 4	
STAT 320-1	Statistical Theory & Methods 1 *
Option 5: ISP	
STAT 383-0	Probability and Statistics for ISP
Option 6: MMSS	
MATH 385-0	Probability and Statistics for MMSS
Option 7: McCormick	
IEMS 202-0	Probability
Option 8: McCormick	
ELEC_ENG 302-0	Probabilistic Systems
Option 9: McCormick	
BMD_ENG 220-0	Introduction to Biomedical Statistics
Option 10: McCormick	
CHEM_ENG 312-0	Probability and Statistics for Chemical Engineering
*MATH 226-0 is a prerequisite or corequisite for these courses. Review prerequisites when planning your schedule	
Econometrics/Statistics Corequisite	
Option 1	
ECON 381-1	Econometrics
Option 2: MMSS	
MATH 386-1	Econometrics for MMSS
Option 3: McCormick	
IEMS 303-0	Statistics
IEMS 304-0	Statistical Learning for Data Analysis
Option 4	
STAT 320-2	Statistical Theory & Methods 2
or STAT 383-0	Probability and Statistics for ISP
STAT 350-0	Regression Analysis
*Option 4: Data Science Major or Minor with R***	
STAT 301-1	Data Science 1 with R
STAT 301-2	Data Science 2 with R
STAT 301-3	Data Science 3 with R
*Option 5: Data Science Major or Minor with Python***	
STAT 303-1	*Data Science 1 with Python*
STAT 303-2	Data Science 2 with Python
STAT 303-3	Data Science 3 with Python
**Students should not plan to take these courses unless they have been admitted to the major or minor	

See kellogg.northwestern.edu/certificate for a complete explanation of the program prerequisites and corequisites.

Financial Economics Certificate

To earn the Financial Economics Certificate, students admitted to the Kellogg Certificate Program for Undergraduates must complete KELLG_FE 310-0 Principles of Finance and three additional KELLG_FE courses, for a total of 4 financial economics certificate courses. Excluding KELLG_FE 310-0 Principles of Finance, one KELLG_FE course is taught each quarter (Fall, Winter, Spring). Each KELLG_FE course is taught once per year.

The 2021-22 Financial Economics curriculum comprises the following four courses:

Course	Title
KELLG_FE 310-0	Principles of Finance (must be completed in Spring Quarter of the year admitted)
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. 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

To earn the Managerial Analytics Certificate, students admitted to the Kellogg Certificate Program for Undergraduates must complete KELLG_FE 310-0 Principles of Finance and three of the KELLG_MA courses listed below. One KELLG_MA course is taught each quarter (Fall, Winter, and Spring). Only three of the courses listed below will be taught in a given year.

In addition to the four certificate courses, students must also complete the prerequisites and corequisites.

Course	Title
KELLG_FE 310-0	Principles of Finance (must be completed in Spring Quarter of the year admitted)
KELLG_MA 322-0	Pricing
KELLG_MA 324-0	Operations and Supply Chain Management
KELLG_MA 326-0	Topics in Managerial Analytics
KELLG_MA 328-0	Competitive Strategy and Industrial Structure

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:

- Human Computer Interaction (p. 174)
- Segal Design (p. 188)

Information on these options, including course requirements and application instructions, can be found in Academic Options (p. 133) 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 (p. 193) 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. 190) section of this catalog.

Programs & Centers Certificates

- Leadership (p. 31)
- Sustainability and Energy (p. 31)

Leadership

lead.northwestern.edu

Northwestern's Center for Leadership offers the Undergraduate Leadership Program (ULP), a certificate program open to all Northwestern undergraduates. The inter-school 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 Steps and Requirements

To earn the Undergraduate Leadership Certificate, students are required to complete the following three courses in the following order.

1: *Paradigms & Strategies of Leadership* (LDRSHP 204-0)

The Paradigms & Strategies of Leadership course is offered each Fall and Spring.

2: *Leading from Design* (LDRSHP 304-0)

The Leading from Design course is offered each Fall and Winter.

3: *Field Study in Leadership* LDRSHP 396-0)

The Field Study in Leadership course is offered every quarter.

As stated above, LDRSHP 204-0 Paradigms and Strategies of Leadership is a prerequisite for LDRSHP 304-0 Leading From Design. LDRSHP 204-0 Paradigms and Strategies of Leadership and LDRSHP 304-0 Leading From Design are prerequisites for LDRSHP 396-0 Field Studies in Leadership. The classes must be taken in this order, but students are not required to take them in consecutive quarters.

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 304-0 Leading From Design (1 Unit) Through readings, small group discussion, one-on-one coaching, self-assessment and reflecting on leadership and other life experiences, this course builds on the themes, models and concepts introduced in LDRSHP 204-0 (Paradigms and Strategies of Leadership), to help students develop a deeper self-awareness that serves as the foundation for the construction of their own individual leadership model.

LDRSHP 395-0 Special Topics in Leadership (0-1 Unit) Topics suggested by students or faculty members and approved by the department.

LDRSHP 396-0 Field Studies in Leadership (2 Units) The Field Study in Leadership is built around a practical leadership experience the student attains or creates. The student must receive instructor approval beforehand. The minimum requirements for a field study experience to be approved are as follows: 1) The endeavor must be one where the student doing the field study is mobilizing and collaborating with a group of at least 3 people (other than the student themselves) to accomplish a common purpose, goal, or objective. 2) The student must spend at least 160 hours leading the endeavor. Through readings, written assignments, small group discussion, and one-on-one coaching, the course helps students process their experience and better understand the perspective of those they hope to lead.

LDRSHP 399-0 Leadership Independent Study (1 Unit) Independent study on a Leadership subject supervised by a faculty member and concluding with a final report or project.

Sustainability and Energy

isen.northwestern.edu (https://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 is the enterprise-wide sustainability and energy Institute supporting on-campus research at the undergraduate, graduate, and faculty levels across physical and social sciences, engineering, law, policy, business, and communications. It also sponsors a variety of stakeholder engagement programs, both on and off campus, in collaboration with student groups, academic and governmental partners, and private industry.

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

ISEN also offers a **professional Master of Science** in Energy and Sustainability (MSES), offered in collaboration with the McCormick School of Engineering. The Master's program prepares graduate students for public and private sector leadership careers in energy and sustainability. The one-year degree combines a comprehensive, interdisciplinary core curriculum spanning technology, markets, and public policy with a student-selected elective specialization track, allowing content personalization while maintaining an overall cohort experience. MSES also provides critical professional training while limiting time out of the workforce, and facilitates student experience with industry partners and practitioners. Certain MSES curriculum (https://isen.northwestern.edu/mses-curriculum/) may be available to advanced undergraduates, with permission of the instructor. At this time, there is no formal option for a combined BA/BS-MS; graduating students would need to apply directly to the program. See more at isen.northwestern.edu/mses (https://isen.northwestern.edu/mses/).

Finally, 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.

ISEN 399-0 Independent Study (1 Unit) Independent study under direction of faculty member. Consent of department required.

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. 130) and Summer Field Studies Programs (p. 130) in Chicago, Washington, DC, and San Francisco. For more information on these programs, see the School of Education and Social Policy (p. 103) 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. 120) to qualify for Illinois state certification.

SoC Certificates

In the School of Communication

The Department of Theatre administers the Music Theatre Certificate Program (p. 99). Students must be 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, and students must continue in one of those majors to remain eligible.

The School of Communication collaborates with the McCormick School of Engineering to offer the Human Computer Interaction (HCI) Certificate (p. 174).

Minors

Minors are smaller in scope than majors and offer an opportunity to become familiar with 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

The minors below are open to students outside the Bienen School:

- General music (p. 60)
- Music cognition (p. 62)
- Music composition (p. 54)
- Music technology (p. 54)
- Musicology (p. 64)

Information on these options, including course requirements and application instructions, can be found in the Bienen School (p. 49) section of this catalog.

Programs & Centers Minors

Transportation and Logistics

transportation.northwestern.edu

The interschool Transportation and Logistics Program offers a minor (p. 33) 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 (p. 33) 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 (p. 33) 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
CIV_ENV 304-0	Civil and Environmental Engineering Systems Analysis
CIV_ENV 371-0	Introduction to Transportation Planning and Analysis
CIV_ENV 376-0	Transportation System Operations
ECON 310-1	Microeconomics
ECON 355-0	Transportation Economics and Public Policy
IEMS 310-0	Operations Research
or IEMS 313-0	Foundations of Optimization
IEMS 381-0	Supply Chain Modeling and Analysis
IEMS 383-0	Service Engineering and 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
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 330-0	Engineering Project Management
CIV_ENV 368-0	Sustainability: The City

CIV_ENV 387-0	Design of Sustainable Urban Developments
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
ECON 373-0	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 (or other approved GIS course)
HISTORY 322-2	Development of the Modern American City: 1880-Present
IEMS 315-0	Stochastic Models
IEMS 317-0	Discrete Event Systems Simulation
IEMS 365-0	Analytics for Social Good
IEMS 382-0	Operations Engineering and Management
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
or SOCIOL 336-0	The Climate Crisis, Policies, and Society
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
IEMS 482-0	Operations

- 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. 98)
- Film and media studies minor (p. 89)
- Human communication sciences minor (p. 79)
- Performance studies minor (p. 86)
- Sound design minor (p. 90)
- Theatre minor (p. 101)

In addition to the above minors, the School of Communication offers a number of modules that pair coursework with co-curricular experiences, and culminate in a capstone project. See the Options and Support tab in the School of Communication (p. 72) section of this catalog and the School of Communication's Module (https://advising.soc.northwestern.edu/undergraduate-programs/soc-academic-modules/) webpage 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:

- Architectural Engineering and Design (p. 152)
- Biotechnology and Biochemical Engineering (p. 142)
- Computer Science (p. 159)
- Data Science and Engineering (p. 160)
- Entrepreneurship (p. 171)
- Environmental Engineering (p. 153)

Information on these options, including course requirements and application instructions, can be found in Academic Options (p. 133) 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. 244) housed within Weinberg College.

For more information on all these options, see the Judd A. and Marjorie Weinberg College of Arts and Sciences (p. 198) chapter of this catalog.

The following academic units offer Weinberg College minors:

- African American Studies (p. 203)
- African Studies (p. 208)
- Anthropology (p. 210)
- Art History (p. 216)
- Art Theory and Practice (p. 220)
- Asian American Studies (p. 221)
- Asian Languages and Cultures (p. 223) (minors in Asian Humanities or Advanced Asian Languages)
- Business Institutions (p. 236)
- Chemistry (p. 237)
- Classics (p. 245) (minors in Latin, Greek, or Classical Studies)
- Cognitive Science (p. 249)
- Comparative Literary Studies (p. 251) (minor in World Literature)
- Computer Science (p. 254)
- Critical Theory (p. 258)
- Earth and Planetary Sciences (p. 258)
- Economics (p. 262)
- English (p. 267) (minors in English and American Literature or Creative Writing)
- Environmental Policy and Culture (p. 272)
- French and Italian (p. 277) (minors in French or Italian)
- Gender and Sexuality Studies (p. 285)
- Geography (p. 288)
- German (p. 289) (minors in German, German Studies, or Business German)
- Global Health Studies (p. 295)
- History (p. 298)
- Humanities (p. 306)
- International Studies (p. 310)
- Jewish Studies (p. 311) (minors in Jewish Studies or Hebrew Studies)
- Latina and Latino Studies (p. 316)
- Latin American and Caribbean Studies (p. 315)
- Legal Studies (p. 318)
- Linguistics (p. 320)
- Materials Science (p. 322)
- Mathematics (p. 327)
- Middle East and North African Studies (p. 336)
- Native American and Indigenous Studies (p. 340)
- Philosophy (p. 347)
- Physics and Astronomy (p. 351) (minor in Physics)
- Political Science (p. 357)
- Psychology (p. 365)
- Religious Studies (p. 370) (minors in Religious Studies or Catholic Studies)
- Science in Human Culture (p. 373)
- Slavic Languages and Literatures (p. 376) (minor in Russian and East European Studies)
- Sociology (p. 380)
- Spanish and Portuguese (p. 384) (minors in Spanish or Portuguese Language and Lusophone Cultures)
- Statistics (p. 395) (minors in Statistics or Data Science)

Second Majors

In addition to their primary (degree) majors, students may pursue additional or "second" majors. The Weinberg College of Arts and Sciences and the Bienen School of Music offer their majors as primary or second majors, open to any student; other schools' majors are only available as primary majors, meaning they can only be earned by students in their home school. 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, most often conferred by different schools, can be found in the Dual Bachelor's Degrees (p. 38) 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. 49) 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. 244) housed within Weinberg College.

For more information on all these options, see the Judd A. and Marjorie Weinberg College of Arts and Sciences (p. 198) chapter of this catalog.

The following academic units offer majors in Weinberg College:

- African American Studies (p. 203)
- African Studies (p. 208) (adjunct major)
- American Studies (p. 210) (special admission requirements)
- Anthropology (p. 210)
- Art History (p. 216)

- Art Theory and Practice (p. 219)
- Asian American Studies (p. 221)
- Asian Languages and Cultures (p. 223)
- Biological Sciences (p. 230)
- Chemistry (p. 237)
- Classics (p. 245)
- Cognitive Science (p. 249)
- Comparative Literary Studies (p. 251)
- Computer Science (p. 254)
- Earth and Planetary Science (p. 258)
- Economics (p. 262)
- English (p. 267) (major in English and American Literature; special admission requirements for major in Creative Writing)
- Environmental Sciences (p. 274)
- French and Italian (p. 277) (majors in French or Italian Literature and Culture)
- Gender and Sexuality Studies (p. 285)
- Geography (p. 288) (adjunct major)
- German (p. 289)
- Global Health Studies (p. 295) (adjunct major)
- History (p. 298)
- Integrated Science (p. 309) (special admission requirements)
- International Studies (p. 310) (adjunct major)
- Jewish Studies (p. 311)
- Latina and Latino Studies (p. 316)
- Legal Studies (p. 318) (special admission requirements)
- Linguistics (p. 320)
- Materials Science (p. 322)
- Mathematical Methods in the Social Sciences (p. 325) (adjunct major; special admission requirements)
- Mathematics (p. 327)
- Middle East and North African Studies (p. 336)
- Neurobiology (p. 341) (major in Neuroscience)
- Philosophy (p. 347)
- Physics and Astronomy (p. 351)
- Political Science (p. 357)
- Psychology (p. 365)
- Religious Studies (p. 370)
- Science in Human Culture (p. 373) (adjunct major)
- Slavic Languages and Literatures (p. 376) (Russian Language, Literature, and Culture or Russian and East European Studies)
- Sociology (p. 380)
- Spanish and Portuguese (p. 384) (major in Spanish)
- Statistics and Data Science (p. 395) (major in Statistics and major in Data Science)

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 various disciplines. Interested students should consult The Graduate School's website (https://www.tgs.northwestern.edu/admission/academic-programs/) for more information, including application and degree requirements.

The Graduate School catalog (https://catalogs.northwestern.edu/tgs/programs-az/#degreesofferedtext) has additional information on the following combined degrees:

- Accelerated Public Health Program (Bachelor's/MPH)
- Biomedical Engineering BS/MS
- Chemical and Biological Engineering BS/MS
- Chemistry BA/MS
- Civil and Environmental Engineering BS/MS
- Comparative Literary Studies BA/MA
- Computer Engineering BS/MS
- Computer Science Bachelor's/MS
- Economics BA/MA
- Electrical Engineering BS/MS
- Engineering Design Innovation BS/MS
- Engineering Sciences and Applied Mathematics BS/MS
- French BA/MA
- Linguistics BA/MA
- Materials Science and Engineering BS/MS
- Mechanical Engineering BS/MS
- Plant Biology and Conservation Bachelor's/MS
- Theoretical and Applied Mechanics BS/MS

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

The Honors Program in Medical Education (HPME) is designed for exceptionally well-prepared high school students who seek careers in medicine or medical science. Undergraduate students entering Northwestern are admitted simultaneously to the Feinberg School of Medicine. HPME is no longer accepting new students. Details regarding requirements can be found in the 2020-2021 or earlier Undergraduate Catalogs (https://catalogs.northwestern.edu/archives/).

Premedical Scholars Program

feinberg.northwestern.edu/admissions/how-to-apply/programs/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 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 ten to twelve students are offered early acceptance to Feinberg via this program. The accepted student agrees to enter FSM in July/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 and MD/PhD applicants only 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. 12).

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 (p. 38)
- BA/BMus in Liberal Arts and Music (p. 38)
- BA/BS or BS/BS in Communication and Engineering (p. 39)
- BA/BMus, BS/BMus, BA/BAMus, or BS/BAMus in Communication and Music (p. 39)
- BSED/BMus or BSED/BAMus in Education and Social Policy and in Music (p. 40)
- BS/BMus or BS/BAMus in Engineering and Music (p. 40)
- BSJ/BMus in Journalism and Music (p. 40)

Typically, five years of faculty-approved full-time study are required to complete any of these programs and meet the Undergraduate Registration Requirement (p. 27).

Students in dual degree programs involving two schools must earn at least 42 credits in 11 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. 12) in Admissions. Students receiving financial aid should also note the restrictions under Financial Aid (p. 15).

BA/BS in Liberal Arts and Engineering

Qualified Northwestern undergraduates with strong interests in the liberal arts as well as engineering may elect to earn both a bachelor of arts degree from Weinberg College and a bachelor of science degree in an engineering field from the McCormick School (BA/BS), typically with five years of enrollment. Students may pursue most major combinations from the two schools, with some exceptions (for example students cannot combine the McCormick degree in computer science with the Weinberg College major in computer science, or the McCormick degree in materials science with the Weinberg College major in materials science). Students must complete all requirements of both schools including a major in each, are subject to all regulations of both schools, and must meet or exceed the required units of credit and quarters of enrollment described for the dual bachelor's degree by the Undergraduate Registration Requirement (p. 27). The following policies also apply.

- Units of credit may be double-counted toward both degrees, except as specified below with respect to major requirements. Students are not required to complete 93 units of credit for the dual degree (45 for the BA plus 48 for the BS) but they must satisfy all requirements in both schools. To verify completion students are required to follow the graduation petition procedures of both schools.
- A single course may be used to fulfill a specific BA degree requirement and a specific BS degree requirement if the course is so designated by the rules of both schools, but Weinberg College has restrictions limiting double-counting of courses towards more than one major or toward both a major and a minor. Courses used to satisfy engineering major program requirements are subject to these double-counting rules with regard to the student's Weinberg College major (units vary). Students should consult a major adviser about allowable course substitutions when needed.
- Students who start in McCormick and add the BA in sophomore year or later are considered to have satisfied the Weinberg College First-Year Seminar requirement and the Weinberg College Writing Proficiency requirement if they have successfully completed DSGN 106-1, DSGN 106-2, ENGLISH 106-1, and ENGLISH 106-2.
- Occasionally students may be exempted (by decision of the Weinberg College associate dean for undergraduate academic affairs) from the rule requiring a minimum of 34 units of credit in a Weinberg College discipline (for more information see the Weinberg College section of this catalog describing Requirements (p. 198)).
- Certain general engineering courses may be applied towards Weinberg College distribution requirements (see list below).

General Engineering courses which may be used by BA/BS students in substitution for Weinberg College distribution requirements:

Course	Title
May be used in place of 1 unit in Area I (Natural Sciences)	
GEN_ENG 205-2	Engineering Analysis II
Each may be used in place of 1 unit in Area II (Formal Studies)	
GEN_ENG 205-1	Engineering Analysis I
GEN_ENG 205-4	Engineering Analysis IV

Interested students most often begin their studies in the McCormick School. To do the necessary planning, they should consult with the Weinberg College Office of Undergraduate Studies and Advising and the McCormick School Undergraduate Engineering Office (https://www.mccormick.northwestern.edu/academics/undergraduate/programs/honors-and-combined-degrees/) as soon as possible after enrolling at Northwestern, and submit an application before the end of sophomore year. Students should meet regularly with advisers in both schools to discuss their progress toward completion of both sets of requirements.

BA/BMus in Liberal Arts and Music

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). Normally this takes five years of enrollment, but at a minimum students must complete the units of credit and quarters of enrollment described for the dual bachelor's degree in the Undergraduate Registration Requirement (p. 27). The following requirements also apply.

- Units of credit may be double-counted towards both degrees, subject to some limitations. Students must earn at least 30 units in Weinberg

College disciplines (what constitutes an applicable unit can be found in this Catalog under Weinberg College Requirements (p. 198)), and may double-count up to 15 Bienen School units to satisfy the required 45 units for the BA degree. Of the double-counted 15 units, up to 9 may be in applied music (see the Bienen School policies for applied music list (p. 50)). Students also must earn at least 30 Bienen School units, for a total of at least 60 units of credit for the dual degree. Courses taken in other schools of the University do not count toward these totals.

- Students satisfy the Bienen School's distribution requirements automatically by completing the requirements for the Weinberg College Bachelor of Arts degree.
- Students must complete all requirements in a major for the BMus.
- Students must complete all requirements in a major for the BA.
- Certain music courses may be applied towards Weinberg College distribution requirements (see list below).

Music courses which may be used by BA/BMus students in substitution for Weinberg College distribution courses:

Course	Title
Music theory sequences which each may be used in place of 1 unit in distribution Area II (Formal Studies) [1]	
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 courses which may be applied towards distribution Area VI (Literature and Fine Arts) [2]	
MUSIC 214-0	The Classical Canon
MUSIC 215-0	Performers and Performance
MUSIC 216-0	Music in the Present

[1] Completion of both sequences satisfies the Area II (Formal Studies) distribution requirement.

[2] Completion of two of these courses satisfies the Area VI (Literature and Fine Arts) distribution requirement.

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 assistant dean for student affairs in the Bienen School and the Weinberg College advising office; the application to add a dual degree program should be submitted before the end of the sophomore year.

BA/BS or BS/BS in Communication and Engineering

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 degrees in engineering.

Dual degree students must complete all requirements for both degrees and are subject to all regulations of both schools and the Undergraduate Registration Requirement (p. 27). 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 (https://www.mccormick.northwestern.edu/academics/undergraduate/programs/honors-and-combined-degrees/) and a School of Communication adviser in the desired major. Information for School of Communication advisers is available at advising.soc.northwestern.edu/about/advisors-by-program/ (https://advising.soc.northwestern.edu/about/advisors-by-program/).

BA/BMus, BS/BMus, BA/BAMus, or BS/BAMus in Communication and Music

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 in five years. 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 (see the double counting allowances in the chart below) and the Undergraduate Registration Requirement (p. 27). 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. Information about advising in the School of Communication is available at https://advising.soc.northwestern.edu/.

BA/BMus or BS/BMus Course Requirements

Course	Title
BMus degree (Bienen): complete all core and major requirements	
BMus degree (Bienen): all distribution requirements are fulfilled by communication degree requirements	
BA or BS degree (SoC): complete all major requirements	
BA or BS degree (SoC): complete all distribution and language requirements according to SoC policy	

BA/BAMus or BS/BAMus Course Requirements

Course	Title
BAMus degree (Bienen): complete all core and major requirements	
BAMus degree (Bienen): complete all distribution and language requirements according to Bienen School policy, with the following double counting allowances:	
SoC math/science/technology distribution courses may count toward Area I Natural Sciences and Area II Formal Studies distribution requirements	
SoC individual social/behavior distribution courses may count toward Area III Social/Behavioral Sciences distribution requirements	

	SoC major courses may count for English composition/writing requirement
BA or BS degree (SoC): complete all major requirements	
BA or BS degree (SoC): complete all distribution and language requirements according to SoC policy	

BSED/BMus or BSED/BAMus in Education and Social Policy and in Music

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.

Dual degree students must complete all requirements for both degrees (see the double counting allowances in the chart below) and the Undergraduate Registration Requirement (p. 27). Each school enforces all of its policies regarding requirements.

Current students interested in pursuing the dual degree in music and education and social policy should contact the assistant dean for student affairs in the Bienen School of Music and the assistant dean for student affairs in SESP.

BSED/BMus Course Requirements

Course	Title
BMus degree (Bienen): complete all core and major requirements	
BSED degree (SESP): complete all core and major requirements	
Dual degree distribution requirements:	
	Natural Sciences (2)
	Formal Studies (2; MUSIC 111-1,2,3 and MUSIC 211-1,2,3 fulfill this requirement)
	Social/Behavioral Sciences (2; SESP courses fulfill this requirement)
	Historical Studies (2)
	Ethics and Values (2)
	Literature/Fine Arts (2; MUSIC 214-0, MUSIC 215-0, and MUSIC 216-0 fulfill this requirement)

BSED/BAMus Course Requirements

Course	Title
BAMus degree (Bienen): complete all core and major requirements	
BSED degree (SESP): complete all core and major requirements	
Dual degree distribution requirements:	
	Natural Sciences (2)
	Formal Studies (2)
	Social/Behavioral Sciences (2; SESP courses fulfill this requirement)
	Historical Studies (2)
	Ethics and Values (2)
	Literature/Fine Arts (2)
	Foreign Language (Two years or proficiency)

BS/BMus or BS/BAMus in Engineering and Music

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).

Dual degree students must complete all requirements for both degrees (see the double counting allowances in the chart below) and the Undergraduate Registration Requirement (p. 27). Each school enforces all of its policies regarding requirements.

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 (https://www.mccormick.northwestern.edu/academics/undergraduate/programs/honors-and-combined-degrees/) in the McCormick School and the assistant dean for student affairs in the Bienen School.

BS/BMus Course Requirements

Course	Title
BMus degree (Bienen): complete all core and major requirements	
BS degree (MEAS): complete all core and major requirements	
BS degree (MEAS): complete the theme by fulfilling the appropriate requirements [1]	
Dual degree distribution requirements:	
	Two courses chosen from McCormick's Social/Behavioral Sciences approved course list

BS/BAMus Course Requirements

Course	Title
BAMus degree (Bienen): complete all core and major requirements	
BS degree (MEAS): complete all core and major requirements	
BS degree (MEAS): complete the theme by fulfilling the appropriate requirements [1]	
Dual degree distribution courses:	
	Area I Natural Sciences (2; engineering courses fulfill this requirement)
	Area II Formal Studies (2; engineering courses fulfill this requirement)
	Area III Social/Behavioral Sciences (2, chosen from McCormick's Social/Behavioral Sciences approved course list)
	Area IV Historical Studies (2)
	Area V Ethics and Values (2)
	Area VI Literature/Fine Arts (2)
	English composition/writing (engineering courses fulfill this requirement)
	Foreign language (Two years or proficiency)

[1] See the main McCormick catalog page (p. 131) for complete details on completing the theme.

BSJ/BMus in Journalism and Music

This dual bachelor's degree program allows students to earn both a bachelor of science in journalism from Medill and a bachelor of music from the Bienen School (BSJ/BMus). 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.

Dual degree students must complete all requirements for both degrees (see the double counting allowances in the chart below) and the Undergraduate Registration Requirement (p. 27). Each school enforces all of its policies regarding requirements. A minimum of 25 non-music units are required for the journalism degree; a minimum of 30 units are required for the music degree.

Current students interested in pursuing the dual degree in journalism and music should contact the assistant dean for student affairs in the Bienen School and the assistant dean of student affairs in Medill.

BSJ/BMus Course Requirements

Course	Title
BM degree (Bienen): complete all core and major requirements	
BM degree (Bienen): all distribution requirements are fulfilled by journalism degree requirements	
BSJ degree (Medill): complete all degree requirements with the following double counting allowances:	
MUSIC 111-1, MUSIC 111-2, and MUSIC 111-3: 1 unit Formal Studies	
MUSIC 211-1, MUSIC 211-2, and MUSIC 211-3: 1 unit Formal Studies	
MUSIC 214-0: 1 unit Literature and Fine Arts	
MUSIC 215-0: 1 unit Literature and Fine Arts	
MUSIC 216-0: 1 unit Literature and Fine Arts	
Music major courses fulfill "WCAS Elective Concentration"	
Music major courses fulfill all but three "Electives"	

STUDY OUTSIDE NORTHWESTERN

Study Abroad

northwestern.edu/abroad

Study abroad is an integral part of many students' Northwestern experience. With early planning, students from all schools and majors are able to study abroad during their time at Northwestern.

The Global Learning Office (GLO), housed within the Northwestern Buffett Institute for Global Affairs, offers credit-bearing study abroad, exchange, research, and academic internship opportunities for Northwestern University undergraduate students. Northwestern administers or affiliates with more than 150 programs in 50 countries, offering a wide variety of program structures, lengths, terms and academic focuses to meet students' diverse needs and goals. These credit-bearing global learning opportunities form a crucial part of the Northwestern experience and help prepare students for success in an increasingly interconnected world.

Study abroad is available during the academic year as well as summer and need not delay graduation. To apply, students 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.

Northwestern is committed to making study abroad financially accessible to all students. 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 study abroad administrative fee. Northwestern financial aid applies to students participating in Northwestern-sponsored and affiliated programs, and students may also apply for Northwestern grant assistance to help offset the cost of their programs. Additional sources of funding include GLO scholarships (https://www.northwestern.edu/abroad/money-matters/scholarships-funding/glo-scholarships-funding.html), opportunities through the Office of Fellowships (https://www.northwestern.edu/fellowships/), and external scholarships (https://www.northwestern.edu/abroad/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.

Study abroad programs vary, and may include language or other academic prerequisites; interested students should consult with study abroad advisers early in their Northwestern careers. Other resources include information sessions, an annual study abroad fair, GLO Student Ambassadors, and detailed information about study abroad programs and policies on the GLO 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. 244) 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 500 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 $9,500 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 their senior year. OUR recently launched the Emerging Scholars Program, a 15-month funded program specifically for students who identify as first generation, lower income, people of color, and/or marginalized. This grant focuses on providing opportunities for students to get started in research and/or creative activities in the arts, humanities, journalism, and social sciences, and this program is focused on supporting research and creative art that speaks to issues of social justice, diversity, equity, and inclusion. 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.

The Office of Undergraduate Research also collaborates with a variety of student organizations committed to supporting research, including the Northwestern Undergraduate Research Journal (NURJ) (https://thenurj.com/), the Chicago Area Undergraduate Research Symposium (CAURS) (https://www.caurs.com/), and TEDx Northwestern (https://www.tedxnorthwesternu.com/).

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 the Arch Scholars (https://www.weinberg.northwestern.edu/undergraduate/first-year-transfer/first-year/arch-scholars/) programs—Bridge I, Bio&ChemEXCEL, NU Bioscientist and the Posner Research Program — plus the Summer Academic Workshop in Weinberg College, the SESP Leadership Institute (https://admissions.northwestern.edu/academics/pre-enrollment/sesp-leadership-institute.html) 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

Northwestern University 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. In short, we're energized by hard questions worth answering; we believe in the process as much as the product.

Military Programs

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

Naval Science

Naval Science (p. 44)

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
luc.edu/militaryscience (https://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 2022–2023

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

Fall Quarter 2022

Date	Event
September	
20	Fall classes begin
November	
23	Thanksgiving break begins, 6:00 p.m.
28	Fall classes resume
December	
3	Fall classes end
5	Fall final exams begin
10	Fall final exams end
16	Degrees conferred for fall quarter graduates

Winter Quarter 2023

Date	Event
January	
3	Winter classes begin 8:00 a.m. (Northwestern Monday: Classes scheduled to meet on Mondays meet on this day.)
16	Martin Luther King Jr. Day (no classes)
March	
11	Winter classes end
13	Winter final exams begin
18	Winter final exams end
18	Spring Break begins
24	Degrees conferred for winter quarter graduates

Spring Quarter 2023

Date	Event
March	
28	Spring classes begin
May	
30	Memorial Day (no classes)
June	
3	Spring classes end
5	Spring final exams begin
10	Spring final exams end
12	Commencement
16	Degrees conferred for spring quarter graduates

Summer Session 2023

Date	Event
June	
19	Juneteenth (no classes)
20	Summer classes begin
July	
4	Independence Day (no classes)
September	
1	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 non-exhaustive list of types of behavior that violate the standards of academic integrity:

- *Cheating:* using unauthorized notes, study aids, or online sources and tools 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 or repurposing the same work for multiple assignments in a class without prior permission from the course instructors
- *Plagiarism:* submitting material that, in part or whole, verbatim or paraphrased, is not entirely one's own work without attributing those same portions to their correct source according to the expectations of the particular discipline (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; use of prohibited online tools, repositories of examination materials, or online examination assistance services
- *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

It is the responsibility of every member of the academic community to be familiar with the specific policies of his or her school. A student who violates these policies may be subject to sanctions, including but not limited to one or more of the following: a letter of reprimand; a period of suspension with or without the attachment of conditions; reduced or failing grade in a course; notation on the official record; expulsion 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 www.northwestern.edu/provost/policies-procedures/academic-integrity/index.html (https://www.northwestern.edu/provost/policies-procedures/academic-integrity/).

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 ConnectNU (https://www.northwestern.edu/undergraduate-advising/for-students/connectnu/). 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://advising.soc.northwestern.edu/).

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 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 advanced 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.

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 foundational 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 a minimum of 48 units. 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	The Classical Canon and Performers and Performance and Music in the Present
Three quarters ensemble (1.5 units)	
One 300-level elective in MUSICOL, MUS_COMP, MUS_TECH, MUS_THRY, or MUSIC_ED	
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)	
Other 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 course recommendations.

For all undergraduate degrees, students must also complete the Undergraduate Registration Requirement (p. 27) 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.

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.

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.

Applied Music Courses

Students in degree programs outside of music may have a limit on the number of applied music courses that are allowed to count toward those degrees. The list below specifies courses offered by the Bienen School that are considered to be applied music.

Applied Music Courses

Course	Title
CONDUCT 364-0	Choral Organizations
CONDUCT 374-0	Band Organizations
CONDUCT 378-0	Contemporary Music Ensemble
CONDUCT 391-0	Chamber Music
CONDUCT 393-0	Orchestral Organizations
CONDUCT 395-0	Baroque Music Ensemble
GEN_MUS 115-0	Non-Major Piano and Organ
GEN_MUS 116-0	Non-Major Piano
GEN_MUS 120-0	Non-Major Strings
GEN_MUS 121-0	Non-Major Guitar Class-Beginning
GEN_MUS 125-0	Non-Major Winds/Percussion
GEN_MUS 130-0	Non-Major Jazz
GEN_MUS 133-0	Non-Major Class Voice-Beginning
GEN_MUS 160-0	Non-Major Private Voice-Beginning
GEN_MUS 260-0	Non-Major Private Voice-Intermediate
GEN_MUS 315-0	Non-Major Piano and Organ
GEN_MUS 316-0	Non-Major Piano - Graduate
GEN_MUS 360-0	Non-Major Private Voice-Advanced
GEN_MUS 364-0	Choral Organizations
GEN_MUS 374-0	Band Organizations
GEN_MUS 378-0	Contemporary Music Ensemble
GEN_MUS 393-0	Orchestral Organizations
GEN_MUS 395-0	Baroque Music Ensemble
JAZZ_ST 162-0	Applied Jazz for Music Majors
JAZZ_ST 262-0	Applied Jazz for Music Majors
JAZZ_ST 362-0	Applied Jazz for Music Majors
JAZZ_ST 377-0	Jazz Orchestra for Music Majors

JAZZ_ST 391-0	Small Ensemble
MUSIC_ED 230-0	Woodwind Class
MUSIC_ED 231-0	Guitar 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 I
MUSIC_ED 239-0	Percussion Class
MUSIC_ED 240-0	Classroom Instruments
MUS_COMP 112-0	Applied Composition for Music Majors
MUS_COMP 212-0	Applied Composition for Music Majors
MUS_COMP 312-0	Applied Composition for Music Majors
PIANO 161-0	Applied Piano for Music Majors
PIANO 255-0	Piano Sight Reading
PIANO 261-0	Applied Piano for Music Majors
PIANO 328-1	Collaborative Piano-Beginning I
PIANO 328-2	Collaborative Piano-Beginning II
PIANO 328-3	Collaborative Piano-Beginning III
PIANO 329-0	Duo Sonata Class
PIANO 358-0	Applied Keyboard for Music Majors
PIANO 361-0	Applied Piano for Music Majors
PIANO 392-0	Studio Ensemble for Music Majors
STRINGS 141-0	Applied Violin for Music Majors
STRINGS 142-0	Applied Viola for Music Majors
STRINGS 143-0	Applied Cello for Music Majors
STRINGS 144-0	Applied Double Bass for Music Majors
STRINGS 151-0	Applied Harp for Music Majors
STRINGS 171-0	Applied Guitar for Music Majors
STRINGS 241-0	Applied Violin for Music Majors
STRINGS 242-0	Applied Viola for Music Majors
STRINGS 243-0	Applied Cello for Music Majors
STRINGS 244-0	Applied Double Bass for Music Majors
STRINGS 251-0	Applied Harp for Music Majors
STRINGS 271-0	Applied Guitar for Music Majors
STRINGS 319-1	Orchestral Repertoire I (Violin,Viola,Cello,Dbl Bass,Harp)
STRINGS 319-2	Orchestral Repertoire II (Violin,Viola,Cello,Dbl Bass,Harp)
STRINGS 319-3	Orchestral Repertoire III (Violin,Viola,Cello,Dbl Bass,Harp)
STRINGS 341-0	Applied Violin for Music Majors
STRINGS 342-0	Applied Viola for Music Majors
STRINGS 343-0	Applied Cello for Music Majors
STRINGS 344-0	Applied Double Bass for Music Majors
STRINGS 351-0	Applied Harp for Music Majors
STRINGS 371-0	Applied Guitar for Music Majors
STRINGS 374-0	Guitar Ensemble for Music Majors
STRINGS 392-0	Studio Ensemble for Music Majors
VOICE 110-0	Applied Voice for Music Majors
VOICE 210-0	Applied Voice for Music Majors
VOICE 310-0	Applied Voice for Music Majors
VOICE 351-1	Undergraduate Opera Workshop I
VOICE 351-2	Undergraduate Opera Workshop II
VOICE 351-3	Undergraduate Opera Workshop III
VOICE 355-0	Vocal Coaching
VOICE 363-0	Opera Performance
VOICE 393-0	Repertoire Studies
WIND_PER 111-0	Applied Flute for Music Majors
WIND_PER 112-0	Applied Oboe for Music Majors
WIND_PER 113-0	Applied Clarinet for Music Majors
WIND_PER 114-0	Applied Saxophone for Music Majors
WIND_PER 115-0	Applied Bassoon for Music Majors
WIND_PER 121-0	Applied Trumpet for Music Majors
WIND_PER 122-0	Applied French Horn for Music Majors
WIND_PER 123-0	Applied Euphonium for Music Majors
WIND_PER 124-0	Applied Trombone for Music Majors
WIND_PER 125-0	Applied Tuba for Music Majors
WIND_PER 131-0	Applied Percussion for Music Majors
WIND_PER 211-0	Applied Flute for Music Majors
WIND_PER 212-0	Applied Oboe for Music Majors
WIND_PER 213-0	Applied Clarinet for Music Majors
WIND_PER 214-0	Applied Saxophone for Music Majors
WIND_PER 215-0	Applied Bassoon for Music Majors
WIND_PER 221-0	Applied Trumpet for Music Majors
WIND_PER 222-0	Applied French Horn for Music Majors
WIND_PER 223-0	Applied Euphonium for Music Majors
WIND_PER 224-0	Applied Trombone for Music Majors
WIND_PER 225-0	Applied Tuba for Music Majors
WIND_PER 231-0	Applied Percussion for Music Majors
WIND_PER 311-0	Applied Flute for Music Majors
WIND_PER 312-0	Applied Oboe for Music Majors
WIND_PER 313-0	Applied Clarinet for Music Majors
WIND_PER 314-0	Applied Saxophone for Music Majors
WIND_PER 315-0	Applied Bassoon for Music Majors
WIND_PER 321-0	Applied Trumpet for Music Majors
WIND_PER 322-0	Applied French Horn for Music Majors
WIND_PER 323-0	Applied Euphonium for Music Majors
WIND_PER 324-0	Applied Trombone for Music Majors
WIND_PER 325-0	Applied Tuba for Music Majors
WIND_PER 331-0	Applied Percussion for Music Majors
WIND_PER 360-0	Bass Clarinet
WIND_PER 361-0	English Horn
WIND_PER 362-0	Baroque Flute
WIND_PER 392-0	Studio Ensemble for Music Majors
WIND_PER 393-0	Repertoire Studies

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.

Students in other undergraduate schools may pursue music as a second major.

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 beyond the core, 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 beyond the core 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, 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. 38).

Minor Programs

Music minors are offered in arts administration (p. 52), general music (p. 60), music cognition (p. 62), music composition (p. 54), music criticism (p.), music education (p. 59), musicology (p. 64), music technology (p. 54), and music theory (p. 63).
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; P/N grades in courses used for minor requirements must be approved by the assistant dean. 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 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 Music Criticism (6 units, music majors only)

- MUSICOL 399-0 Independent Study or MUSIC 398-0 Internship
- JOUR 201-1 Fundamentals of Reporting & Writing News
- JOUR 201-2 Fundamentals of Video Journalism
- JOUR 202-0 Journalism Values, Practice & Trends or JOUR 370-0 Media Law & Ethics
- JOUR 310-0 Media Presentation: Newspaper/Online or JOUR 311-0 Editing & Producing: Magazine or JOUR 312-0 Editing & Producing: Video
- One additional journalism elective

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. 53)
- Composition Minor (p. 54)
- Music Technology Minor (p. 54)

Music Composition Courses

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

MUS_COMP 211-0 Class Composition (1 Unit) Class instruction in techniques of composition. Open to music and non-music majors.

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

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

MUS_COMP 314-1 Instrumentation (1 Unit)
Instruments of the orchestra; scoring techniques; analysis of instrumental combinations.
Prerequisite: MUSIC 211-3 or consent of instructor.

MUS_COMP 314-2 Orchestration (1 Unit)
Stylistic scoring projects; analysis of orchestral and chamber scores.
Prerequisite: MUS_COMP 314-1 or consent of instructor.

MUS_COMP 314-3 Advanced Orchestration (1 Unit)
Contemporary scoring techniques; creative projects; analysis of orchestral and chamber scores.
Prerequisite: MUS_COMP 314-2, graduate standing, or consent of instructor.

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., Ferneyhough; 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 48 units, and include core music requirements (15 units), major requirements (19 units), and distribution and elective requirements (14 units).

Music Core Requirements (15 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	The Classical Canon and Performers and Performance and Music in the Present
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 (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)	
Electives (8 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 211-0	Class Composition (six quarters)
MUS_COMP 314-1 or MUS_COMP 314-2	Instrumentation 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 include MUS_TECH 259-0 Introduction to Music Technology. The five remaining classes are to be chosen from any 300-level courses in MUS_TECH. Music technology minors may be declared after the completion of MUS_TECH 259-0 Introduction to Music Technology or with equivalent experience as determined by an interview with the program faculty. Music technology minors should be declared through the Bienen School's Office of Student Affairs by the end of the sophomore year.

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. Prerequisite: CONDUCT 326-0 or equivalent. May be repeated for credit.

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. Prerequisite: CONDUCT 326-0 or equivalent. May be repeated for credit.

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. Prerequisite: CONDUCT 326-0 or equivalent. May be repeated for credit.

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. 55)

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 48 units, and include core music requirements (10 units), major requirements (29.5 units), and distribution and elective requirements (8.5 units).

Music Core Requirements (10 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	The Classical Canon and Performers and Performance and Music in the Present
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 (8.5 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)	
Electives (2.5 units, music or non-music)	
Business/Finance Overlay course (double counts with JAZZ_ST 337-0)	

Music Cognition

See Music Theory and Cognition (p. 61).

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 214-0 The Classical Canon (1 Unit) This course explores the idea of "classical music," a canon of works united not by scoring, age, nationality, or style, but rather by the perception of timeless value. What musical and social factors influenced inclusion or exclusion? This course seeks to both introduce a variety of extremely famous "classical" works and to interrogate the processes that made them famous.

MUSIC 215-0 Performers and Performance (1 Unit) This course focuses on what it means or meant to be a musician in different places and times. Students will gain introductory literacy in diverse modes of musical performance and learn to conceive of music history through the lens of performance rather than through composers and works, including reflection on how to locate themselves within a complex global music scene.

MUSIC 216-0 Music in the Present (1 Unit) This course explores contemporary musical practices through their circulation, reception, and mediation. Examples are drawn from Western art, popular, and global musical genres though we will explore how all these musics share-at least in part-a similar mode of distribution in the early twenty-

first century. Emphasis is placed on technology, listening practices, aesthetics, and contemporary musical institutions.

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 Unit)

MUSIC 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.

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: instrumental, choral, or general education. All music education majors are required to complete 100 hours of clinical observation. The combination of coursework and hands-on practical experience 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.

Programs of Study

- Music Education Major (p. 58)
- Music Education Minor (p. 59)

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 I (0.5 Unit)

MUSIC_ED 238-0 String Class II (0.5 Unit) Bienen School of Music.

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) 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 48.5 to 51.5 units, and include core music requirements (13 units), major requirements (22 units), certification track requirements (9.5-12.5 units), distribution requirements (4 units), and non-registration requirements.

Music Core Requirements (13 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	The Classical Canon and Performers and Performance and Music in the Present
CONDUCT 326-0	Basic Conducting

Music Education (22 units)

Course	Title
Applied lessons (9 quarters)	
MUSIC_ED 260-0	Introduction to Music Education
CONDUCT 340-1	Advanced Conducting Band
or CONDUCT 340-2	Advanced Conducting Choral
or CONDUCT 340-3	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 326-0	World Music Pedagogy
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 244-0	Developmental Psychology
TEACH_ED 322-0	Content Area Reading and Writing
Student Teaching, selected from MUSIC_ED 370-387 (1 quarter, full time)	
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 (9 quarters)
CONDUCT 364-0	Choral Organizations (11 quarters)
One MUSIC_ED 200-level Instrumental Techniques Elective	
MUSIC_ED 237-0	String Class I
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 237-0	String Class I
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 units)

Course	Title
Major Ensemble (10 quarters)	
CONDUCT 391-0	Chamber Music
MUSIC_ED 230-0	Woodwind 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 I (2 quarters, 237 String Class I and 238 String Class II)
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, 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. 62), music composition (p. 54), music technology (p. 54), and musicology (p. 64) 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	
Two music academic courses 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 (0-0.5 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 (0-0.5 Unit) Private lessons for non-majors; audition required.

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

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

GEN_MUS 160-0 Non-Major Private Voice-Beginning (0-0.5 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 (0-0.5 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. Prerequisite: GEN_MUS 170-0 or equivalent. (VI. Literature and fine arts). *Literature Fine Arts Distro Area*

GEN_MUS 270-2 Western Musical Tradition (1 Unit) Major genres and composers from 1825 to the present. Prerequisite: GEN_MUS 170-0 or equivalent. (VI. Literature and fine arts). *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 (0-0.5 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. 52).

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. 61)
- Music Cognition Minor (p. 62)
- Music Theory Major (p. 62)
- Music Theory Minor (p. 63)

Music Theory Courses

MUS_THRY 251-0 Intro to Music Cognition (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 313-0 Analytical Approaches to World Musics (1 Unit)
Bienen School of Music.

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 Historical Improvisation (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 Classical Form (1 Unit)
An examination of phrase-construction and punctuation in the musical forms of the late eighteenth and early nineteenth centuries. The focus will typically be on Haydn, Mozart, and Beethoven's skillful use of conventional formal structures to engage creatively with listeners' expectations.

MUS_THRY 322-1 Rhythm and Meter I (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 322-2 Rhythm and Meter II (1 Unit) Among the most remarkable developments in the music theory of recent decades have been the rapid advances in the study of rhythm and meter. This course combines close readings of canonical texts and innovative work in this field with analysis of rhythm and meter in common-practice repertoire.

MUS_THRY 325-0 Style and Phrase (1 Unit) An investigation of the musical phrase in the long 18th century (1680–1830) from the perspective of schema theory. A schema is a typically short, memorable pattern defined by a characteristic pairing of scale degree progressions in the melody and bass, and an accompanying harmonic progression. Such schemata are the essential building blocks of composition in the long 18th century.

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 333-0 Analysis of Popular Music (1 Unit)
Course objectives are (1) developing skill in analyzing popular music and (2) exploring how music scholars have studied traits such as form, harmony, timbre, etc. in a variety of popular repertoires. Students will become familiar with recurring issues in the interpretation of popular music and develop the ability to form their own critical interpretations using music analysis as a tool.

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 340-0 Analysis of Recorded Performance (1 Unit) Bienen School of Music.

MUS_THRY 341-0 Sound to Structure (1 Unit) Music theory privileges the parameters of pitch (as melody, harmony, and counterpoint) and rhythm (as surface rhythm and meter), but music as experienced is much more than the sum of these. This class engages how musical experience arises from and is shaped by other parameters, notably timbre, register, texture, and dynamics, across musical styles and periods.

MUS_THRY 345-0 Experimental and Empirical Methods in Music Theory (1 Unit) Bienen School of Music.

MUS_THRY 348-0 Corpus Studies (1 Unit) Bienen School of Music.

MUS_THRY 355-0 Analysis of Post-Tonal Music (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 48 units, and include core music requirements (18 units), major requirements (15-16 units), and distribution and elective requirements (14-15 units).

Music Core Requirements (18 units)

Course	Title
MUSIC 111-1	Music Theory I
& MUSIC 111-2	and Music Theory II
& MUSIC 111-3	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	The Classical Canon and Performers and Performance and Music in the Present
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	Intro to Music Cognition (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 (14-15 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)	
Electives (8 units if completing Senior Project or 9 units; 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 Intro to Music Cognition (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 (such as psychology, linguistics, and communication sciences and disorders)

Music Theory Major

Bachelor of Music degrees in music theory require a minimum of 48 units, and include core music requirements (18 units), major requirements (15-17 units), and distribution and elective requirements (13-15 units).

Music Core Requirements (18 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	The Classical Canon and Performers and Performance and Music in the Present
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 (13-15 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)	

Electives (7 units if completing Senior Project or 9 units; 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. 64)
- Musicology Minor (p. 64)

MUSICOL 313-0 World Music Cultures (1 Unit)
Introduction to both the world's musical variety and common issues related to music cultures worldwide.

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; Andalucian flamenco; 19thcentury 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-20thcentury 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 Gabrielis.
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 48 units, and include core music requirements (18 units), major requirements (16 units), and distribution and elective requirements (14 units).

Core Music Requirements (18 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	The Classical Canon and Performers and Performance and Music in the Present
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 (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)	
Electives (8 units, 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 313-0	World Music Cultures
MUSICOL 323-0	Topics in Ethnomusicology
MUSICOL 326-0	Topics in World Music: Asia
MUSICOL 327-0	Topics in World Music: Africa
MUSICOL 328-0	Topics in World Music: The Americas
MUSICOL 329-0	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. 65)

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 (0.5 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 (0.5 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 (0.5 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 Sonata 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 Forum (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 48 units, and include core music requirements (15 units), major requirements (18.5 units), and distribution and elective requirements (14.5 units).

Core Music Requirements (15 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	The Classical Canon and Performers and Performance and Music in the Present
CONDUCT 326-0	Basic Conducting
One MUSICOL elective	
One 20th/21st century Music Studies elective	
Three quarters ensemble (1.5 units)	

Piano Major Requirements (18.5 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 Forum (12 quarters)
PIANO 370-0	Junior Recital
PIANO 380-0	Senior Recital

Distribution and Elective Requirements (14.5 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)	
Electives (8.5 units, 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. 67)

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 48 units, and include core music requirements (13.5 units), major requirements (22.5-24 units), and distribution and elective requirements (10.5-12 units).

Music Core Requirements (13.5 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	The Classical Canon and Performers and Performance and Music in the Present
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,Dbl Bass,Harp) and Orchestral Repertoire II (Violin,Viola,Cello,Dbl Bass,Harp) and Orchestral Repertoire III (Violin,Viola,Cello,Dbl Bass,Harp)
STRINGS 370-0	Junior Recital
STRINGS 380-0	Senior Recital

Double Bass Performance (22.5 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,Dbl Bass,Harp) and Orchestral Repertoire II (Violin,Viola,Cello,Dbl Bass,Harp) and Orchestral Repertoire III (Violin,Viola,Cello,Dbl Bass,Harp)
STRINGS 370-0	Junior Recital (0 units)
STRINGS 380-0	Senior Recital (0 units)

Harp Performance (22.5 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,Dbl Bass,Harp) and Orchestral Repertoire II (Violin,Viola,Cello,Dbl Bass,Harp) and Orchestral Repertoire III (Violin,Viola,Cello,Dbl Bass,Harp)
STRINGS 380-0	Senior Recital

Guitar Major Requirements (22.5 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

Distribution and Elective Requirements (10.5-12 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)	
Electives (4.5 - 6 units, music or non-music courses)	
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. 69)

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 363-0 Opera Performance (0-0.5 Unit) Opera Production.

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 48 units, and include core music requirements (13.5 units), major requirements (22.5 units), and distribution and elective requirements (12 units).

Music Core Requirements (13.5 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	The Classical Canon and Performers and Performance and Music in the Present
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 (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)	
Electives (6 units; 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. 70)

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 48 units, and include core music requirements (13.5 units), major requirements (22-23.5 units), and distribution and elective requirements (11-12.5 units).

Music Core Requirements (13.5 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	The Classical Canon and Performers and Performance and Music in the Present
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 (22 units)

Course	Title
100-level applied study (3 quarters)	
200-level applied study (3 quarters)	
300-level applied study (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
WIND_PER 370-0	Junior Recital (Flute, Trumpet, and Horn only)
WIND_PER 380-0	Senior Recital

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 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

Percussion Performance (22 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

Distribution and Elective Requirements (11-12.5 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)	
Electives (5 - 6.5 units, music or non-music courses)	
Business/Finance Overlay course (may double count with any other requirement)	

SCHOOL OF COMMUNICATION

communication.northwestern.edu

Communication is at the root of nearly everything we do, and mastering the art of communication can open doors to a wide range of careers. The School of Communication is committed to elevating and expanding access to the communication arts and sciences. Bridging theory and practice, our immersive curriculum and research opportunities position students for professional success in education, scholarship, media and artistic work, policy analysis, and advocacy. Through these pathways, we are building a collaborative, interdisciplinary community known as much for its achievements as the breadth of voices, perspectives, and traditions that shape them.

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 1,000 undergraduate majors and 700 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 debate, film and video, neuroscience and communication, playwriting, and theatre arts divisions of Northwestern's National High School Institute, also known as the "Cherubs."

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.)

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 Office of Undergraduate Programs and Advising. 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 Hobson/Lucas Soundstage, the studios of WNUR-FM, and the Barbara and Garry Marshall Studio wing, a film soundstage. The facility also houses the Alvina Krause Studio black box theater operated by the Department of Performance Studies.

The Virginia Wadsworth Wirtz Center for the Performing Arts, recently renovated to increase student performance and rehearsal space, houses the Josephine Louis Theater, a 288-seat proscenium theater; the Ethel M. Barber Theater, a 439-seat thrust theater; four black box spaces, including the Hal and Martha Hyer Wallis and the Mussetter-Struble Theaters and the Clara, Lu 'n' Em Theater; and production facilities, including scene and costume shops, wet and dry design rooms, computer labs, rehearsal spaces, and more. In addition, the Department of Theatre sponsors occasional productions in Cahn Auditorium, Northwestern's 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 greater Evanston community through excellence in clinical care, cutting-edge research, and student development. 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 in Abbott Hall are offices for the School of Communication master's program in communication and health and its treatment programs in voice, speech, and swallowing disorders. Additionally, the building houses the administrative headquarters for the Black Arts Consortium. In Spring 2021, the Virginia Wadsworth Wirtz Center for Performing and Media Arts in Chicago was completed. The state-of-the-art facility supports the School's MFA programs by providing dynamic spaces for student work while fostering partnerships with city arts institutions and audiences.

Degree Requirements

The School of Communication grants the degree of bachelor of science in communication (BSCMN) or bachelor of arts in communication (BACMN) upon:

a. the satisfactory completion of 42 course units;
b. the fulfillment of the distribution requirement of the student's major department; and
c. the completion of an approved major in communication 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, students 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 Department of Communication Sciences and Disorders offers only the BSCMN, which does not include a foreign language requirement.

The Departments of Communication Studies and Radio/Television/Film offer both the BSCMN and BACMN, both of which have a foreign language requirement.

The Departments of Performance Studies and Theatre (including dance) offer both the BSCMN and BACMN. The BACMN has a foreign language requirement but the BSCMN does not.

Students in programs with a foreign language requirement 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 the Weinberg College (p. 198) section of this catalog.

General Requirements

Of the 42 units of credit required for all major programs in the School of Communication, 32 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. See the major requirements for each program for additional grade requirements. 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 a minimum of 21 credits at Northwestern, and at least 11 of those credits in the School of Communication. An advising meeting is required before the 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:

- Mathematics, science, and technology
- Individual and social behavior
- Humanities and fine arts

Students should consult an advisor in the relevant major 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: communication studies, dance, human communication sciences, performance studies, radio/television/film, or theatre.

A comprehensive list of policies is available at https://advising.soc.northwestern.edu/policies-procedures-forms/.

Degree Awarded

Students in the School of Communication pursue either a Bachelor of Arts in Communication (BACMN) or a Bachelor of Science in Communication (BSCMN) with a ***major*** in Communication Studies, Dance, Performance Studies, Radio/Television/Film, or Theatre. Students in the Human Communication Sciences major pursue a Bachelor of Science in Communication (BSCMN). With the exception of students enrolled in the Bienen and McCormick dual degree programs, students will earn only ***one degree*** even if they have more than one major. For example, if you have a primary major in Theatre and a second major in Political Science, you will earn either a Bachelor of Arts or a Bachelor of Science in Communication with a major in Theatre and a major in Political Science. At graduation, students attend the Convocation for the School of their ***primary major***, no matter what other programs or majors they might be completing. Students completing dual degrees are invited to participate in both convocation ceremonies; however, honors earned in one program may not be read at the other school's convocation.

Academic Advising

advising.soc.northwestern.edu

Each School of Communication student is assigned an academic advisor who holds a faculty appointment in their department, and is knowledgeable about their particular major. This advisor 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 and transfer students are required to have two advising meetings during the academic year. Juniors are required to meet with their academic advisor when they petition to graduate, and seniors are encouraged to consult with their academic advisor regarding their final degree audit. While these meetings satisfy the minimal academic advising requirements, students often find it valuable to consult with their advisors more frequently. Ultimate responsibility for meeting degree requirements rests with the student.

Academic Standing, Probation, and Dismissal

advising.soc.northwestern.edu/policies_procedures/academic-standing-probation-and-dismissal/ (https://advising.soc.northwestern.edu/policies_procedures/academic-standing-probation-and-dismissal/)

Academic Standing

The decision concerning the academic standing of a student is the responsibility of the faculty of the school in which the student is registered. Academic probation constitutes notice of unsatisfactory academic performance; it is a warning that minimum standards for graduation are not being met.

Unless a student demonstrates significant scholastic improvement during the period of probation and thereby indicates the ability to fulfill degree requirements within a reasonable period of time, the student may be dismissed from the University. A student will be notified in writing no later than the middle of a term that, because of unsatisfactory work in a previous term or terms, he or she will be excluded in the event of unsatisfactory work during the term for which the notice is issued.

Academic Probation

The following students are ordinarily placed on academic probation:

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

- Students who have failed to maintain a C average in the major or a professional field of study

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

Removal from Academic Probation

Students on academic probation are ordinarily removed from probation if the deficiencies that resulted in probation have been remedied during the next succeeding quarter in residence. Students are rarely removed from probation on the basis of a program consisting of less than four courses graded on a basis other than the pass/no credit option. However, in the School of Communication, students enrolled in a course load of 3 credits and receiving a grade of C or higher in all three may be considered for removal from probation. If students on probation who receive grades of X or Y are not dismissed, probation continues until they have completed all courses or until the end of the next quarter in residence, when the students' records are again subject to scrutiny.

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

Academic Dismissal

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

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

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

Internship Credit

advising.soc.northwestern.edu/policies_procedures/internships/ (https://advising.soc.northwestern.edu/policies_procedures/internships/)

Internships allow students to gain valuable organizational experience and apply theoretical knowledge to situations outside of the classroom. A total of 4 units of internship credit is permitted to count toward the undergraduate SoC degree. However, additional restrictions may apply depending on a student's other coursework, such as practica or independent studies, so students should consult with their SoC advisor on how credits may be applied.

Students seeking academic credit through SoC while working at an internship enroll in a weekly seminar (CMN 340) led by an internship coordinator. SoC's Office of External Programs, Internships and Career Services (EPICS) (https://epics.soc.northwestern.edu/) maintains a database for SoC students of internships primarily in Chicago, Los Angeles, and New York City, and opportunities may be available in other cities as well. Students can also find their own internships, and obtain approval to register them for credit through EPICS.

SoC students may also participate in Weinberg's Chicago Field Studies program (https://internships.northwestern.edu/); however, credit earned in the program will also be counted toward the limit of 4 internship credits total for the degree.

Regardless of whether internship credit comes from EPICS (taught by SoC faculty under CMN 340) or Chicago Field Studies (CFS in Weinberg), the limit of 4 internship credits to count toward SoC degree requirements supersedes the CFS policy of 6 allowed.

Within the total 4 units of internship allowable for your degree:

- One unit of CMN 340-0 School of Communication EPICS Internship Seminar can apply toward your major. Communication Studies, Communication Sciences and Disorders, Performance Studies, and Radio/TV/Film have additional restrictions on internships, independent studies, research practica and other special course types.
- One unit of CFS internship credit can apply as an additional distribution course. CFS internship credit cannot apply to your major.
- Additional credits of CMN 340-0 School of Communication EPICS Internship Seminar or CFS will count as electives.

Students may earn more than four credits from internship enrollment (this is sometimes advisable for international students or when a particular employer requires credit is received), but no more than four will count among the 42 required for the degree.

Academic Advising

advising.soc.northwestern.edu

Each School of Communication student is assigned an academic advisor who holds a faculty appointment in their department, and is knowledgeable about their particular major. This advisor 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 and transfer students are required to have two advising meetings during the academic year. Juniors are required to meet with their academic advisor when they petition to graduate, and seniors are encouraged to consult with their academic advisor regarding their final degree audit. While these meetings satisfy the minimal academic advising requirements, students often find it valuable to consult with their advisors more frequently. Ultimate responsibility for meeting degree requirements rests with the student.

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 Office of Undergraduate Programs and Advising (https://advising.soc.northwestern.edu/about/contact/) 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 performance

studies and theatre. The Department of Communication Sciences and Disorders administers the minor in human communication sciences. The Department of Radio/Television/Film administers the minor programs in film and media studies and in sound design. The Department of Theatre administers the minor in dance.

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 Programs

The Department of Theatre administers the Music Theatre Certificate Program (p. 99).

The School of Communication collaborates with the McCormick School of Engineering to offer the Human Computer Interaction (HCI) Certificate (p. 174).

Modules

Modules are highly focused plans of study that include formal coursework, co-curricular activities, and pre-professional experiences, and culminate in the creation of a capstone project. Through extended, structured learning experiences, modules provide a flexible way to build student-faculty cohorts, promote in-depth learning in specific areas, and develop students' abilities to articulate and present what they have learned. For more information about modules, visit the School of Communication's website at advising.soc.northwestern.edu/undergraduate-programs/soc-academic-modules/ (https://advising.soc.northwestern.edu/undergraduate-programs/soc-academic-modules/).

To view module requirements within the catalog, please click on the relevant module below.

- Acting for the Screen (https://catalogs.northwestern.edu/undergraduate/communication/module-acting-for-the-screen/)
- Children and Communication (https://catalogs.northwestern.edu/undergraduate/communication/module-children-and-communication/)
- Comedy Arts (https://catalogs.northwestern.edu/undergraduate/communication/module-comedy-arts/)
- Creating the Musical (https://catalogs.northwestern.edu/undergraduate/communication/module-creating-the-musical/)
- Digital Media (https://catalogs.northwestern.edu/undergraduate/communication/module-digital-media/)
- Directing for the Screen (https://catalogs.northwestern.edu/undergraduate/communication/module-directing-for-the-screen/)
- Health Communication (https://catalogs.northwestern.edu/undergraduate/communication/module-health-communication/)
- Media and Creative Markets (https://catalogs.northwestern.edu/undergraduate/communication/module-media-and-creative-markets/)
- Media Arts and Game Design (https://catalogs.northwestern.edu/undergraduate/communication/module-media-arts-and-game-design/)
- Performance and Activism (https://catalogs.northwestern.edu/undergraduate/communication/module-performance-and-activism/)
- Playwriting (https://catalogs.northwestern.edu/undergraduate/communication/module-playwriting/)
- Sound Cultures (https://catalogs.northwestern.edu/undergraduate/communication/module-sound-cultures/)
- Strategic & Organizational Communication (https://catalogs.northwestern.edu/undergraduate/communication/module-strategic-organization-communication/)
- The Communicating Brain (https://catalogs.northwestern.edu/undergraduate/communication/module-communicating-brain/)
- Theatre for Young Audiences (https://catalogs.northwestern.edu/undergraduate/communication/module-theatre-for-young-audiences/)
- Theatre Management (https://catalogs.northwestern.edu/undergraduate/communication/module-theatre-management/)
- Theatrical Design (https://catalogs.northwestern.edu/undergraduate/communication/module-theatrical-design/)

Research Practica

Opportunities sometimes arise for a student to assist with research, teaching, and/or a production in collaboration with a faculty member. Sometimes faculty will invite students to participate in a practicum, but students may also approach a professor whose activities or area of expertise particularly interests them. For information on how to register for a practicum, visit advising.soc.northwestern.edu/policies_procedures/practica/ (https://advising.soc.northwestern.edu/policies_procedures/practica/). Professor approval is required to register.

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 Office of Undergraduate Programs and Advising on the fifth floor of the Ryan Center for the Musical Arts, in department offices, and online at advising.soc.northwestern.edu/policies_procedures/independent-studies/ (https://advising.soc.northwestern.edu/policies_procedures/independent-studies/). 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 a maximum of 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

Internships (also sometimes referred to as field studies) allow students to gain valuable organizational experience and apply theoretical

knowledge to situations outside the classroom. SoC's Office of External Programs, Internships and Career Services (EPICS) (https://epics.soc.northwestern.edu/) maintains a database for SoC students of internships primarily in Chicago, Los Angeles, and New York City, and opportunities may be available in other cities as well. 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. Additional rules may apply. For more information on internships, interested students should visit advising.soc.northwestern.edu/policies_procedures/internships/ (https://advising.soc.northwestern.edu/policies_procedures/internships/), and consult with their academic advisor.

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 organize a course to explore a specific topic not covered in, but deemed appropriate for, the Northwestern University curriculum. Typically, an SOS comprises ten or fewer students. One or more students take responsibility for developing the syllabus, organizing the weekly seminar work, advertising the seminar, and managing the class. Guidelines for proposing an SOS are available online at advising.soc.northwestern.edu/policies_procedures/student-organized-seminars/ (https://advising.soc.northwestern.edu/policies_procedures/student-organized-seminars/).

Study Abroad

Students are encouraged to consider studying abroad at some point during their educational career. Most aspects of study abroad are handled by the Global Learning Office: www.northwestern.edu/abroad/index.html (https://www.northwestern.edu/abroad/). 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. Information about these degree programs is available from the respective programs within the School of Communication.

Co-curricular Activities and Programs

A variety of co-curricular opportunities are available to School of Communication students. Each fall quarter, Northwestern's Activities Fair is the place to check out student groups and clubs, and additional resources for connecting with student groups can be found at advising.soc.northwestern.edu/campus-resources/organizations-and-activities/ (https://advising.soc.northwestern.edu/campus-resources/organizations-and-activities/).

In order to participate in co-curricular 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 co-curricular or student group activities. This includes all department-sponsored and student-run theatre and film projects and productions.

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 hearing, speech, swallowing, language, and learning, and their disorders. The department's classroom and research facilities are located in the Frances Searle Building on the Evanston campus, adjacent to the Northwestern University Center for Audiology, Speech, Language, and Learning clinic. 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 lifespan development and disorders of communication. The department and field are highly interdisciplinary, drawing on neuroscience, data science, technology, and more. The major in human communication sciences is appealing to students who plan to attend graduate or professional school in fields such as speech-language pathology, audiology, education, medicine, dentistry, and biomedical engineering, as well as for research. It is an attractive major particularly for students who plan to become health practitioners, providing opportunities for students to connect their study of basic scientific principles to research and clinical activities as well as real-life issues. 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 can pursue a course of study tailored to their goals, including coursework to prepare specifically for a career in audiology and hearing sciences, or in speech-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.

Speech-language pathology introduces students to the psychological, linguistic, neurological, acoustic, anatomical, and physiological bases of typical speech, swallowing, language, and learning behavior. As their familiarity with typical processes increases, students explore the communicative disorders that result from the disruption of these processes. Advanced undergraduate courses expand students' knowledge in such areas as learning and neurodevelopmental disorders (including autism), the neuroscience of communication, cultural and socio-economic influences on language acquisition and usage, and clinical practice.

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. 78)
- Human Communication Sciences Minor (p. 79)

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 327-0; students may not earn credit for both courses. *Interdisciplinary Distro* - See Rules (p. 198) *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. 198) *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. Prerequisite: CSD 318-0.

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 issues in communication sciences and disorders. Topics vary by offering.

CSD 373-0 Introduction to 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 Disorder (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 395-0 Cognitive Neuroscience of Human Communication (1 Unit)
In-depth study of cognitive neuroscience methods (MRI, EEG, etc.) and what they have revealed about human communication and its disorders. The focus is on reading and critiquing research papers. Students also work as a team to design, execute hands-on, and analyze data from their own EEG experiment.

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. 27) 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 advisor for details.

Major Requirements (13 units)

1 COMM_ST course and 11 CSD courses, all of which must be passed with a grade of C (not C–) or higher, and 2 0.5-credit CMN seminars.

SoC Courses (2 units)

Course	Title
CMN 101-0	SoC First Year Seminar: Interdisciplinary Topics in Communication Arts & Sciences
CMN 398-0	School of Communication Senior Seminar
COMM_ST 102-0	Public Speaking

CSD Courses (11 units)

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 (29 units)

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 221-0	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 (11 units)

Electives in communication and other areas to complete a minimum of 42 units of credit.

Writing Proficiency

Requirement for all students.

Honors in Communication Sciences and Disorders

An honors program is available for Human Communication Sciences majors 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 department honors in communication sciences and disorders. Also see Honors and Prizes (p. 25).

Human Communication Sciences Minor

communication.northwestern.edu/programs/minor_human_communication_sciences

The minor in human communication sciences enables students to expand their understanding of the physical and physiological principles underlying communication. The minor is suited to students who want to learn about communication-based health issues, or to apply the knowledge and skills gained from their major to health-related industries by which they can help others. It is a strong complement to studies in therapies that use art, dance, or theatre to reach children with learning disabilities or other developmental difficulties.

Minor Requirements (7 units)

All courses for SoC majors, minors, fields of concentration and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

A maximum of the equivalent of 2 non-Northwestern academic units can count towards an SoC minor.

A minor in human communication sciences requires 7 units of credit, of which 6 units must be in the communication sciences and disorders department. A maximum of 1 unit of research credit may be counted toward the total units required.

Course	Title
1 neurobiology course selected from the following options:	
CSD 202-0	Neurobiology of Communication
or PSYCH 221-0	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 Neurobiology of Communication.	

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 scholarship. Both required and elective courses are intended to prepare students for personal success and civic leadership through informed and ethical communication teaching, research, and practice in and for a world of diversity, equity, inclusion, and social justice. The Department of Communication Studies commits to the cultivation of an inclusive learning environment where diverse perspectives are recognized, respected, and seen as sources of strength. We expect that students, faculty, administrators, and staff will respect differences and demonstrate diligence in understanding how other peoples' perspectives, behaviors, and worldviews may be different from their own. The department embraces the position that our intellectual community is enriched and enhanced by diversity along many dimensions. The department values the intersections of these experiences and characteristics in our community.

Program of Study

- Communication Studies Major (p. 82)

COMM_ST 101-1 Communication in Context: Introduction (1 Unit) Introduction to Communication Studies as a broad and interdisciplinary field, looking at important domains, processes and perspectives for understanding communication phenomena. *SOC First-Year Seminar*

COMM_ST 101-2 Communication in Context: Analysis & Research (1 Unit) The second course moves beyond the introduction offered in the first course (Communication Studies 101-1 Communication in Context: Introduction) through additional skills training and expanded research and analytic assignments. Prerequisites: COMM_ST 101-1. *SOC First-Year Seminar*

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 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) Examines factors informing and shaping the design of everyday objects and our virtual world; psychological aspects of computer-mediated communication and virtual collaboration, including impression formation, 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 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 261-0 Introduction to Strategic Communication (1 Unit) The affordances of new technologies and changes in the modern business landscape have fundamentally transformed strategic communication. Where previous research and practice has separated public relations from organizational communication, the modern environment makes such a distinction not only meaningless, but dangerous. This course, using case studies and foundational readings, explores the nature of the modern organization and the role of communication in it.

COMM_ST 270-0 Media Effects (1 Unit) Media content and effects are explored in various domains, including politics, violence, sexuality, marketing, health, science, and video games. The course begins with a historical overview of theory, methodology and research in the realm of media effects. The course continues with extensive survey of contemporary research about the role of media in facilitating changes in people and society, and consideration of possible explanations of how media effects occur. The course will conclude with discussion of possible ways to diminish socially undesirable media effects and enhance pro-social influence.

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 295-0 Topics in Communication Studies (1 Unit) Reading, research, and discussion in areas of significance. Topics vary.

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 303-0 Communication and Misinformation (1 Unit)
This course will explore the factors that make people vulnerable to misinformation and the reasons that corrections so often fail to change their minds. We will also analyze how those tendencies are enhanced by media technologies and exploited by various stakeholders. In addition, we will consider possible remedies that could be employed to combat misperceptions. Finally, students will put knowledge into practice, by producing an original podcast episode in small groups.

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 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 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, Colonial to 1920 (1 Unit)
Students in this course investigate the early U.S. women's rights movement through the analysis of primary texts and the examination of critical essays. Students should expect to gain a complex and nuanced perspective on the rhetorical history of public advocacy by U.S. women, and also to improve their skills in critical reading and analysis.

COMM_ST 324-2 Rhetoric of U.S. Women's Rights, 1920-Present (1 Unit)
Students in this course investigate the discourse of contemporary U.S. feminisms through the analysis of primary texts and the examination of critical essays. Students who complete the course successfully should expect to gain a complex and nuanced perspective on the rhetoric of U.S. feminisms and to improve their skills in critical reading and analysis.

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 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 339-0 Health Communication and Precision Medicine (1 Unit) This applied course will provide you with a basic understanding of precision medicine and an in depth understanding of health communication theory and practice. Specifically, we will use precision medicine as a case in which to explore pertinent theories and principles of health communication such as complexity, risk, and uncertainty. By the end of this course, you should have an understanding of opportunities for communication scholarship to contribute to the advancement of precision medicine.

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 Advanced 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 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 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 358-0 Algorithms and Society (1 Unit) Computing technologies play a role in an increasing percentage in our lives. They help to define the information we consume, the jobs that are available to us, and even our romantic partners. While these technologies bring us many benefits – more appealing information, better jobs – an increasing body of research suggests that they may also have critical negative side-effects or externalities. These externalities may be serious: some have attributed recent election outcomes and future massive-scale job loss to computing technologies (at least in part), even suggesting that we need a new "societal business model" [1]. In this course, we will first review and discuss this body of research. We will then shift towards developing potential solutions to these problems. Ultimately, my hope is that students who take this course will be better equipped to build technologies that are more likely to have a net positive effect on society.

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 Organizational Assessment (1 Unit)
Advanced concepts and techniques for defining and analyzing organizational problems. Preparation for recognizing and working with problems in business organizations.

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 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 381-0 Media, Movements, & Social Change (1 Unit) Social movements are formed through communication and it is through communication that they achieve much of their strategic objectives. This course explores the complex relationships between communication and social movements, bringing together theories from communication studies, sociology, and political science, as well as tracing historically how social movements have developed new practices of achieving social change.

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 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. 27) and the degree requirements of their home school.

Major Requirements (13 units)

All courses for SoC majors, minors, fields of concentration and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

SoC Courses (1 unit)

- 2 0.5-unit seminars:

Course	Title
CMN 101-0	SoC First Year Seminar: Interdisciplinary Topics in Communication Arts & Sciences
CMN 398-0	School of Communication Senior Seminar

Introductory Courses (3 units)

- Introductory courses to be completed in the first year of studies in the major:

Course	Title
COMM_ST 101-1	Communication in Context: Introduction
COMM_ST 101-2	Communication in Context: Analysis & Research
COMM_ST 102-0	Public Speaking

200-Level Courses (3 units)

- Any 3 of these 200-level 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 201-0	Research Methods in Comm Studies
COMM_ST 205-0	Theories of Persuasion
COMM_ST 215-0	Principles of Rhetorical Criticism
COMM_ST 220-0	Theories of Argumentation
COMM_ST 225-0	Communication and Culture
COMM_ST 227-0	Communication & Technology
COMM_ST 241-0	Theories of Relational Communication
COMM_ST 246-0	Intro to Health Communication
COMM_ST 250-0	Team Leadership and Decision Making
COMM_ST 255-0	Understanding Media Markets: Users, Makers and Metrics
COMM_ST 261-0	Introduction to Strategic Communication
COMM_ST 270-0	Media Effects
COMM_ST 274-0	Power in Entertainment
COMM_ST 275-0	Persuasive Images: Rhetoric of Popular Culture
COMM_ST 295-0	Topics in Communication Studies

Advanced Courses (6 units)

- 6 additional communication studies courses at the 300 level.
- 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).

Course	Title
CMN 340-0	School of Communication EPICS Internship Seminar
COMM_ST 389-0	Practicum in Communication Research
COMM_ST 397-0	Honors Seminar
COMM_ST 398-0	Undergraduate Seminar
COMM_ST 399-0	Independent Study

Additional Requirements (29 units)

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 (11 units)

Electives in communication and other areas to complete a minimum of 42 units of credit.

Concentration Outside the School of Communication

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. A non–School of Communication minor, dual major, or adjunct major satisfies this requirement. Courses taken to satisfy the field of concentration requirement may fulfill distribution or elective course requirements.

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. 198)). Courses taken to satisfy the language requirement may fulfill distribution or elective course requirements.

Honors in Communication Studies Major

The Undergraduate Honors Program in Communication Studies offers an opportunity for highly motivated Communication Studies majors 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. 25).

Dance

The Dance Program is housed in the Department of Theatre (p. 91), which offers both a **Dance Major (p. 97)** and a Dance Minor (p. 98).

Human Communication Sciences

See Communication Sciences and Disorders (p. 76).

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. 86)
- Performance Studies Minor (p. 86)

PERF_ST 101-0 Modes of Performance (1 Unit) Introduction to performance as a concept, embodied practice, and as a critical methodology. We will cover the various ways performance has been conceived over time; various approaches to acting; various performance styles; and various ways of using performance to analyze literary and non-literary texts. Students will do both solo and group performances each week and write critical essays on performance.

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 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 230-0 Food and Performance (1 Unit) A critical engagement with food as a performance medium. This course explores food in its embodied, material, symbolic and evocative potential in historical, fictional, ethnographic and journalistic writings, as well as poetry, memoirs, cookbooks, selected films, plays, performances, music, visual and performance art.

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 306-0 Performance and Race (1 Unit) An exploration of the field of performance studies as it interrogates the relationship between race and performance. Anchoring each class in the work of artists who engages the medium of performance, we explore the ways in which race is performed and performative. Performance works by black, brown, Asian, and indigenous artists will anchor understandings of race and racism. *Ethics Values Distro Area*

PERF_ST 307-0 Performance in Latin America (1 Unit) This course provides an overview of artistic, quotidian, and activist performance practices in Latin America. Students will engage performance practice as an object of study, analytic framework, and communication medium in order to develop their own work in dialogue with the course themes and contexts.

PERF_ST 308-0 Contemporary Middle Eastern Performance (1 Unit) This seminar examines embodied cultural practices across the Middle East and North Africa, with particular attention to music, dance, theater, and popular culture. Spanning the late nineteenth century to the Arab Spring, students will better understand a cultural history of the region, its role in shaping global modernity, and the politics of gender, sexuality, and ethnoreligious difference.

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 312-0 Yoga: Practice, History, and Politics (1 Unit) This course combines yoga practice with critical inquiry to engage the global phenomenon of yoga as performance, industry, philosophy, and culturally contested zone. We will study the historical and social processes that shaped the historic transformation of yoga from a 5,000 year-old South Asian tradition into a modern cultural form.

PERF_ST 313-0 Documentary Theater and Performance (1 Unit)
This practice-based course focuses on the historical and theoretical foundations of documentary theatre and performance. Through case studies we will explore the poetics and politics of the genre. Students will devise their own documentary pieces based on interviews, personal narratives, and archival records of their choosing.

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 317-0 Feminist Performance (1 Unit) This seminar focuses on the analytics and practice of intersectional, queer, and trans-feminist performance through a selection of key scholarly, artistic, and activist works. Pursuing what a feminist performance practice is and what it does, we will develop critical readings and hands-on experiments that follow feminist strategies in response to issues like gender-based violence, dissident identities, and collective emancipation. *Ethics Values Distro Area*

PERF_ST 318-0 Performing Masculinities (1 Unit) This course will examine the ways in which masculinity is represented in popular culture, theoretical discourse, and live performance. Assuming that gender is made and not given, the course will challenge the assumption that only "men" are creators, performers, and producers of masculinity. We will also examine the ways in which race, class, and sexuality alter tropes of masculinity. *Ethics Values Distro Area*

PERF_ST 319-0 Queer and Trans of Color Critique (1 Unit) This class explores the development of queer of color and trans of color critique, their relationship to each other and to the realm of performance and performance studies. In addition to engaging with the traditions of queer and trans of color critique, the course will explore queer and trans of color performance practice as a site of theoretical praxis. *Ethics Values Distro Area*

PERF_ST 320-0 Blacktino Queer Performance (1 Unit) This course stages a conversation among blackness, Latinidad and sexuality by examining the work of black and brown artists in the black diaspora. Using "blacktino" as the framing device, the course will highlight how these artists index the specificities of black and brown social and political relations, while also waging a broader queer-of-color critique of institutionalized racism and homophobia. *Ethics Values Distro Area*

PERF_ST 321-0 Performance, Sex, and Censorship (1 Unit) This seminar pursues the central issues that animated the "culture wars" in the United States since the 1980s, such as artistic expression, censorship, sex and sexuality, gender, race, reproductive choice, and religion. It focuses the history of performance, art, and censorship in the contemporary US, as well as the relevant first amendment law that accompanies much of this history. *Historical Studies Distro Area*

PERF_ST 322-0 Museums and Cultural Collections (1 Unit) A look at museums as sites and practices of performance. This course focuses on how museums have historically collected, exhibited, and programmed around objects, images, plants, and, at times, human and non-human animals. We will explore the history of collections in libraries, cultural centers, museums and other archives. The course includes significant site visits to Chicago museums and collections.

PERF_ST 323-0 Performing Popular Music (1 Unit) This course approaches the study of popular music practices, discourses, and worldmaking from the perspective of performance studies, with its attendant focus on the role of embodiment, social and cultural difference, and practice-based research.

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 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. 27) and the degree requirements of their home school.

Major Requirements (13 units)

All courses for SoC majors, minors, fields of concentration and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

SoC Courses (1 unit)

2 0.5-unit seminars:

Course	Title
CMN 101-0	SoC First Year Seminar: Interdisciplinary Topics in Communication Arts & Sciences
CMN 398-0	School of Communication Senior Seminar

Introductory Courses (2 units)

Choose 2:

Course	Title
PERF_ST 101-0	Modes of Performance
PERF_ST 200-0	Introduction to Performance Studies
PERF_ST 203-0	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	Performance of Poetry
PERF_ST 210-2	Performance of Narrative Fiction
PERF_ST 220-0	Sound Cultures
PERF_ST 224-0	Adapting Narrative for Group Performance
PERF_ST 230-0	Food and Performance

Production Courses (0 units)

Course	Title
PERF_ST 119-0	Production Laboratory (1 quarter)
or	
One performance studies course with a studio lab component (minimum 20 lab hours per term). Consult with your academic advisor for lab component options.	

Additional Courses (8 units) [1]

Course	Title
PERF_ST 326-1	Performance Art (required)
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 306-0	Performance and Race
PERF_ST 307-0	Performance in Latin America
PERF_ST 308-0	Contemporary Middle Eastern Performance
PERF_ST 309-0	Black Performance
PERF_ST 310-0	Performance of Women of Color
PERF_ST 312-0	Yoga: Practice, History, and Politics
PERF_ST 317-0	Feminist Performance
PERF_ST 318-0	Performing Masculinities
PERF_ST 319-0	Queer and Trans of Color Critique
PERF_ST 320-0	Blacktino Queer Performance
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 (29 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 (11 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, fields of concentration and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

A maximum of the equivalent of 2 non-Northwestern academic units can count towards an SoC minor.

Introductory Courses (2 units)

Choose 2:

Course	Title
PERF_ST 101-0	Modes of Performance
PERF_ST 200-0	Introduction to Performance Studies
PERF_ST 203-0	Performance Culture and Communication

Additional Courses (5 units)

5 additional courses, of which at least 3 must be in the performance studies department. The remaining 2 courses may come from outside departments or related disciplines (as approved by the director of undergraduate studies).

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 suites; 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 multiple active student-run cocurricular production groups and offers students 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. 89)
- Radio/Television/Film Major (p. 90)
- Sound Design Minor (p. 90)

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 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 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 314-0 History of the Recording Industry (1 Unit)
Exploration of the history of the recording industry from the invention of the phonograph in 1877 to recent developments in digital audio.

RTVF 315-0 Audio Drama (1 Unit)
Introduction to masterpieces of audio and radio drama in three historical periods: classic American (1937-54); mid-century British (1954-1974) and contemporary global traditions.

RTVF 316-0 Media and Cultural Theory (1 Unit)
Introduction to the critical analysis of film, television, and other popular media by surveying influential theories of media, culture, and power.

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.
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.
Literature Fine Arts Distro Area

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 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 363-0 Writing the TV Pilot (1 Unit)
Students will learn the craft of writing a television pilot in this small, workshop-based course.
Prerequisite: RTVF 260-0.

RTVF 364-0 Writing the Feature (1 Unit)
Students will learn the craft of writing a feature film in this small, workshop-based course.
Prerequisite: RTVF 260-0.

RTVF 365-0 Writing the Adaptation (1 Unit)
Students will learn the craft of writing an adaptation in this small, workshop-based course.
Prerequisite: RTVF 260-0.

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. Prerequisite: 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 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 nonfiction media techniques and aesthetics.
Prerequisites: 190 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 Cinematography - Film (1 Unit)
Techniques, aesthetics, and technologies of lighting for cinema using film and film cameras.

RTVF 381-0 Cinematography - Digital (1 Unit)
Techniques, aesthetics, and technologies of lighting and digital camera skills.
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)
Introduction to the theories and principles of basic sound production. Demos, lectures, readings, screenings, and exercises cover all basics of sound recording technology.
Prerequisites: 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 Topics in 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/academic_programs/minor-in-film-and-media-studies/ (https://communication.northwestern.edu/academic_programs/minor-in-film-and-media-studies/)

The Film and Media Studies Program brings together faculty and students from across the University who are interested in thinking about film and media within a broad intellectual framework. Students in this interdisciplinary program acquire critical tools for analyzing traditional and new media, as well as knowledge of some crucial historical and interpretive problems raised by the study of media within the context of the humanities and social sciences. Students who minor in film and media studies are encouraged to participate in the rich and varied media offerings of the University, including film series and individual film screenings, workshops, performances, exhibitions, and presentations by invited speakers. 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, fields of concentration and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

A maximum of the equivalent of 2 non-Northwestern academic units can count towards an SoC minor.

- 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 298-0	Studies in Media Topics
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 314-0	History of the Recording Industry
RTVF 315-0	Audio Drama
RTVF 316-0	Media and Cultural Theory
RTVF 321-0	Radio/Tv/Film Authorship
RTVF 322-0	Radio/Television/Film Genre
RTVF 325-0	Film, Media & Gender
RTVF 326-0	Film & TV Criticism
RTVF 330-0	Culture Industries
RTVF 341-0	Technological Innovations
RTVF 345-0	History of Hollywood Cinema
RTVF 351-0	National Cinema
RTVF 353-0	Film, Media, and Globalization
RTVF 398-0	Symposium: Issues in RTVF
COMM_ST 270-0	Media Effects
COMM_ST 274-0	Power in Entertainment
COMM_ST 275-0	Persuasive Images: Rhetoric of Popular Culture
ASIAN_LC 224-0	Introduction to Japanese Film, Media, and Visual Culture
CLASSICS 245-0	Classics and the Cinema
COMP_LIT 305-0	Studies in Film, Media, and Visual Culture
ENGLISH 214-0	Introduction to Film and Its Literatures
ENGLISH 386-0	Studies in Literature and Film
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
RELIGION 371-0	Religion and Film
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 advisor.

Radio/Television/Film Major

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Major Requirements (13 units)

All courses for SoC majors, minors, fields of concentration and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

SoC Courses (1 unit)

- 2 0.5-unit seminars:

Course	Title
CMN 101-0	SoC First Year Seminar: Interdisciplinary Topics in Communication Arts & Sciences
CMN 398-0	School of Communication Senior Seminar

Introductory Courses (3 units)

- 3 lower-level courses:

Course	Title
RTVF 190-0	Media Construction
RTVF 220-0	Analyzing Media Texts
1 additional 200-level course from the following list:	
RTVF 202-0	First-Year Topics Seminar
RTVF 260-0	Foundations of Screenwriting
RTVF 298-0	Studies in Media Topics
COMM_ST 275-0	Persuasive Images: Rhetoric of Popular Culture

Advanced Courses (9 units)

- 1 300-level course in media history or theory from the following list:

Course	Title
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 314-0	History of the Recording Industry
RTVF 315-0	Audio Drama
RTVF 316-0	Media and Cultural Theory
RTVF 345-0	History of Hollywood Cinema

- 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 (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.

Electives (11 units)

Electives in communication and other areas to complete a minimum of 42 units.

Courses Outside Communication

6 courses at the 200 level or above outside communication, including at least 3 courses at the 300 level or above; courses taken to satisfy this requirement may fulfill distribution or elective course requirements.

Language Requirement

Two-year proficiency in a classical or modern foreign language as defined by the Weinberg College foreign language proficiency requirement.

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, fields of concentration and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

A maximum of the equivalent of 2 non-Northwestern academic units can count towards an SoC minor.

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

Other courses also may be counted toward the minor with the approval of a sound design adviser.

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. 97) 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. 97)
- Dance Minor (p. 98)
- Music Theatre Certificate (p. 99)
- Theatre Major (p. 99)
- Theatre Minor (p. 101)

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, performace 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 wih Directing Faculty on special topics related to directing and theatrical forms.
Prerequisite: consent 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.
Prerequisite: consent 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 undergraduates 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. Prerequisite: consent 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 Drawing and Painting for the Theatre: Freehand Drawing (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 Drawing and Painting for the Theatre: The Figure in Space (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. Prerequisite: consent 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.
Prerequisite: 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 infuences.

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)
Study of Asian American playwrights, practitioners, theatre companies, historical performance practices, theoretical inquiries, or transnational infuences.

THEATRE 347-0 Latinx Theatre (1 Unit)
Study of Latinx playwrights, practitioners, theatre companies, historical performance practices, theoretical inquiries, or transnational infuences.

THEATRE 348-0 Transnational Theatre (1 Unit)
Study of the history, theory, or literature of transnational theatre and other performance forms.

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, amoung 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. Prerequisite: consent 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. Prerequisite: consent 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. Prerequisite: consent 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. Prerequisite: consent 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 responsibilites, production budgets, timelines and building and leading production team. Prerequisites: Introdution 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) Research, teaching, and/or production assistance in collaboration with departmental faculty. The aim of the practicum is for students to learn about theatrical education, research, or artistic process through applied practice rather than through traditional coursework (including independent study) or external professional opportunities (internships, apprenticeships, etc.). A student may take up to 4 credits of CMN 340-0 or THEATRE 395-0. One credit of CMN 340-0, THEATRE 395-0 may count towards the major requirements; the remaining three will be applied to Elective credit.

THEATRE 396-0 Theatre Management and Arts Leadership (1 Unit) Exploring and understanding the Artistic and Business leadership and parnternship in the Commerical and not for profit theatre communities. Prerequisites: 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. Prerequisites: 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 1 (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 1 (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. 27) and the degree requirements of their home school.

Major Requirements (14 units)

All courses for SoC majors, minors, fields of concentration and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

SoC Courses (1 unit)

2 0.5-unit seminars:

Course	Title
CMN 101-0	SoC First Year Seminar: Interdisciplinary Topics in Communication Arts & Sciences
CMN 398-0	School of Communication Senior Seminar

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 1
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 1
DANCE 170-0	Ballet I
DANCE 180-0	Tap I
DANCE 181-0	Jump Rhythm Tap 1
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 (28 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 (10 units)

Electives in communication and other areas to complete a minimum of 42 units of credit.

Honors in Da nce

The Dance Program encourages students who have demonstrated academic excellence in the dance major to participate in the Senior Honors Program. Students work closely with a faculty member to design, execute and present a research project that delves into the study of Dance. Contact the Dance Program for more information on eligibility and requirements.

Dance Minor

communication.northwestern.edu/programs/minor_dance

The dance minor offered by the Department of Theatre introduces 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, fields of concentration and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

A maximum of the equivalent of 2 non-Northwestern academic units can count towards an SoC minor.

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 (.68 units) in DANCE 140-0 Cultural Forms; 1 class (.34 units) can be substituted by tap or jazz Jump Rhythm Technique, chosen from:

Course	Title
DANCE 161-0	Jump Rhythm Technique 1
or DANCE 261-0	Jump Rhythm Technique II
or DANCE 181-0	Jump Rhythm Tap 1
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, fields of concentration 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	Acting I
THEATRE 273-2	Acting I
THEATRE 273-3	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

- **Music Theatre History (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)**

Theatre Major

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Major Requirements (13 units)

All courses for SoC majors, minors, fields of concentration and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

SoC Courses (1 unit)

- 2 0.5-unit seminars

Course	Title
CMN 101-0	SoC First Year Seminar: Interdisciplinary Topics in Communication Arts & Sciences
CMN 398-0	School of Communication Senior Seminar

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 Production Laboratory (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
  At least 2 courses in each of the following areas (200- and 300-level courses in the lists fulfill advanced course requirements):
  - **Performance (2 courses)**

Course	Title
THEATRE 171-0	Basic Acting
THEATRE 211-0	Fundamentals of Stage Directing
THEATRE 231-0	Theatre for Young Audiences
THEATRE 252-0	Intermediate MT Techniques
THEATRE 272-0	Voice for Shakespeare
THEATRE 273-1 & THEATRE 273-2 & THEATRE 273-3	Acting I and Acting I and Acting I
THEATRE 281-0	Intro to Playwriting
THEATRE 310-0	Special Topics in Directing
THEATRE 311-0	Advanced Stage Directing
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 352-1	Advanced Music Theatre Techniques I
THEATRE 352-2	Advanced Music Theatre Techniques II
THEATRE 353-0	Musical Theatre Techniques for Non-Music Theatre Cert
THEATRE 354-0	Musical Theatre Repertoire
THEATRE 358-0	Showcase
THEATRE 359-0	Senior Audition Techniques
THEATRE 361-0	Partnered Swing Dancing
THEATRE 362-0	Standing Down Straight for Actors
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 380-0	Special Topics in Playwriting
THEATRE 382-0	Playwriting Genres
THEATRE 383-1 & THEATRE 383-2 & THEATRE 383-3	Advanced Playwriting Sequence and Advanced Playwriting Sequence and Advanced Playwriting Sequence

  - **Design/Management (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 292-0	Introduction to Stage Management
THEATRE 310-0	Special Topics in Directing (Toy Theatre)
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	Drawing and Painting for the Theatre: Freehand Drawing
THEATRE 326-2	Drawing and Painting for the Theatre: The Figure in Space
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
THEATRE 392-0	Advanced Stage Management
THEATRE 393-0	Production Management
THEATRE 396-0	Theatre Management and Arts Leadership
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 250-0	Introduction to Photography
ART_HIST 232-0	Introduction to the History of Architecture: 1400 to Present
DSGN 208-0	Design Thinking and Doing
MUS_TECH 259-0	Introduction to Music Technology
RTVF 190-0	Media Construction
MUS_COMP 211-0	Class Composition
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	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 313-0	History of Directing
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 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
PERF_ST 200-0	Introduction to Performance Studies
PERF_ST 305-0	Performance Theory
PERF_ST 321-0	Performance, Sex, and Censorship
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 (29 units)

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 (11 units)

Electives in communication and other areas to complete a minimum of 42 units of credit.

Courses Outside Communication

6 courses outside Communication, including three 200-level courses, and three 300-level courses. Courses taken to satisfy this requirement may fulfill distribution or elective course requirements.

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 is 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, fields of concentration and distribution requirements must be completed with a grade of C- or higher and may not be taken P/N.

A maximum of the equivalent of 2 non-Northwestern academic units can count towards an SoC minor.

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 313-0	History of Directing
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 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 321-0	Performance, Sex, and Censorship
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 292-0	Introduction to Stage Management
THEATRE 310-0	Special Topics in Directing (Toy Theatre)
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
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	Drawing and Painting for the Theatre: Freehand Drawing
THEATRE 326-2	Drawing and Painting for the Theatre: The Figure in Space
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 392-0	Advanced Stage Management
THEATRE 393-0	Production Management
RTVF 190-0	Media Construction
RTVF 383-0	Introduction to Sound Production
ART 210-0	Introduction to Drawing
ART 220-0	Introduction to Painting
ART 240-0	Introduction to Sculpture
ART 250-0	Introduction to Photography
DSGN 208-0	Design Thinking and Doing
MUS_TECH 259-0	Introduction to Music Technology
MUS_COMP 211-0	Class Composition

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; 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. Six concentrations lead to the degree of bachelor of science in education and social policy. The intellectual core of the human development in context 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, elementary teaching and secondary teaching concentrations is grounded in the school's learning sciences graduate program.

The six 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, applied economics and social and economic 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 in context, learning and organizational change, learning sciences, and social policy have similar distribution and core requirements, though each has different major courses. The new elementary teaching curriculum follows the Illinois Board of Education requirements, and includes the distribution and core requirements similar to the other concentrations. 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/foundational courses and maintain minimum GPAs of 2.5 overall and 3.0 in teaching subject–area. In order to maintain a 3.0 in their teaching subject area, students must earn a minimum grade of C in subject-area courses. Subject-area courses earning a grade of C- or below will require conversation with a student's academic advisor and may require retaking the course. Students in the human development in context, 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 or an adjunct major (https://weinberg.northwestern.edu/undergraduate/major-minor/about-majors/adjunct-majors.html)and up to 2 units toward a minor. Required related courses in Weinberg College are not subject to these limits.
- Students may double-count 1 or 2 course units toward a certificate, if a certificate is over 4 courses. However, certificates that are specifically only 4 courses do not permit any double counting because certificates MUST be four unique courses (https://catalogs.northwestern.edu/undergraduate/additional-baccalaureate-options/certificates/) separate from any other major, minor, or certificate.
- Coursework taken at institutions other than Northwestern that is to be counted toward SESP requirements must be approved in advance (https://www.registrar.northwestern.edu/registration-graduation/transfer-and-test-credit/transfer-credit-after-enrolling-at-nu.html) 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 first year. This is referred to as the "rule of three." Certificate programs do not account against this limit of the "rule of three."
- All degree candidates must file an application for the degree (https://www.registrar.northwestern.edu/registration-graduation/graduation-preparation/graduation-petition-procedure.html) 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 (https://www.sesp.northwestern.edu/ugrad/information-sessions.html) 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 21 units at Northwestern.

In addition to and independent of the requirements set by SESP, all students must satisfy the Undergraduate Registration Requirement (p. 27).

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 meet the SESP requirements. SESP students must work with the Undergraduate Advising Team to meet the conditions set by their probation and address the academic concerns that resulted in probation. Expectations and supports are shared with students in a probation letter and in a meeting with their adviser. For more information on SESP's probation process, please visit the SESP website under the Courses, Registration and Grades menu.

Petitions for Course Substitutions

Students must petition if they wish to request a change in any of the SESP degree or specific course requirements of SESP. Petitions can be submitted via email or discussed in person with the student's adviser. No petition is considered unless it is approved by the student's adviser.

Additional requirements are stipulated on the SESP website. 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 Design 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 Senior Thesis Seminar 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 Senior Thesis Seminar 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 Degrees (p. 38).

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 Student Affairs Office and on the SESP website.

Student Resources

Academic Advising

Each student is assigned to an adviser in the SESP Student Affairs Office. 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.

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 on the SESP website and in the SESP Student Affairs Office.

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 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.

Applications for all SESP financial funds are through the SES One Form (https://northwestern.academicworks.com/).

Elementary Teaching

SESP's interdisciplinary elementary teaching concentration combines subject-area courses in the fields of Physical, Life, and Earth and Space Sciences, Civics and Government, Economics, Geography, Literature and Fine Arts, Historical Studies, and Mathematics/Statistics chosen from SESP and the Weinberg College of Arts and Sciences with courses in child and adolescent development, elementary education theory and methods, and urban education. In addition to the elementary teaching concentration-specific requirements, such as foundational, concentration cluster, and methods courses, elementary teaching candidates must also complete SESP's Core courses, electives, distribution requirements, global engagement overlay, and Heterogeneities, Systems and Inequalities overlay. The program leads to an Illinois Professional Educator license as well as a bachelor of science in education and social policy degree. The degree is 42 units.

Similar to the other SESP concentrations, which have a four unit practicum in the third year, elementary teaching students must complete a one-quarter student teaching internship in the last year while enrolled in TEACH_ED 387-0 Student Teaching: Elementary.

Weinberg College of Arts and Sciences students who wish to pursue elementary teaching licensure must apply to the program by the fall of their third year and complete the requirements of the elementary teaching concentration. They also must complete the degree requirements of the Weinberg College of Arts and Sciences.

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Total requirements—42 units

- ***Distribution requirements***—10 units
- ***SESP core***— 8 units
- ***Foundations Courses*** – 5 units
- ***Concentration Cluster Courses*** – 11 units
- ***Electives***— 8 units

Plus the SESP Overlay Requirements: Global Engagement, Methods in Context, and Heterogeneity, Systems, and Inequalities

Plus additional licensure requirements of:*

- History courses taken through the historical studies distribution requirement
- Literature courses taken through the literature and fine arts distribution requirement
- Math and statistics courses taken through SESP 210-0 and 1 formal studies distribution requirement
- Physical science, life science, and earth and space science courses; 2 of these courses can be taken through the natural science distribution requirements, 1 course is a part of the concentration course requirement.

* All licensure requirements are included in the 42 units needed for the degree.

Overlay Requirements*

* Overlay requirements are fulfilled by courses taken for the concentration

Course	Title
Global Engagement	
1 quarter of study abroad or 3 quarters of foreign language or equivalent.	
Heterogeneities, Systems, and Inequalities	
1 course counted towards the concentration: HDC 305-0, LOC 214-0, LOC 214-BR, LOC 351-0 (Identities, Intersection, and Organizations), LRN_SCI 202-0, LRN_SCI 214-0, LRN_SCI 302-0, LRN_SCI 309-0, SESP 251-0 (Finding Your Path: Future Possibilities and Social Change) and (Community Research Methods: Educational Justice), SESP 317-0, SESP 320-0, SESP 323-0, SESP 324-0, SESP 325-0, SESP 351-0 (Computing, Ethics, and Society or Public Learning Through the Arts), SOC_POL 313-0, SOC_POL 315-0, SOC_POL 331-0, SOC_POL 333-0, SOC_POL 351-0 (Intersectional Identities and Public Policy or Urban Education Policy and Practice) TEACH_ED 302-0, TEACH_ED 351-0 (Cognition and Culture in Teaching and Learning), TEACH_ED 341-0	
Methods in Context [1]	
1 course counted towards the concentration: HDC 330-0, HDC 351-0 (Mapping and Spatial Analysis for Social Issues), LOC 308-0, LOC 311-0, LRN_SCI 301-0, LRN_SCI 309-0, LRN_SCI 313-0, LRN_SCI 326, LRN_SCI 351-0 (Sports, Technology and Learning), LRN_SCI 372-0, SESP 204-0, SESP 251-0 (Demystifying Quantitative Data and Community Research Methods: Educational Justice), SESP 310-0, SESP 323-0, SESP 324-0, SESP 351-0 (Public Learning or The Life Story Interview) , SOC_POL 330-0, SOC_POL 331-0, SOC_POL 332-0, SOC_POL 333-0, SOC_POL 334-0	

[1] For Elementary Teaching students, any TEACH_ED Methods course can also fulfill this overlay requirement: TEACH_ED 311-0, TEACH_ED 312-0, TEACH_ED 323-0, and TEACH_ED 326-0.

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 Board of Education. 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 by the fall of their third year. To be admitted, they must have a minimum overall GPA of 2.5 and a minimum GPA of 3.0 in the subject-area courses in the fields of Physical, Life, and Earth and Space Sciences, Civics and Government, Economics, Geography, Literature and Fine Arts, Historical Studies, and Mathematics/Statistics chosen from SESP and the Weinberg College of Arts and Sciences. Additional admissions requirements include two letters of recommendation and responses to selected essay prompts. Students must be eligible for entrance to the program no later than the end of fall quarter of their third year.

Clinical Experience

Students in the Teacher Preparation Program complete two clinical experiences: a school practicum (typically during fall of the last year); and student teaching (typically during winter of the last year).

To be eligible for the clinical experiences, students must have met the GPA requirements for and been admitted to the Teacher Preparation Program. Students need to be on track to have completed a minimum of 9 courses in the elementary teaching subject area by the end of the practicum term for placement with a teacher mentor at a local school. Additionally, students must be available to begin the practicum at the start of the field-site placement's academic school year. Please note that the students' practicum/student teaching field-site placement can be postponed, stopped or withdrawn due to concerns over their health or academic or professional performance.

Clinical experiences gained at the field-site are central to the discussion of methods and theories in the practicum seminar TEACH_ED 377-0 Theory and Practice of Teaching: Elementary Teaching and the Elementary methodology courses TEACH_ED 311-0 Elementary Science Methods,TEACH_ED 312-0 Elementary Social Studies Methods, TEACH_ED 323-0 Elementary Literacy Methods & Content, and TEACH_ED 326-0 Elementary Math: Methods and Content.

To be eligible for student teaching, students must have successfully completed the applicable Elementary methodology courses TEACH_ED 311-0, TEACH_ED 312-0, TEACH_ED 323-0 Elementary Literacy Methods & Content and TEACH_ED 326-0 Elementary Math: Methods and Content as well as TEACH_ED 377-0 Theory and Practice of Teaching: Elementary Teaching, earned a passing score on the applicable ILTS Content-Area Test, fulfilled minimum GPA requirements for student teaching, completed 9 elementary 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 387-0 Student Teaching: Elementary). 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 the clinical experiences, all teacher candidates must successfully complete the Teacher Performance Assessment, at the end of the practicum.

Recommendation for Licensure

Students are recommended for licensure when they successfully complete degree requirements, earn a rating of recommendation for licensure for practicum/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 and are eligible 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). Illinois school districts require applicants to submit to a criminal background check.

Program of Study

- Elementary Teaching Major (p. 108)

TEACH_ED 301-0 Schooling in America (1 Unit) This course will explore the development of schools in the United States by understanding the ideologies and decisions (pedagogical and political) that have shaped schools over 200 years.

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 311-0 Elementary Science Methods (1 Unit) This course is designed to build your knowledge and skills at making science learning more meaningful for elementary students, based on current ideas and research about how teachers learn to teach science and how students learn science.

TEACH_ED 312-0 Elementary Social Studies Methods (1 Unit) This course provides students with an overview of the field of social studies, selected issues in the field and research based strategies for teaching social studies to elementary students.

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 314-0 Math for Elementary Teachers (1 Unit) Math for Elementary Teachers.

TEACH_ED 318-0 Teaching Math: Geometry (1 Unit) The course is intended to deepen conceptual understanding of middle school and high school geometry topics, especially as related to attributes and relationships of geometric objects.

TEACH_ED 319-0 Teaching Math: Statistics and Probability (1 Unit) This course aims to effectively prepare teachers to help middle school and high school students "learn with understanding" the fundamentally important statistics and probability concepts and skills that are needed

for today's world and that are articulated in the Common Core State Standards.

TEACH_ED 321-0 Content Area Reading and Writing (Elementary) (1 Unit) This class surveys various aspects of children's literature: poetry, folk and fairy tales, picture books, and novels.

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 323-0 Elementary Literacy Methods & Content (1 Unit) In the course participants will gain an understanding of the cognitive foundations of reading comprehension and their influence on methods of instruction and assessment, as well as the interrelationships between reading processes and language learning.

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 326-0 Elementary Math: Methods and Content (1 Unit) The course provides an overview of mathematical topics taught in elementary and middle school. Course participants learn in small groups and reflect on their own and children's learning. Pedagogical contexts for the mathematical concepts are provided.

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 Cognition and Culture in Teaching and Learning (1 Unit) This course is an exploration of the theoretical foundations of research on culture and cognition and how to apply these ideas to views of learning and teaching in a variety of settings. Students enrolled in the course can still receive credit if LOC/LRN_SCI 214 has already been taken. This course builds on topics from LRN_SCI 301 with an emphasis on classroom environment.

TEACH_ED 333-0 Science Content for Teachers (1 Unit) This course utilizes a discussion format with a heavy emphasis on critical thinking and skills based activities. The inquiry/discussion approach will help us delve into the concepts of ecology & earth systems found on the Illinois Licensure Test.

TEACH_ED 334-0 Social Science Content for Teachers (1 Unit) Students will explore ways to select social studies content that is both meaningful and empowering for their students by engaging with texts that critically examine various social studies topics.

TEACH_ED 336-0 Instructional Design & Assessment (1 Unit) Students will gain an overview of various approaches to curriculum design and instructional models, and will investigate several kinds of assessments, including formative and summative, and how those assessments are linked to instructional design, teaching and learning. Opportunities will be given to practice grading, providing good feedback, and managing a class assessment system.

TEACH_ED 338-0 Learning and Teaching with Techology (1 Unit) Theory and practice of designing school environments that integrate new technologies and media. Taught with LRN_SCI 338-0; 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 375-0 Theory & Practice of Teaching : Math (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 376-0 Theory & Practice of Teaching : Science (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 377-0 Theory and Practice of Teaching: Elementary Teaching (1 Unit) The teaching practicum encompasses a ten-week period of part-time experience under the direction of two classroom mentors. It is performed two different sites -- urban and suburban, is organized in conjunction with a subject-specific methods tutorial, and is accompanied by a weekly practicum seminar.

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 385-0 Student Teaching Seminar: Math (4 Units) See description for TEACH_ED 388-0.

TEACH_ED 386-0 Student Teaching Seminar: Science (4 Units) See description for TEACH_ED 388-0.

TEACH_ED 387-0 Student Teaching: Elementary (4 Units) "Seminar and accompanying full time, 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 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.

Elementary Teaching Major

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Distribution requirements (10 units)

- 2 natural sciences courses [1]
- 2 formal studies courses[2]
- 2 historical studies courses
- 2 ethics and values courses
- 2 literature and fine arts courses

Selected courses from Weinberg College and professional schools across the University fulfill distribution requirements. A meeting with the student's academic advisor is required prior to registering for distribution requirement courses.

1 Please speak to academic advisor before choosing Natural Sciences courses distribution requirement courses to make sure elementary teaching licensure requirement is met. Please visit the Elementary Teaching Extension Courses guide (https://docs.google.com/spreadsheets/d/1L77FcQVf0fG-K_8eXMN2i89oww4CGLTLW9pbn_8Dv8A/edit/#gid=0) for more information.

2 Please speak to your academic advisor before choosing Formal Studies distribution requirement courses to make sure elementary teaching licensure requirement is met. Please visit the Elementary Teaching Extension Courses guide (https://docs.google.com/spreadsheets/d/1L77FcQVf0fG-K_8eXMN2i89oww4CGLTLW9pbn_8Dv8A/edit/#gid=0) for more information.

SESP Core (8 units)

Course	Title
SESP 200-0	Understanding Knowledge
SESP 201-0	Human Development: Childhood and Adolescence [3]
SESP 210-0	Introduction to Statistics and Research Methodology
SESP 272-0	Field Research Methods
TEACH_ED 387-0	Student Teaching: Elementary
TEACH_ED 321-0	Content Area Reading and Writing (Elementary)

3 SESP 201 has a few alternatives. SESP 351-0 Special Topics (Child and Adolescent Development) and PSYCH 244-0 Developmental Psychology are both substitutions, however please note that PSYCH 110-0 Introduction to Psychology is a prerequisite for PSYCH 244-0.

Foundations Courses (6 units)

Course	Title
TEACH_ED 302-0	Social Contexts of Education
TEACH_ED 310-0	Foundations of Learning in a New Language
TEACH_ED 327-0	Educating Exceptional Children
TEACH_ED 301-0	Schooling in America
TEACH_ED 377-0	Theory and Practice of Teaching: Elementary Teaching

Concentration Cluster Courses

Please visit the Elementary Teaching Extension Courses guide (https://docs.google.com/spreadsheets/d/1L77FcQVf0fG-K_8eXMN2i89oww4CGLTLW9pbn_8Dv8A/edit/#gid=0) for more information. Students will be notified by their advisor if there are any changes to this list.

All Elementary Teaching students take the following as a part of their cluster requirements:

Sciences (3 units)

One from the Physical Science cluster, one from the Life Science cluster, and one from the Earth and Space Science cluster.

Some courses will fulfill more than one cluster, but credit will only be applied once to one cluster. Students still need to complete 3 units, one in each cluster.

Please note that up to two science classes can be fulfilled by the Natural Science distribution requirements if they fall into the following categories:

Course	Title
Physical Science	
CHEM 131-0	General Chemistry 1
CHEM 132-0	General Chemistry 2
CHEM 201-0	Chemistry of Nature and Culture
EARTH 101-0	Earth Science for the 21st Century
EARTH 106-0	The Ocean, the Atmosphere & Our Climate
EARTH 180-0	Fantasy Worlds – How to Build Your Own Planet
EARTH 201-0	Earth Systems Revealed
EARTH 203-0	Earth System History
PHYSICS 103-0	Ideas of Physics
Any level Physics course; please speak with your advisor.	
Life Science	
BIOL_SCI 103-0	Diversity of Life
BIOL_SCI 109-0	The Nature of Plants
BIOL_SCI 150-0	Human Genetics
EARTH 101-0	Earth Science for the 21st Century
EARTH 106-0	The Ocean, the Atmosphere & Our Climate

EARTH 203-0	Earth System History
ENVR_SCI 201-0	Earth: A Habitable Planet
ENVR_SCI 202-0	The Health of the Biosphere
TEACH_ED 333-0	Science Content for Teachers
Any level Biological Sciences course; please speak with your advisor.	
Earth and Planetary Science	
ASTRON 101-0	Modern Cosmology
ASTRON 102-0	Milky Way Galaxy
ASTRON 103-0	Solar System
ASTRON 120-0	Highlights of Astronomy
EARTH 101-0	Earth Science for the 21st Century
EARTH 106-0	The Ocean, the Atmosphere & Our Climate
EARTH 180-0	Fantasy Worlds – How to Build Your Own Planet
EARTH 201-0	Earth Systems Revealed
EARTH 203-0	Earth System History
TEACH_ED 333-0	Science Content for Teachers

Math and Statistics (1 unit)

Please note that this unit can be fulfilled by one of the Formal Studies distribution requirements if the formal studies class is included in the following list:

Course	Title
MATH 100-0	Quantitative Reasoning
MATH 202-0	Finite Mathematics
Any level Math course; please speak with your advisor.	
STAT 210-0	Introduction to Probability and Statistics
TEACH_ED 314-0	Math for Elementary Teachers
TEACH_ED 318-0	Teaching Math: Geometry
TEACH_ED 319-0	Teaching Math: Statistics and Probability
TEACH_ED 373-0	Topics in High School Math

Social Sciences (2 units)

Course	Title
TEACH_ED 334-0	Social Science Content for Teachers

The other unit can be fulfilled with any of the following:

Course	Title
POLI_SCI 220-CN	American Government and Politics
POLI_SCI 230-CN	Law in the Political Arena
ECON 201-0	Introduction to Macroeconomics
ECON 202-0	Introduction to Microeconomics

Methods (4 units)

Course	Title
TEACH_ED 311-0	Elementary Science Methods
TEACH_ED 312-0	Elementary Social Studies Methods
TEACH_ED 323-0	Elementary Literacy Methods & Content
TEACH_ED 326-0	Elementary Math: Methods and Content

Equity and Education (3 Units)

Course	Title
TEACH_ED 309-0	Speech & Communication in the School Environment
LOC/LRN_SCI 214-0	Culture and Cognition
or LOC 214-BR	Culture and Cognition: SESP Leadership Institute
SESP 251-0	Special Topics (Community Research Methods: Educational Justice)
TEACH_ED 324-0	Critical Issues in Literacy
TEACH_ED 328-0	Dynamics of Middle School Curriculum
SESP 320-0	Race and Education
SESP 325-0	Race, Adolescence, and School Discipline
TEACH_ED 329-0	Cognition and Culture in Teaching and Learning (CHANGE NAME)
LRN_SCI 301-0	Design of Learning Environments
HDC 305-0	Identity and Motivation
SESP 324-0	Pedagogies for History and Injustice: Holocaust Education Design

Electives (8 units)

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.

Additional Licensure Requirements (included in the degree's 42 units)

- History courses
- Literature and fine arts courses
- Physical Science, life science and earth/space science courses
  - **Please note that up to two science classes can be fulfilled by the Natural Science distribution requirements if they fall into the following categories:**

Course	Title
Physical Science	
CHEM 131-0	General Chemistry 1
CHEM 132-0	General Chemistry 2
CHEM 201-0	Chemistry of Nature and Culture
EARTH 101-0	Earth Science for the 21st Century
EARTH 106-0	The Ocean, the Atmosphere & Our Climate
EARTH 180-0	Fantasy Worlds – How to Build Your Own Planet
EARTH 201-0	Earth Systems Revealed
EARTH 203-0	Earth System History
PHYSICS 103-0	Ideas of Physics
Any level Physics course; please speak with your advisor.	
Life Science	
BIOL_SCI 103-0	Diversity of Life
BIOL_SCI 109-0	The Nature of Plants
BIOL_SCI 150-0	Human Genetics
EARTH 101-0	Earth Science for the 21st Century
EARTH 106-CN	The Ocean, the Atmosphere, and our Climate
EARTH 203-0	Earth System History
ENVR_SCI 201-0	Earth: A Habitable Planet
ENVR_SCI 202-0	The Health of the Biosphere
TEACH_ED 333-0	Science Content for Teachers
Earth and Planetary Science	
ASTRON 101-0	Modern Cosmology
ASTRON 102-0	Milky Way Galaxy
ASTRON 103-0	Solar System
EARTH 101-0	Earth Science for the 21st Century
EARTH 106-0	The Ocean, the Atmosphere & Our Climate
EARTH 180-0	Fantasy Worlds – How to Build Your Own Planet
EARTH 201-0	Earth Systems Revealed

EARTH 203-0	Earth System History
TEACH_ED 333-0	Science Content for Teachers

- Math and statistics courses
  - **Please note that one of these classes can fulfilled by the Formal Studies distribution requirements if they fall into the following categories:**

Course	Title
MATH 100-0	Quantitative Reasoning
MATH 202-0	Finite Mathematics
Any level Math course; please speak with your advisor.	
STAT 210-0	Introduction to Probability and Statistics
TEACH_ED 314-0	Math for Elementary Teachers
TEACH_ED 318-0	Teaching Math: Geometry
TEACH_ED 319-0	Teaching Math: Statistics and Probability
TEACH_ED 373-0	Topics in High School Math

Middle Grade Endorsement (optional)

- 7 courses in competency areas:
  - Science
  - English
  - Spanish
  - Math
  - Social Science
- 1 Middle Grades Methods and Techniques course:

Course	Title
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

Human Development in Context

sesp.northwestern.edu/ugrad/human-development-in-context

The Human Development in Context (HDC) program, formerly called Human Development and Psychological Services, examines how people throughout the lifespan develop in, are influenced by, and shape the social settings they encounter (e.g., families, communities, educational institutions, and the workplace). HDC courses focus on theories of individual and family development; the local and global dynamics of learning; and cognition, social relations, and policy. This interdisciplinary program draws from current and actionable theory, research, and practice from areas as diverse as psychology, sociology, intercultural studies, gender studies, economics, and policy science.

Program of Study

- Human Development in Context Major (p. 112)

HDC 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.

HDC 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.

HDC 307-0 Emotional Mysteries (1 Unit) Classrooms, work settings, and family relations are hotbeds of emotion. But what is an emotion? What happens in our bodies when an emotion is triggered? How can emotions help us live productive, healthy, and connected lives? And can we ever truly understand what somebody else is feeling? These are some of the mysteries that we will seek to unravel in this course. We will read literature from Darwin to the latest scientific studies, combine lectures and small-group discussions, conduct research experiments, and engage in peer review and online collaboration.

HDC 309-0 Team Dynamics (1 Unit) In this course, we will explore team dynamics, those forces that influence a team's behavior and performance, and what can enhance or hinder potential for impact. We will analyze the contributors to team functioning and their interrelationships at multiple levels: intrapersonal, interpersonal, group and organizational. Key topics include team development, team make-up and roles, leadership and followership, decision-making, navigating conflict, collaboration and competition, effective communication, content vs. process, diversity and in-group/out-group tensions. Throughout the class, students will be analyzing and applying concepts through case studies and simulations. Assignments to demonstrate mastery include regular written individual papers and a team project. This course is suitable for undergraduate students in LOC, Human Development in Context, and related majors throughout Northwestern that are interested in leadership, teams/groups or organizational change. Taught with LOC 309-0; may not receive credit for both courses.

HDC 310-0 The Art and Science of Aging (1 Unit) For over 2000 years, poets and philosophers have commented on the universal human experience of "getting older." In the past few hundred years, novelists and scientists have joined the effort, along with filmmakers, musicians, counselors, bloggers, motivational speakers, and a host of others. What does it feel like to move through the adult years and toward "old age"? How do people's personalities, social relationships, and overall world view change as they grow older? What does psychological and social science have to say about general trends, as well as individual differences, in aging? This discussion-based and writing-intensive seminar is sequentially organized in terms of five cardinal themes: (1) the social/emotional world, (2) generations, (3) memory and the self, (4) loss, and (5) wisdom of the ages. Within these five themes, the seminar will consider a range of psychological and social issues as they apply to adult development and aging, sampling some of the most provocative sources from fiction, drama, poetry, music, and cinema - and from the scientific literature.

HDC 330-0 Adolescent Stress: Sources and Solutions (1 Unit) Why are adolescence and early adulthood stressful periods of life? Are they more stressful now than in the past? How do we best define and measure adolescent and young adult stress? This course is an advanced, interactive, undergraduate class in which the instructor and students explore the set of above questions together, through readings, discussions, and through qualitative and quantitative coding and analysis of datasets on adolescent stress. Prerequisites: (SESP 201-0) and (SESP 210-0 or any 200-level Statistics Equivalent).

HDC 340-0 Building Loving and Lasting Relationships: Marriage 101 (1 Unit) The intricacies and problems of close, committed, interpersonal relationships, especially marriage. Open to first-year students.

HDC 351-0 Special Topics in Human Development in Context (1 Unit) Advanced work on special topics.

HDC 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 195-0 Community Engagement (1 Unit) Critical reflection on community service experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community. For Civic Engagement Certificate students only.

SESP 200-0 Understanding Knowledge (1 Unit) What does it mean to know something? What are the different types of knowledge and what distinguishes them from one another? What counts as fact vs. opinion vs. belief and so on; who gets to decide and under what conditions? How is knowledge produced and how does it gain traction? How does the source and type of knowledge interact with socio-political-cultural constructs and systems of power and, in turn, how can "knowledge" be used to produce and/or perpetuate power and privilege or to empower those who are marginalized? Finally, how does what we do in SESP and at Northwestern as both consumers and producers of knowledge fit within the landscape of these questions? In this course students will explore these and other questions to gain insight into the social production, distribution, consumption, interpretation, and operationalization of "knowledge." Using primarily seminar-style discussion, the first portion of the course focuses on building and analyzing theoretical frameworks and applied texts in order to generate a working understanding of "knowledge" in its myriad forms. Among our goals for the first portion of the course is to tie theoretical, academic, and "folk" knowledges to everyday experiences and the world around us writ large. The second portion of the class will involve a series of applied of cases studies, including welcoming members of the SESP faculty community to present on their research, which we will work to bring into conversation with our generated frameworks regarding the sources, types, and implications of knowledge.

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 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 204-0 Designing for Social Change (1 Unit) A key goal of this course is to acquire an intellectual and applied understanding of the principles of program design and development, which include a sustained consideration of issues affecting the quality of program implementation. This course is best suited for FIRST AND SECOND YEAR students.

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 218-0 Leaders Lab (1 Unit) N/A.

SESP 251-0 Special Topics (1 Unit) N/A.

SESP 272-0 Field Research Methods (1 Unit) Guided practice in systematic and participant observation. Observer bias, field notes, unobtrusive measures.

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 310-0 Causal Methods for Evaluating Policy (1 Unit) This course will provide students with a framework for understanding causal inference and a toolkit for making causal claims using quantitative data. Prerequisites: Students need to have taken SESP 210-0 or any 200-level STATS course.

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 322-0 Crafting Child Policy (1 Unit) N/A.

SESP 323-0 Trauma and Atrocity: Holocaust Memory, Memorial and Museums (1 Unit) What is Holocaust memory? How has Holocaust memory changed over time, and how does the Holocaust continue to affect our understanding of trauma, atrocity, and human rights today? This seminar addresses individual memory, including survivor and witness testimony, memory and trauma, and the impact of the Holocaust on survivors' families and communities.

SESP 324-0 Pedagogies for History and Injustice: Holocaust Education Design (1 Unit) N/A.

SESP 325-0 Race, Adolescence, and School Discipline (1 Unit) In recent years, racial disparities in school discipline have attracted the attention of educators, policymakers, parents, and the general public. Why is it so hard for legal, political, and educational institutions to improve school discipline? How do intersections of race, gender, and social class matter for students' experiences of school discipline? Are there schools that are getting discipline right? What does that look like, and to what extent can other schools learn from their successes? In this course, we will learn

about evidence-based policy improvements and imagine how to create schools where race does not predict discipline.

SESP 351-0 Special Topics (1 Unit) Advanced work on special topics.

SESP 351-SA Special Topics (1 Unit) Advanced work on special topics. This course is limited to students approved to study abroad through the Global Learning Office (GLO).

SESP 384-0 Practicum in Human Development - Washington, D.C. (4 Units) See description for SESP 382-0. Offered during Summer Session only. Prerequisites: SESP 272-0; consent of SESP practicum director 3 quarters before registration. For participants in the Washington, DC, field studies program 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 Design (1 Unit) Overview of research methods that may be used to design and implement the honors thesis. Prerequisites: SESP 210-0 and SESP 272-0 recommended.

SESP 392-0 Experiential Learning: Practicum (4 Units)

SESP 398-0 Senior Thesis Seminar (1-3 Units) Students develop, design, implement, and evaluate a research project under a faculty advisor's guidance. Prerequisites: senior status, cumulative GPA by the end 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 in Context Major

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Concentration Program—16 units*

* 8 of the 16 units need to be at the 300-level

Course	Title
Required Courses (6 units)	
SESP 201-0	Human Development: Childhood and Adolescence
or [1]	
SESP 203-0	Human Development: Adulthood and Aging
or HDC 310-0	The Art and Science of Aging
1 course for the Fundamentals cluster from:	
HDC 305-0	Identity and Motivation
PSYCH 215-0	Psychology of Personality
HDC 307-0	Emotional Mysteries
PSYCH 228-0	Cognitive Psychology
SESP 317-0	Gender and the Life Course
1 course for the Social Policy in Action cluster from:	
SESP 320-0	Race and Education
SESP 204-0	Designing for Social Change
SESP 325-0	Race, Adolescence, and School Discipline
SOC_POL 304-0	Social Policy & the Human Services
SOC_POL 313-0	Race, Inequality, and the Political Analysis of Public Policy
SOC_POL 315-0	Global Human Trafficking
SOC_POL 331-0	Economics of Inequality and Discrimination
SOC_POL 351-0	Special Topics in Social Policy (Social Opportunity and Education Policy or Urban Education Policy and Practice or The Social Side of College: Understanding the Lived Experiences of Undergraduates or Global Education)
HDC 330-0	Adolescent Stress: Sources and Solutions
1 course for the Learning and Cognition cluster from:	
HDC 305-0	Identity and Motivation
HDC 351-0	Special Topics in Human Development in Context (Mapping and Spatial Analysis for Social Issues)
LOC 351-0	Topics in Learning and Organizational Change (Cognition in Contexts)
LRN_SCI 201-0	Cognition and Action
LRN_SCI 202-0	Culture, Language, & Identity
LOC 313-0	Learning and Thinking in Organizations
TEACH_ED 351-0	Special Topics in Teacher Education (Cognition and Culture in Teaching and Learning)
CSD 392-0	Language Development and Usage
1 course for the Social Relations cluster from:	
HDC 301-0	The Counseling Process: Theory & Practice
HDC 307-0	Emotional Mysteries
HDC/LOC 309-0	Team Dynamics
HDC 340-0	Building Loving and Lasting Relationships: Marriage 101
HDC 351-0	Special Topics in Human Development in Context (Identities, Intersections, and Organizations)
1 course for the Analysis cluster from:	
HDC 330-0	Adolescent Stress: Sources and Solutions
LRN_SCI 301-0	Design of Learning Environments
LRN_SCI 351-0	Topics in Learning Sciences
SESP 204-0	Designing for Social Change
SESP 251-0	Special Topics (Community Research Methods: Educational Justice)
SESP 310-0	Causal Methods for Evaluating Policy
SESP 324-0	Pedagogies for History and Injustice: Holocaust Education Design
SESP 351-0	Special Topics (The Life Story Interview or Intersectionality, Measurement, and Public Policy)
SOC_POL 333-0	Economics of Health, Human Capital, and Happiness
SOC_POL 334-0	Quantitative Tools for Policy Analysis
Concentration Extension Courses (10 units)	
Must be selected from an approved list of courses in human development in context, 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.	

[1] HDC students who take SESP 201-0 Human Development: Childhood and Adolescence for the SESP Core can choose either SESP 203-0

Human Development: Adulthood and Aging or HDC 310-0 The Art and Science of Aging for the HDC Concentration. HDC students who take either SESP 203-0 or HDC 310-0 for the SESP Core can take SESP 201-0 for the HDC Concentration.

SESP Core (8 units)

Course	Title
Seminar—1 unit	
SESP 200-0	Understanding Knowledge
Human Development—1 unit	
SESP 201-0	Human Development: Childhood and Adolescence [1]
or PSYCH 244-0	Developmental Psychology
OR	
SESP 203-0	Human Development: Adulthood and Aging
OR	
HDC 310-0	The Art and Science of Aging
Methodologies —2 units	
SESP 210-0	Introduction to Statistics and Research Methodology
SESP 272-0	Field Research Methods
Experiential Learning—4 units [2]	
SESP 392-0	Experiential Learning: Practicum
or SESP 389-0	Practicum in Human Development - San Francisco

1 PSYCH 110-0 Introduction to Psychology is a prerequisite for PSYCH 244-0.

2 Practicum course must be in concentration field. This 4-unit course may be taken either for 1 quarter during junior year or for nine weeks during the Summer Session before or after 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.

Overlay Requirements*

* Overlay requirements are fulfilled by courses taken for the concentration

Course	Title
Global Engagement	
1 quarter of study abroad or 3 quarters of foreign language or equivalent.	
Heterogeneities, Systems, and Inequalities	
1 course counted towards the concentration: HDC 305-0, LOC 214-0, LOC 214-BR, LOC 351-0 (Identities, Intersection, and Organizations), LRN_SCI 202-0, LRN_SCI 214-0, LRN_SCI 302-0, LRN_SCI 309-0, SESP 251-0 (Finding Your Path: Future Possibilities and Social Change) and (Community Research Methods: Educational Justice), SESP 317-0, SESP 320-0, SESP 323-0, SESP 324-0, SESP 325-0, SESP 351-0 (Computing, Ethics, and Society or Public Learning Through the Arts), SOC_POL 313-0, SOC_POL 315-0, SOC_POL 331-0, SOC_POL 333-0, SOC_POL 351-0 (Intersectional Identities and Public Policy or Urban Education Policy and Practice) TEACH_ED 302-0, TEACH_ED 351-0 (Cognition and Culture in Teaching and Learning), TEACH_ED 341-0	
Methods in Context	
1 course counted towards the concentration: HDC 330-0, HDC 351-0 (Mapping and Spatial Analysis for Social Issues), LOC 308-0, LOC 311-0, LRN_SCI 301-0, LRN_SCI 309-0, LRN_SCI 313-0, LRN_SCI 326, LRN_SCI 351-0 (Sports, Technology and Learning), LRN_SCI 372-0, SESP 204-0, SESP 251-0 (Demystifying Quantitative Data and Community Research Methods: Educational Justice), SESP 310-0, SESP 323-0, SESP 324-0, SESP 351-0 (Public Learning or The Life Story Interview) , SOC_POL 330-0, SOC_POL 331-0, SOC_POL 332-0, SOC_POL 333-0, SOC_POL 334-0	

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

The Learning and Organizational Change program examines formal and informal change among individuals, groups, organizations, and systems. Students study organizational change, learning, and design thinking to analyze systems, structures, and team dynamics through multiple perspectives and approaches. The program draws from theoretical and empirical research and practice from disciplines as diverse as organization and management sciences, learning sciences, sociology, psychology, economics, and design.

Program of Study

- Learning and Organizational Change Major (p. 115)

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: SESP Leadership Institute (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 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 309-0 Team Dynamics (1 Unit) In this course, we will explore team dynamics, those forces that influence a team's behavior and performance, and what can enhance or hinder potential for impact. We will analyze the contributors to team functioning and their interrelationships at multiple levels: intrapersonal, interpersonal, group and organizational. Key topics include team development, team make-up and roles, leadership and followership, decision-making, navigating conflict, collaboration and competition, effective communication, content vs. process, diversity and in-group/out-group tensions. Throughout the class, students will be analyzing and applying concepts through case studies and simulations. Assignments to demonstrate mastery include regular written individual papers and a team project. This course is suitable for undergraduate students in LOC, Human Development in Context, and related majors throughout Northwestern that are interested in leadership, teams/groups or organizational change. Taught with HDC 309-0; may not receive credit for both courses.

LOC 311-0 Tools for Organizational Analysis (1 Unit) Understanding cause-and-effect relationships pertaining to organizational behavior and performance.

LOC 312-0 Modern Organization and Innovations (1 Unit) Advances in technologies, from computation to analytics to new models of management and organizations, has radically transformed both every day work and classic models of management and organization. This course takes a novel approach to understanding these transformations by partnering a SESP faculty member with industry leaders and change agents to identify and analyze changing organizational forms and the implications for work in the contemporary economy. In doing so, this course will expose students to variants in organizational models, for example, from the highly institutionalized, yet ever changing, digital firm to firm-market hybrids that supply branded service yet do not employ the providers or own the assets that provide services. Students will have weekly analytic assignments that prepare for and reflect on industry co-instructor sessions as well as a final team project. This course is suitable for undergraduate students in LOC, social policy, and related majors throughout northwestern that are interested in leadership or organizational change. This advanced, highly interactive course fulfills new Learning and Organizational Change (LOC) requirements and is open to LOC students and beyond.

LOC 313-0 Learning and Thinking in Organizations (1 Unit) Learning & Thinking in Organizations explores human judgment and decision making under conditions of uncertainty. You will learn to recognize recurring patterns in your own cognition and that of the people around you, and examine the ways those tendencies can lead people to better or worse courses of action. The class opens with a focus on the work of two research psychologists, Amos Tversky and Daniel Kahneman, who developed an important framework for understanding how people reach conclusions and make decisions. Their work formed the foundation of the field of behavioral economics. As we move through the quarter, we will draw on this framework to analyze human judgment and organizational decisionmaking in the domains of medicine, public health, criminal justice, and sports. We will investigate ways to use insights from research to improve the functioning of organizations, with a goal of making life better for the people that work in them and the people they serve. In the final project, working either independently or in a group, you will research an organizational phenomenon and develop a design for change using the theoretical perspectives from the course. Grading is based on quizzes, a midterm, and a final project.

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 195-0 Community Engagement (1 Unit) Critical reflection on community service experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community. For Civic Engagement Certificate students only.

SESP 200-0 Understanding Knowledge (1 Unit) What does it mean to know something? What are the different types of knowledge and what distinguishes them from one another? What counts as fact vs. opinion vs. belief and so on; who gets to decide and under what conditions? How is knowledge produced and how does it gain traction? How does the source and type of knowledge interact with socio-political-cultural constructs and systems of power and, in turn, how can "knowledge" be used to produce and/or perpetuate power and privilege or to empower those who are marginalized? Finally, how does what we do in SESP and at Northwestern as both consumers and producers of knowledge fit within the landscape of these questions? In this course students will explore these and other questions to gain insight into the social production, distribution, consumption, interpretation, and operationalization of "knowledge." Using primarily seminar-style discussion, the first portion of the course focuses on building and analyzing theoretical frameworks and applied texts in order to generate a working understanding of "knowledge" in its myriad forms. Among our goals for the first portion of the course is to tie theoretical, academic, and "folk" knowledges to everyday experiences and the world around us writ large. The second portion of the class will involve a series of applied of cases studies, including welcoming members of the SESP faculty community to present on their research, which we will work to bring into conversation with our generated frameworks regarding the sources, types, and implications of knowledge.

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 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 204-0 Designing for Social Change (1 Unit) A key goal of this course is to acquire an intellectual and applied understanding of the principles of program design and development, which include a sustained consideration of issues affecting the quality of program implementation. This course is best suited for FIRST AND SECOND YEAR students.

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 218-0 Leaders Lab (1 Unit) N/A.

SESP 251-0 Special Topics (1 Unit) N/A.

SESP 272-0 Field Research Methods (1 Unit) Guided practice in systematic and participant observation. Observer bias, field notes, unobtrusive measures.

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 310-0 Causal Methods for Evaluating Policy (1 Unit) This course will provide students with a framework for understanding causal inference and a toolkit for making causal claims using quantitative data. Prerequisites: Students need to have taken SESP 210-0 or any 200-level STATS course.

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 322-0 Crafting Child Policy (1 Unit) N/A.

SESP 323-0 Trauma and Atrocity: Holocaust Memory, Memorial and Museums (1 Unit) What is Holocaust memory? How has Holocaust memory changed over time, and how does the Holocaust continue to affect our understanding of trauma, atrocity, and human rights today? This seminar addresses individual memory, including survivor and witness testimony, memory and trauma, and the impact of the Holocaust on survivors' families and communities.

SESP 324-0 Pedagogies for History and Injustice: Holocaust Education Design (1 Unit) N/A.

SESP 325-0 Race, Adolescence, and School Discipline (1 Unit) In recent years, racial disparities in school discipline have attracted the attention of educators, policymakers, parents, and the general public. Why is it so hard for legal, political, and educational institutions to improve school discipline? How do intersections of race, gender, and social class matter for students' experiences of school discipline? Are there schools that are getting discipline right? What does that look like, and to what extent can other schools learn from their successes? In this course, we will learn about evidence-based policy improvements and imagine how to create schools where race does not predict discipline.

SESP 351-0 Special Topics (1 Unit) Advanced work on special topics.

SESP 351-SA Special Topics (1 Unit) Advanced work on special topics. This course is limited to students approved to study abroad through the Global Learning Office (GLO).

SESP 384-0 Practicum in Human Development - Washington, D.C. (4 Units) See description for SESP 382-0. Offered during Summer Session only. Prerequisites: SESP 272-0; consent of SESP practicum director 3 quarters before registration. For participants in the Washington, DC, field studies program 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 Design (1 Unit) Overview of research methods that may be used to design and implement the honors thesis. Prerequisites: SESP 210-0 and SESP 272-0 recommended.

SESP 392-0 Experiential Learning: Practicum (4 Units)

SESP 398-0 Senior Thesis Seminar (1-3 Units) Students develop, design, implement, and evaluate a research project under a faculty advisor's guidance. Prerequisites: senior status, cumulative GPA by the end 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. 27) and the degree requirements of their home school.

Concentration Program—16 units*

* 8 of the 16 units need to be at the 300-level

Course	Title
Required Courses (7 units)	
LOC 211-0	Intro to Organization Theory & Practice
LOC 306-0	Studies in Organizational Change
1 course for the Sociocultural cluster from:	
LOC 214-0	Culture and Cognition
or LOC 214-BR	Culture and Cognition: SESP Leadership Institute
or LRN_SCI 214-0	Culture and Cognition
LOC/LRN_SCI 308-0	Redesigning Everyday Organizations

LOC 351-0	Topics in Learning and Organizational Change (Cognition in Contexts or Identities, Intersections, and Organizations)
SESP 320-0	Race and Education
SOC_POL 351-0	Special Topics in Social Policy (Urban Education Policy and Practice)
1 course for the Cognitive Psychology cluster from:	
LRN_SCI 201-0	Cognition and Action
LOC 313-0	Learning and Thinking in Organizations
LOC 351-0	Topics in Learning and Organizational Change (Mapping and Spatial Analysis for Social Issues)
1 course for the Organizational Design cluster from:	
LOC/LRN_SCI 308-0	Redesigning Everyday Organizations
LRN_SCI 301-0	Design of Learning Environments
LRN_SCI 351-0	Topics in Learning Sciences (Sports, Technology and Learning)
SESP 204-0	Designing for Social Change
SESP 351-0	Special Topics (Public Learning through the Arts: Magic, Monsters and the Holocaust)
LOC 346-0	Psychology of Technology & Instructional Design
SESP 323-0	Trauma and Atrocity: Holocaust Memory, Memorial and Museums
SESP 324-0	Pedagogies for History and Injustice: Holocaust Education Design
2 courses for the Organizational Analysis cluster from:	
LOC/HDC 309-0	Team Dynamics
LOC 311-0	Tools for Organizational Analysis
LOC 312-0	Modern Organization and Innovations
LOC 351-0	Topics in Learning and Organizational Change (Identities, Intersections, and Organizations)
SESP 310-0	Causal Methods for Evaluating Policy
SESP 351-0	Special Topics (Computing, Ethics, and Society)
SOC_POL 312-0	Social Policymaking and Implementation
SOC_POL 334-0	Quantitative Tools for Policy Analysis
Concentration Extension Course (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
Seminar—1 unit	
SESP 200-0	Understanding Knowledge
Human Development—1 unit	
SESP 201-0	Human Development: Childhood and Adolescence [1]
or PSYCH 244-0	Developmental Psychology
OR	
SESP 203-0	Human Development: Adulthood and Aging
OR	
HDC 310-0	The Art and Science of Aging
Methodologies —2 units	
SESP 210-0	Introduction to Statistics and Research Methodology
SESP 272-0	Field Research Methods
Experiential Learning—4 units [2]	
SESP 392-0	Experiential Learning: Practicum
or SESP 389-0	Practicum in Human Development - San Francisco

1 PSYCH 110-0 Introduction to Psychology is a prerequisite for PSYCH 244-0.

2 Practicum course must be in concentration field. This 4-unit course may be taken either for 1 quarter during junior year or for nine weeks during the Summer Session before or after 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.

Overlay Requirements*

* Overlay requirements are fulfilled by courses taken for the concentration

Course	Title
Global Engagement	
1 quarter of study abroad or 3 quarters of foreign language or equivalent.	
Heterogeneities, Systems, and Inequalities	
1 course counted towards the concentration: HDC 305-0, LOC 214-0, LOC 214-BR, LOC 351-0 (Identities, Intersection, and Organizations), LRN_SCI 202-0, LRN_SCI 214-0, LRN_SCI 302-0, LRN_SCI 309-0, SESP 251-0 (Finding Your Path: Future Possibilities and Social Change) and (Community Research Methods: Educational Justice), SESP 317-0, SESP 320-0, SESP 323-0, SESP 324-0, SESP 325-0, SESP 351-0 (Computing, Ethics, and Society or Public Learning Through the Arts), SOC_POL 313-0, SOC_POL 315-0, SOC_POL 331-0, SOC_POL 333-0, SOC_POL 351-0 (Intersectional Identities and Public Policy or Urban Education Policy and Practice) TEACH_ED 302-0, TEACH_ED 351-0 (Cognition and Culture in Teaching and Learning), TEACH_ED 341-0	
Methods in Context	
1 course counted towards the concentration: HDC 330-0, HDC 351-0 (Mapping and Spatial Analysis for Social Issues), LOC 308-0, LOC 311-0, LRN_SCI 301-0, LRN_SCI 309-0, LRN_SCI 313-0, LRN_SCI 326, LRN_SCI 351-0 (Sports, Technology and Learning), LRN_SCI 372-0, SESP 204-0, SESP 251-0 (Demystifying Quantitative Data and Community Research Methods: Educational Justice), SESP 310-0, SESP 323-0, SESP 324-0, SESP 351-0 (Public Learning or The Life Story Interview) , SOC_POL 330-0, SOC_POL 331-0, SOC_POL 332-0, SOC_POL 333-0, SOC_POL 334-0	

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. 119)

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. Combined with LOC 214-0; may not receive credit for both courses.

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 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: COMP_SCI 110-0 or permission of instructor.

LRN_SCI 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. Combined with LOC 308-0; may not receive credit for both courses.

LRN_SCI 309-0 Inclusive Making (1 Unit) Excitement for the Maker Movement continues to grow. Part of this growth stems from the idea that Making provides a means for democratization of fabrication and invention. While this is true, in part, the practices and people that are typically included under this brand are limited. In particular, issues of diversity, equity and inclusivity are seldom at the forefront of the design and implementation of Makerspaces, the tools used or the artifacts created. Hence, the purpose of this course is to bring issues of diversity, equity and inclusivity to the forefront. In particular, the goals of this course are to push students to 1) critically explore Making as a practice that promotes democratization, 2) develop interfaces that allow a broader population of students to participate in digital fabrication and 3) design artifacts that positively impact accessibility and inclusivity. The course will include guest speakers, laboratory portions and a projects that encourages students to develop publishable scholarship and/or functional prototypes, as they work in interdisciplinary teams. This is a hands-on project course. All students will design and implement interactive technologies. For this reason you will be expected to do computer programming and digital fabrication. However, all projects can be completed in teams. Hence, it is not essential that all students come with prior knowledge in computer programming and digital fabrication. Additionally, a portion of class and office hours will be devoted to helping students gain familiarity in basic digital fabrication and computer programming.

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 COMP_SCI 313-0; may not receive credit for both courses. Prerequisite: COMP_SCI 110-0.

LRN_SCI 326-0 Design of Technological Tools for Thinking and Learning (1 Unit) Constructionist approach to design. Participants discuss learning design literature, critique software, and design and build computer-based learning environments (CBLE).

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 COMP_SCI 372-0; may not receive credit for both courses.

SESP 114-0 Summer Internship (0 Unit)

SESP 115-0 Internship (0 Unit)

SESP 195-0 Community Engagement (1 Unit) Critical reflection on community service experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community. For Civic Engagement Certificate students only.

SESP 200-0 Understanding Knowledge (1 Unit) What does it mean to know something? What are the different types of knowledge and what distinguishes them from one another? What counts as fact vs. opinion vs. belief and so on; who gets to decide and under what conditions? How is knowledge produced and how does it gain traction? How does the source and type of knowledge interact with socio-political-cultural constructs and systems of power and, in turn, how can "knowledge" be used to produce and/or perpetuate power and privilege or to empower those who are marginalized? Finally, how does what we do in SESP and at Northwestern as both consumers and producers of knowledge fit within the landscape of these questions? In this course students will explore these and other questions to gain insight into the social production, distribution, consumption, interpretation, and operationalization of "knowledge." Using primarily seminar-style discussion, the first portion of the course focuses on building and analyzing theoretical frameworks and applied texts in order to generate a working understanding of "knowledge" in its myriad forms. Among our goals for the first portion of the course is to tie theoretical, academic, and "folk" knowledges to everyday experiences and the world around us writ large. The second portion of the class will involve a series of applied of cases studies, including welcoming members of the SESP faculty community to present on their research, which we will work to bring into conversation with our generated frameworks regarding the sources, types, and implications of knowledge.

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 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 204-0 Designing for Social Change (1 Unit) A key goal of this course is to acquire an intellectual and applied understanding of the principles of program design and development, which include a sustained consideration of issues affecting the quality of program implementation. This course is best suited for FIRST AND SECOND YEAR students.

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 218-0 Leaders Lab (1 Unit) N/A.

SESP 251-0 Special Topics (1 Unit) N/A.

SESP 272-0 Field Research Methods (1 Unit) Guided practice in systematic and participant observation. Observer bias, field notes, unobtrusive measures.

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 310-0 Causal Methods for Evaluating Policy (1 Unit) This course will provide students with a framework for understanding causal inference and a toolkit for making causal claims using quantitative data. Prerequisites: Students need to have taken SESP 210-0 or any 200-level STATS course.

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 322-0 Crafting Child Policy (1 Unit) N/A.

SESP 323-0 Trauma and Atrocity: Holocaust Memory, Memorial and Museums (1 Unit) What is Holocaust memory? How has Holocaust memory changed over time, and how does the Holocaust continue to affect our understanding of trauma, atrocity, and human rights today? This seminar addresses individual memory, including survivor and witness testimony, memory and trauma, and the impact of the Holocaust on survivors' families and communities.

SESP 324-0 Pedagogies for History and Injustice: Holocaust Education Design (1 Unit) N/A.

SESP 325-0 Race, Adolescence, and School Discipline (1 Unit) In recent years, racial disparities in school discipline have attracted the attention of educators, policymakers, parents, and the general public. Why is it so hard for legal, political, and educational institutions to improve school discipline? How do intersections of race, gender, and social class matter for students' experiences of school discipline? Are there schools that are getting discipline right? What does that look like, and to what extent can other schools learn from their successes? In this course, we will learn about evidence-based policy improvements and imagine how to create schools where race does not predict discipline.

SESP 351-0 Special Topics (1 Unit) Advanced work on special topics.

SESP 351-SA Special Topics (1 Unit) Advanced work on special topics. This course is limited to students approved to study abroad through the Global Learning Office (GLO).

SESP 384-0 Practicum in Human Development - Washington, D.C. (4 Units) See description for SESP 382-0. Offered during Summer Session

only. Prerequisites: SESP 272-0; consent of SESP practicum director 3 quarters before registration. For participants in the Washington, DC, field studies program 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 Design (1 Unit) Overview of research methods that may be used to design and implement the honors thesis. Prerequisites: SESP 210-0 and SESP 272-0 recommended.

SESP 392-0 Experiential Learning: Practicum (4 Units)

SESP 398-0 Senior Thesis Seminar (1-3 Units) Students develop, design, implement, and evaluate a research project under a faculty advisor's guidance. Prerequisites: senior status, cumulative GPA by the end 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. 27) and the degree requirements of their home school.

Concentration Program—16 units*

* 8 of the 16 units need to be at the 300-level

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 for the Cognition cluster from:	
COG_SCI 207-0	Introduction to Cognitive Modeling
COG_SCI 211-0	Learning, Representation & Reasoning
PSYCH 228-0	Cognitive Psychology
1 course for the Language and Culture cluster 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 Crosslisted with SLAVIC 222
LING 223-0	Language & Gender Crosslisted with GNDR_ST 234
1 course for the Learning in Schools cluster from:	
LRN_SCI 302-0	Social Contexts of Education
LRN_SCI 338-0	Learning and Teaching with Technology
LRN_SCI/TEACH_ED 351-0	Topics in Learning Sciences (Computer Science Education)
SESP 320-0	Race and Education
SOC_POL 351-0	Special Topics in Social Policy (Urban Education Policy and Practice)
TEACH_ED 302-0	Social Contexts of Education
TEACH_ED 301-0	Schooling in America
1 course for the Out of School Learning cluster from:	
LRN_SCI 214-0	Culture and Cognition
or LOC 214-BR	Culture and Cognition: SESP Leadership Institute
LOC 306-0	Studies in Organizational Change
LOC 351-0	Topics in Learning and Organizational Change (Cognition in Contexts)
LRN_SCI/LOC 308-0	Redesigning Everyday Organizations
SESP 204-0	Designing for Social Change
SESP 251-0	Special Topics (Finding Your Path: Future Possibilities and Social Change)
SESP 323-0	Trauma and Atrocity: Holocaust Memory, Memorial and Museums
SESP 324-0	Pedagogies for History and Injustice: Holocaust Education Design
SESP 351-0	Special Topics (Computing, Ethics, and Society)
TEACH_ED 329-0	Cognition and Culture in Teaching and Learning
1 course for the Design of Learning Environments cluster from:	
SESP 251-0	Special Topics (Community Research Methods: Educational Justice)
LRN_SCI 307-0	Designing Interactive Media and Technology for Learning
LRN_SCI 309-0	Inclusive Making
LRN_SCI 313-0	Tangible Interaction Design and Learning
LRN_SCI 326-0	Design of Technological Tools for Thinking and Learning
LRN_SCI 351-0	Topics in Learning Sciences (Sports, Technology and Learning or Design of Sociotechnical Systems)
LRN_SCI 372-0	Designing and Constructing Models with Multi-agent Languages
1 additional course in student's specialization	
Concentration Extension Course (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
Seminar—1 unit	
SESP 200-0	Understanding Knowledge
Human Development—1 unit	
SESP 201-0	Human Development: Childhood and Adolescence [1]
or PSYCH 244-0	Developmental Psychology
OR	
SESP 203-0	Human Development: Adulthood and Aging
OR	
HDC 310-0	The Art and Science of Aging
Methodologies —2 units	
SESP 210-0	Introduction to Statistics and Research Methodology
SESP 272-0	Field Research Methods
Experiential Learning—4 units [2]	

SESP 392-0	Experiential Learning: Practicum
or SESP 389-0	Practicum in Human Development - San Francisco

1 PSYCH 110-0 Introduction to Psychology is a prerequisite for PSYCH 244-0.

2 Practicum course must be in concentration field. This 4-unit course may be taken either for 1 quarter during junior year or for nine weeks during the Summer Session before or after 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.

Overlay Requirements*

* Overlay requirements are fulfilled by courses taken for the concentration

Course	Title
Global Engagement	
1 quarter of study abroad or 3 quarters of foreign language or equivalent.	
Heterogeneities, Systems, and Inequalities	
1 course counted towards the concentration: HDC 305-0, LOC 214-0, LOC 214-BR, LOC 351-0 (Identities, Intersection, and Organizations), LRN_SCI 202-0, LRN_SCI 214-0, LRN_SCI 302-0, LRN_SCI 309-0, SESP 251-0 (Finding Your Path: Future Possibilities and Social Change) and (Community Research Methods: Educational Justice), SESP 317-0, SESP 320-0, SESP 323-0, SESP 324-0, SESP 325-0, SESP 351-0 (Computing, Ethics, and Society or Public Learning Through the Arts), SOC_POL 313-0, SOC_POL 315-0, SOC_POL 331-0, SOC_POL 333-0, SOC_POL 351-0 (Intersectional Identities and Public Policy or Urban Education Policy and Practice) TEACH_ED 302-0, TEACH_ED 351-0 (Cognition and Culture in Teaching and Learning), TEACH_ED 341-0	
Methods in Context	
1 course counted towards the concentration: HDC 330-0, HDC 351-0 (Mapping and Spatial Analysis for Social Issues), LOC 308-0, LOC 311-0, LRN_SCI 301-0, LRN_SCI 309-0, LRN_SCI 313-0, LRN_SCI 326, LRN_SCI 351-0 (Sports, Technology and Learning), LRN_SCI 372-0, SESP 204-0, SESP 251-0 (Demystifying Quantitative Data and Community Research Methods: Educational Justice), SESP 310-0, SESP 323-0, SESP 324-0, SESP 351-0 (Public Learning or The Life Story Interview) , SOC_POL 330-0, SOC_POL 331-0, SOC_POL 332-0, SOC_POL 333-0, SOC_POL 334-0	

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, history, mathematics, physics, political science, or Spanish—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 in education and social policy degree. The degree is 42 units.

Similar to the other SESP concentrations, which have a four unit practicum in the third year, secondary teaching students must complete a one-quarter student teaching internship in the last year while enrolled in TEACH_ED 388-0 Student Teaching: Humanities or TEACH_ED 385-0 Student Teaching Seminar: Math or TEACH_ED 386-0 Student Teaching Seminar: Science.

Weinberg College of Arts and Sciences students who wish to pursue secondary teaching licensure must apply to the program by the fall of their third year and complete the requirements of the secondary teaching concentration. They also must complete the degree requirements of the Weinberg College of Arts and Sciences.

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Total requirements—42 units

Distribution requirements—10 units

Professional core—12 units

Teaching subject–area requirements—varies

Electives—8 or fewer as needed to complete the 42-unit degree requirement

Distribution Requirements (10 units)

- 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 (12 units)

Course	Title
SESP 201-0	Human Development: Childhood and Adolescence [1,2]
TEACH_ED 302-0	Social Contexts of Education
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 375-0	Theory & Practice of Teaching : Math
or TEACH_ED 376-0	Theory & Practice of Teaching : Science
1 student teaching seminar (4 units):	
TEACH_ED 388-0	Student Teaching: Humanities
or TEACH_ED 385-0	Student Teaching Seminar: Math
or TEACH_ED 386-0	Student Teaching Seminar: Science

[1] PSYCH 244-0 Developmental Psychology for non-SESP students
[2] PSYCH 110 is a prerequisite for PSYCH 244-0.

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. The unit totals below are approximate minimums. Exact unit totals depend on options chosen.

Biological and Physical Sciences

Biological Sciences (20.06 units)

Course	Title
8 core science courses plus labs:	
BIOL_SCI 201-0	Molecular Biology
ASTRON 101-0	Modern Cosmology
or ASTRON 120-0	Highlights of Astronomy
CHEM 110-0 & CHEM 131-0 & CHEM 141-0	Quantitative Problem Solving in Chemistry and General Chemistry 1 and General Chemistry Laboratory 1
OR	
CHEM 151-0 & CHEM 161-0	Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1
OR	
CHEM 171-0 & CHEM 181-0	Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory
EARTH 201-0	Earth Systems Revealed
or ENVR_SCI 201-0	Earth: A Habitable Planet
ENVR_SCI 202-0	The Health of the Biosphere
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
3 additional chemistry courses and required labs:	
CHEM 132-0 & CHEM 142-0	General Chemistry 2 and General Chemistry Laboratory 2
OR	
CHEM 172-0 & CHEM 182-0	Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory
OR	
CHEM 152-0 & CHEM 162-0	Accelerated General Chemistry 2 and Accelerated General Chemistry Laboratory 2
CHEM 212-1 & CHEM 232-1	Organic Chemistry and Organic Chemistry Laboratory I
or CHEM 215-1 & CHEM 235-1	Organic Chemistry I and Organic Chemistry Lab I
CHEM 212-2 & CHEM 232-2	Organic Chemistry and Organic Chemistry Laboratory II
or CHEM 215-2 & CHEM 235-2	Organic Chemistry II and Organic Chemistry Lab II
5 additional biological sciences courses plus 3 labs:	
BIOL_SCI 202-0	Cell Biology
BIOL_SCI 203-0	Genetics and Evolution
BIOL_SCI 301-0	Principles of Biochemistry
1 chosen from:	
BIOL_SCI 341-0	Population Genetics
BIOL_SCI 342-0	Evolutionary Processes
BIOL_SCI 392-0	Developmental Genetics Laboratory
1 additional 300-level biological sciences course (SESP students) [1]	
3 labs:	
BIOL_SCI 232-0	Molecular and Cellular Processes Laboratory
BIOL_SCI 233-0	Genetics and Molecular Processes Laboratory
BIOL_SCI 234-0	Investigative Laboratory

[1] *For Weinberg College students*: additional courses as needed to meet requirements for the major.

Chemistry (20.72 units)

Course	Title
9 core science courses plus labs:	
ASTRON 101-0	Modern Cosmology
or ASTRON 120-0	Highlights of Astronomy
BIOL_SCI 164-0	Basic Genetics and Evolution
OR	
BIOL_SCI 202-0 & BIOL_SCI 232-0	Cell Biology and Molecular and Cellular Processes Laboratory
CHEM 110-0 & CHEM 131-0 & CHEM 141-0	Quantitative Problem Solving in Chemistry and General Chemistry 1 and General Chemistry Laboratory 1
OR	

CHEM 151-0 & CHEM 161-0	Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1
OR	
CHEM 171-0 & CHEM 181-0	Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory
EARTH 201-0	Earth Systems Revealed
ENVR_SCI 201-0	Earth: A Habitable Planet
ENVR_SCI 202-0	The Health of the Biosphere
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
6 additional chemistry courses and required labs:	
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
CHEM 220-0	Introductory Instrumental Analysis
CHEM 212-1 & CHEM 232-1	Organic Chemistry and Organic Chemistry Laboratory I
or CHEM 215-1 & CHEM 235-1	Organic Chemistry I and Organic Chemistry Lab I
CHEM 212-2 & CHEM 232-2	Organic Chemistry and Organic Chemistry Laboratory II
or CHEM 215-2 & CHEM 235-2	Organic Chemistry II and Organic Chemistry Lab II
CHEM 212-3 & CHEM 235-3	Organic Chemistry and Advanced Organic Chemistry Lab
or CHEM 215-3 & CHEM 235-3	Advanced Organic Chemistry and Advanced Organic Chemistry Lab
CHEM 393-0	Green Chemistry
2 additional 300-level chemistry courses	

Physics (14.36 units)

Course	Title
7 core science courses plus labs:	
ASTRON 101-0	Modern Cosmology
or ASTRON 120-0	Highlights of Astronomy
BIOL_SCI 103-0	Diversity of Life
CHEM 110-0 & CHEM 131-0 & CHEM 141-0	Quantitative Problem Solving in Chemistry and General Chemistry 1 and General Chemistry Laboratory 1
or CHEM 171-0 & CHEM 181-0	Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory
or	
CHEM 151-0 & CHEM 161-0	Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1
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
6 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
2 additional physics courses including at least 1 at the 300 level	

English

English (13 units)

Course	Title
ENGLISH 210-1 & ENGLISH 210-2	British Literary Traditions and British Literary Traditions
or ENGLISH 270-1 & ENGLISH 270-2	American Literary Traditions and American Literary Traditions
ENGLISH 300-0	Seminar in Reading and Interpretation
TEACH_ED 324-0	Critical Issues in Literacy
9 additional courses, including at least 4 at the 300 level:	
At least 3 world literature courses chosen from but not limited to:	
COMP_LIT 201-0	Reading World Literature
COMP_LIT 202-0	Interpreting Culture
COMP_LIT 270-0	Literatures in Translation
COMP_LIT 301-0	Studies in World Literature
COMP_LIT 303-0	Movements and Periods
ENGLISH 365-0	Studies in Postcolonial Literature
ENGLISH 369-0	Studies in African Literature
ENGLISH 369-CN	Studies in African Literature
At least 3 literature courses representing different genders, ethnicities and social classes chosen from but not limited to:	
ENGLISH 274-0	Introduction to Native American and Indigenous Literatures
ENGLISH 275-0	Introduction to Asian American Literature
ENGLISH 277-0	Introduction to Latina and Latino Literature
ENGLISH 366-0	Studies in African American Literature
ENGLISH 374-0	Topics in Native American and Indigenous Literatures
ENGLISH 375-0	Topics in Asian American Literature
ENGLISH 377-0	Topics in Latina and Latino Literature
COMP_LIT 205-0	Reading Difference
COMP_LIT 306-0	Studies in Race & Ethnicity
COMP_LIT 307-0	Studies in Gender, Sexuality & Representation
3 additional courses chosen from the following:	
COMP_LIT 305-0	Studies in Film, Media, and Visual Culture
ENGLISH 206-0	Reading & Writing Poetry
ENGLISH 207-0	Reading and Writing Fiction
ENGLISH 208-0	Reading & Writing Creative Non-Fiction
ENGLISH 308-0	Advanced Creative Nonfiction Writing
ENGLISH 386-0	Studies in Literature and Film
JOUR 201-1	Fundamentals of Reporting & Writing News
JOUR 201-2	Fundamentals of Video Journalism
JOUR 291-0	Intro to Podcasting
RTVF 190-0	Media Construction
RTVF 220-0	Analyzing Media Texts

Spanish

Spanish (13 units)

Course	Title
Students must earn a score of upper-intermediate or higher on the ACTFL OPI for licensure.	
TEACH_ED 328-0	Dynamics of Middle School Curriculum

12 Spanish language, literature, and culture and civilization courses, including at least 5 at the 300 level:

3 courses chosen from:	
SPANISH 200-0	Language in Context: Latinx, Language and Culture
SPANISH 201-0	Advanced Spanish I: Current Topics through Media
SPANISH 202-0	Conversation on Current Topics
SPANISH 204-0	Advanced Spanish II: Artivism in Times of Political Change
SPANISH 208-0	Spanish and the Community
2 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 literature courses with at least 2 focusing on Latin-American literature selected from the following:	
SPANISH 231-0	The "New" Latin American Narrative (Taught in English)
SPANISH 232-0	Discovering Jewish Latin America
SPANISH 277-0	Introduction to Latina/o Literature
SPANISH 223-0	Cervantes (Taught in English)
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 340-0	Colonial Latin American Literature
SPANISH 341-0	Latin American Modernismo
SPANISH 343-0	Latin American Avant-Gardes
SPANISH 345-0	Reading the 'Boom'
SPANISH 346-0	Testimonial Narrative in Latin America
SPANISH 348-0	Readings in Latin American Short Fiction
3 Latin American/Latin-x culture and civilization courses including film, art, and history, from:	
SPANISH 361-0	Latin America: Studies in Culture and Society
SPANISH 362-0	Citizenship and Urban Violence in Latin America
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
Choose 1 from the following:	
SPANISH 280-0	Introduction to Spanish Linguistics
SPANISH 281-0	Spanish Phonetics and Phonology
SPANISH 302-0	Advanced Grammar

Mathematics

Mathematics (12 units)

Course	Title
12 courses (total number of courses may depend on the calculus sequence the student enrolls in) with at least 5 at the 300 level. No more than two AP credits may be counted toward the 12.	
Foundation calculus courses:	
MATH 218-1 & MATH 218-2 & MATH 218-3	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
or MATH 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus
MATH 226-0	Sequences and Series
MATH 230-1	Multivariable Differential Calculus
MATH 230-2	Multivariable Integral Calculus
Additional required courses:	
MATH 240-0	Linear Algebra
MATH 306-0	Combinatorics & Discrete 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	Introduction to Probability and Statistics
TEACH_ED 373-0	Topics in High School Math
TEACH_ED 319-0	Teaching Math: Statistics and Probability
1 geometry course chosen from:	
MATH 340-0	Geometry
TEACH_ED 318-0	Teaching Math: Geometry
Additional courses as needed to reach minimum 12 units	

Social Sciences

History (14 units)

Course	Title
No more than 1 AP credit may be counted towards history course requirements.	
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	Europe in the Medieval and Early Modern World and Europe in the Modern World
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 393-0	Approaches to History
5 additional courses, including at least 4 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	Modern China: The Transition to Modern Times, 1600-1912 and Modern China: The Twentieth Century
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
3 additional history courses with at least 2 in US History	
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
or GEOG 240-0	Economic Geography
Plus 2 from the following:	
TEACH_ED 334-0	Social Science Content for Teachers
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

Economics (15 units)

Course	Title
8 economics courses:	
ECON 201-0	Introduction to Macroeconomics
ECON 202-0	Introduction to Microeconomics
ECON 281-0	Introduction to Applied Econometrics
ECON 310-1	Microeconomics
ECON 310-2	Microeconomics
or ECON 311-0	Macroeconomics
3 additional economics courses at the 300 level	
6 history courses including four in U.S. history	
1 related core chosen from the list:	
TEACH_ED 334-0	Social Science Content for Teachers
POLI_SCI 220-0	American Government and Politics
POLI_SCI 240-0	Introduction to International Relations
POLI_SCI 250-0	Introduction to Comparative Politics

Political Science (15 units)

Course	Title
8 political science courses of which 5 must be at the 300 level:	
Choose at least 2 from:	
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
POLI_SCI 321-0	Urban 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 political science courses with at least two focusing on a region outside of North America	
6 history courses with four in U.S. history	
1 related core course chosen from the following:	
TEACH_ED 334-0	Social Science Content for Teachers
ECON 201-0	Introduction to Macroeconomics
ECON 202-0	Introduction to Microeconomics
GEOG 240-0	Economic Geography

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 Board of Education. 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 by the fall of their third year. To be admitted, they must have a minimum overall GPA of 2.5 and a minimum GPA of 3.0 in a humanities teaching subject–area or meet an annually calculated and determined GPA in math or science subject-areas. Additional admissions requirements include two letters of recommendation and responses to selected essay prompts. Students must be eligible for entrance to the program no later than the end of fall quarter of their third year.

Clinical Experience

Students in the Teacher Preparation Program complete two clinical experiences: a school practicum (typically during fall of the last year); and student teaching (typically during winter of the last year).

To be eligible for the clinical experiences, students must have met the GPA requirements for and been admitted to the Teacher Preparation Program. Students need to be on track to have completed a minimum of 9 courses in the teaching subject area by the end of the practicum term for field-site placement with a department or teacher mentor at a local school. Additionally, students must be available to begin the practicum at the start of the field-site placement's academic school year. Please note that the students' practicum/student teaching field-site placement can be postponed, stopped or withdrawn due to concerns over their health or academic or professional performance.

Clinical experiences gained at the field-site are central to the discussion of methods and theories in the practicum seminar (TEACH_ED 378-0 or TEACH_ED 375-0 or TEACH_ED 376-0) and methodology courses (TEACH_ED 355-0–TEACH_ED 359-0).

To be eligible for student teaching, students must have successfully completed the applicable TEACH_ED 355-0–TEACH_ED 359-0 course(s) as well as TEACH_ED 378-0 or TEACH_ED 375-0 or TEACH_ED 376-0, earned a passing score on the applicable ILTS 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 385-0, TEACH_ED 386-0 or TEACH_ED 388-0). 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 the clinical experiences, all teacher candidates must successfully complete the Teacher Performance Assessment at the end of the practicum.

World language teacher candidates are required to complete the Oral Proficiency Interview of the ACTFL 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 practicum/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 and are eligible 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). Illinois school districts require applicants to submit to a criminal background check.

TEACH_ED 301-0 Schooling in America (1 Unit) This course will explore the development of schools in the United States by understanding the ideologies and decisions (pedagogical and political) that have shaped schools over 200 years.

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 311-0 Elementary Science Methods (1 Unit) This course is designed to build your knowledge and skills at making science learning more meaningful for elementary students, based on current ideas and research about how teachers learn to teach science and how students learn science.

TEACH_ED 312-0 Elementary Social Studies Methods (1 Unit) This course provides students with an overview of the field of social studies, selected issues in the field and research based strategies for teaching social studies to elementary students.

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 314-0 Math for Elementary Teachers (1 Unit) Math for Elementary Teachers.

TEACH_ED 318-0 Teaching Math: Geometry (1 Unit) The course is intended to deepen conceptual understanding of middle school and high school geometry topics, especially as related to attributes and relationships of geometric objects.

TEACH_ED 319-0 Teaching Math: Statistics and Probability (1 Unit) This course aims to effectively prepare teachers to help middle school and high school students "learn with understanding" the fundamentally important statistics and probability concepts and skills that are needed for today's world and that are articulated in the Common Core State Standards.

TEACH_ED 321-0 Content Area Reading and Writing (Elementary) (1 Unit) This class surveys various aspects of children's literature: poetry, folk and fairy tales, picture books, and novels.

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 323-0 Elementary Literacy Methods & Content (1 Unit) In the course participants will gain an understanding of the cognitive foundations of reading comprehension and their influence on methods of instruction and assessment, as well as the interrelationships between reading processes and language learning.

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 326-0 Elementary Math: Methods and Content (1 Unit) The course provides an overview of mathematical topics taught in elementary and middle school. Course participants learn in small groups and reflect on their own and children's learning. Pedagogical contexts for the mathematical concepts are provided.

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 Cognition and Culture in Teaching and Learning (1 Unit) This course is an exploration of the theoretical foundations of research on culture and cognition and how to apply these ideas to views of learning and teaching in a variety of settings. Students enrolled in the course can still receive credit if LOC/LRN_SCI 214 has already been taken. This course builds on topics from LRN_SCI 301 with an emphasis on classroom environment.

TEACH_ED 333-0 Science Content for Teachers (1 Unit) This course utilizes a discussion format with a heavy emphasis on critical thinking and skills based activities. The inquiry/discussion approach will help us delve into the concepts of ecology & earth systems found on the Illinois Licensure Test.

TEACH_ED 334-0 Social Science Content for Teachers (1 Unit) Students will explore ways to select social studies content that is both meaningful and empowering for their students by engaging with texts that critically examine various social studies topics.

TEACH_ED 336-0 Instructional Design & Assessment (1 Unit) Students will gain an overview of various approaches to curriculum design and instructional models, and will investigate several kinds of assessments, including formative and summative, and how those assessments are linked to instructional design, teaching and learning. Opportunities will be given to practice grading, providing good feedback, and managing a class assessment system.

TEACH_ED 338-0 Learning and Teaching with Techology (1 Unit) Theory and practice of designing school environments that integrate new technologies and media. Taught with LRN_SCI 338-0; 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 375-0 Theory & Practice of Teaching : Math (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 376-0 Theory & Practice of Teaching : Science (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 377-0 Theory and Practice of Teaching: Elementary Teaching (1 Unit) The teaching practicum encompasses a ten-week period of part-time experience under the direction of two classroom mentors. It is performed two different sites -- urban and suburban, is organized in conjunction with a subject-specific methods tutorial, and is accompanied by a weekly practicum seminar.

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 385-0 Student Teaching Seminar: Math (4 Units) See description for TEACH_ED 388-0.

TEACH_ED 386-0 Student Teaching Seminar: Science (4 Units) See description for TEACH_ED 388-0.

TEACH_ED 387-0 Student Teaching: Elementary (4 Units) "Seminar and accompanying full time, 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 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 anthropology, communication studies, economics, ethnic studies, 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. 129)

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 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 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 313-0 Race, Inequality, and the Political Analysis of Public Policy (1 Unit) The purpose of this course is to make you a better political analyst. This course will familiarize you with substantive research on politics that has concrete insights for reformers, political advocates, and other public policy stakeholders. The class will cover substantive issues in politics along with how they intersect with class, race, gender and partisanship. While the main focus of the course is to discuss critical issues, there will also be an emphasis on public policy and political science writing formats, styles and standards. It cannot be emphasized enough how important research, analytic and writing skills are to virtually all careers; nothing is more quickly discrediting of good ideas than bad writing. The first half of class is mainly lecture and discussion. The second half of class has been designed to promote your learning as a writer and thinker in public policy. It will provide students with a designated forum for developing and "work shopping" their written work and discussing issues covered in class. The TA will offer feedback on questions as students write, edit, and revise their papers. We will also frequently practice skills in responding critically to colleagues' texts. One or more quizzes may be administered as well.

SOC_POL 315-0 Global Human Trafficking (1 Unit) We will examine the context of modern slavery against a backdrop of colonialism and slavery to understand key features of modern slavery, both as the crime is perpetuated and variations in legal definitions.

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. Pre-Requisites are Econ 281 and Econ 310-1 or SESP 310 for SESP students. SOC_POL 330-0 and ECON 333-0 are taught together; may not receive credit for both. SESP students must register for SOC_POL 330-0.

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 333-0 Economics of Health, Human Capital, and Happiness (1 Unit) Understanding causal relationships is a central goal in social science and science in general. Correlations help to predict outcomes, but if we want to influence outcomes we need to understand causal pathways. It is not sufficient to observe what is happening, we need to know why it is happening. In this course students will learn the toolbox of causal inference econometrics with applications to the economics of health, human capital, and subjective wellbeing. The empirical methods we will cover include multivariate regressions, panel data, difference-indifference designs, instrumental variables, randomized control trials, and regression discontinuities. We will also discuss causal evidence derived from theoretical models and machine learning. Health, human capital, and subjective wellbeing ("happiness") are core dimensions of social welfare and inequality in our society. They matter as an outcome for people's lives and they matter as an input into economic and social productivity. Moreover, health, human capital, and happiness are impacted by behaviors and by social and environmental conditions – factors that can be impacted via social policies. To develop effective social policies, however, it is crucial to understand the causal mechanisms driving these factors. We will discuss fetal origins, the impact of air pollution on health, causes and consequences of mental illness in childhood and youth, the impact of income on health, trends in mortality, the economic drivers of fertility, happiness across countries and over time, and the roots of midlife crisis. Prerequisites: ECON 202-0 (Intro to Microeconomics) and a 200-level statistics class (SESP 210-0, STAT 202-0, STAT 210-0 and PSYCH 201-0 are all suitable).

SOC_POL 334-0 Quantitative Tools for Policy Analysis (1 Unit) Hands on analysis of the real time challenges facing a range of policy areas and industries across federal and state governments and the private sector. *Formal Studies Distro Area*

SOC_POL 335-0 Women and American Political Leadership (1 Unit) With women comprising 51% of the American population, yet having significantly lower political representation, we will explore the evolution of women's political leadership in our nation.

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 195-0 Community Engagement (1 Unit) Critical reflection on community service experiences in relation to broader societal issues. Conceptual frameworks for understanding the meaning and nature of community. For Civic Engagement Certificate students only.

SESP 200-0 Understanding Knowledge (1 Unit) What does it mean to know something? What are the different types of knowledge and what distinguishes them from one another? What counts as fact vs. opinion vs. belief and so on; who gets to decide and under what conditions? How is knowledge produced and how does it gain traction? How does the source and type of knowledge interact with socio-political-cultural constructs and systems of power and, in turn, how can "knowledge" be used to produce and/or perpetuate power and privilege or to empower those who are marginalized? Finally, how does what we do in SESP and at Northwestern as both consumers and producers of knowledge fit within the landscape of these questions? In this course students will explore

these and other questions to gain insight into the social production, distribution, consumption, interpretation, and operationalization of "knowledge." Using primarily seminar-style discussion, the first portion of the course focuses on building and analyzing theoretical frameworks and applied texts in order to generate a working understanding of "knowledge" in its myriad forms. Among our goals for the first portion of the course is to tie theoretical, academic, and "folk" knowledges to everyday experiences and the world around us writ large. The second portion of the class will involve a series of applied of cases studies, including welcoming members of the SESP faculty community to present on their research, which we will work to bring into conversation with our generated frameworks regarding the sources, types, and implications of knowledge.

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 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 204-0 Designing for Social Change (1 Unit) A key goal of this course is to acquire an intellectual and applied understanding of the principles of program design and development, which include a sustained consideration of issues affecting the quality of program implementation. This course is best suited for FIRST AND SECOND YEAR students.

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 218-0 Leaders Lab (1 Unit) N/A.

SESP 251-0 Special Topics (1 Unit) N/A.

SESP 272-0 Field Research Methods (1 Unit) Guided practice in systematic and participant observation. Observer bias, field notes, unobtrusive measures.

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 310-0 Causal Methods for Evaluating Policy (1 Unit) This course will provide students with a framework for understanding causal inference and a toolkit for making causal claims using quantitative data. Prerequisites: Students need to have taken SESP 210-0 or any 200-level STATS course.

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 322-0 Crafting Child Policy (1 Unit) N/A.

SESP 323-0 Trauma and Atrocity: Holocaust Memory, Memorial and Museums (1 Unit) What is Holocaust memory? How has Holocaust memory changed over time, and how does the Holocaust continue to affect our understanding of trauma, atrocity, and human rights today? This seminar addresses individual memory, including survivor and witness testimony, memory and trauma, and the impact of the Holocaust on survivors' families and communities.

SESP 324-0 Pedagogies for History and Injustice: Holocaust Education Design (1 Unit) N/A.

SESP 325-0 Race, Adolescence, and School Discipline (1 Unit) In recent years, racial disparities in school discipline have attracted the attention of educators, policymakers, parents, and the general public. Why is it so hard for legal, political, and educational institutions to improve school discipline? How do intersections of race, gender, and social class matter for students' experiences of school discipline? Are there schools that are getting discipline right? What does that look like, and to what extent can other schools learn from their successes? In this course, we will learn about evidence-based policy improvements and imagine how to create schools where race does not predict discipline.

SESP 351-0 Special Topics (1 Unit) Advanced work on special topics.

SESP 351-SA Special Topics (1 Unit) Advanced work on special topics. This course is limited to students approved to study abroad through the Global Learning Office (GLO).

SESP 384-0 Practicum in Human Development - Washington, D.C. (4 Units) See description for SESP 382-0. Offered during Summer Session only. Prerequisites: SESP 272-0; consent of SESP practicum director 3 quarters before registration. For participants in the Washington, DC, field studies program 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 Design (1 Unit) Overview of research methods that may be used to design and implement the honors thesis. Prerequisites: SESP 210-0 and SESP 272-0 recommended.

SESP 392-0 Experiential Learning: Practicum (4 Units)

SESP 398-0 Senior Thesis Seminar (1-3 Units) Students develop, design, implement, and evaluate a research project under a faculty advisor's guidance. Prerequisites: senior status, cumulative GPA by the end 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. 27) and the degree requirements of their home school.

Concentration Program—16 units *

* 8 of the 16 units need to be at the 300-level

Course	Title
Required Courses (8 units)	
SOC_POL 312-0	Social Policymaking and Implementation
ECON 202-0	Introduction to Microeconomics
POLI_SCI 220-0	American Government and Politics
4 courses for the Policy Across Settings cluster from:	
HDC 330-0	Adolescent Stress: Sources and Solutions
SESP 204-0	Designing for Social Change
SESP 310-0	Causal Methods for Evaluating Policy
SESP 320-0	Race and Education
SESP 322-0	Crafting Child Policy
SESP 324-0	Pedagogies for History and Injustice: Holocaust Education Design
SESP 325-0	Race, Adolescence, and School Discipline
SESP 351-0	Special Topics (Public Learning through the Arts: Magic, Monsters, and the Holocaust)
SOC_POL 313-0	Race, Inequality, and the Political Analysis of Public Policy
SOC_POL 315-0	Global Human Trafficking
SOC_POL 334-0	Quantitative Tools for Policy Analysis
SOC_POL 335-0	Women and American Political Leadership
SOC_POL 351-0	Special Topics in Social Policy (Intersectionality, Measurement, and Public Policy)
SOC_POL 351-0	Special Topics in Social Policy (Social Opportunity and Education Policy)
SOC_POL 351-0	Special Topics in Social Policy (Urban Education Policy and Practice)
SOC_POL 351-0	Special Topics in Social Policy (Global Education)
SOC_POL 351-0	Special Topics in Social Policy (Social Side of College: Understanding the Lived Experiences of Undergraduates)
1 course for the Economic Analysis of Policy cluster from:	
SOC_POL 330-0/ ECON 333-0	Economics of Social Policy
SOC_POL 331-0	Economics of Inequality and Discrimination
SOC_POL 332-0	Economics of Education Policy [1]
SOC_POL 333-0	Economics of Health, Human Capital, and Happiness
Concentration Extension Courses (8 units)	
Must be selected from an approved list of courses in SOC POL, other SESP concentrations, and disciplines such as communication studies, economics, ethnic studies, political science, and sociology. 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.	

[1] SOC_POL 332-0 Economics of Education Policy cannot be double counted.

SESP Core (8 units)

Course	Title
Seminar—1 unit	
SESP 200-0	Understanding Knowledge
Human Development—1 unit	
SESP 201-0	Human Development: Childhood and Adolescence [1]
or PSYCH 244-0	Developmental Psychology
OR	
SESP 203-0	Human Development: Adulthood and Aging
OR	
HDC 310-0	The Art and Science of Aging
Methodologies —2 units	
SESP 210-0	Introduction to Statistics and Research Methodology
SESP 272-0	Field Research Methods
Experiential Learning—4 units [2]	
SESP 392-0	Experiential Learning: Practicum
or SESP 389-0	Practicum in Human Development - San Francisco

[1] PSYCH 110-0 Introduction to Psychology is a prerequisite for PSYCH 244-0.

[2] Practicum course must be in concentration field. This 4-unit course may be taken either for 1 quarter during junior year or for nine weeks during the Summer Session before or after 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.

Overlay Requirements*

* Overlay requirements are fulfilled by courses taken for the concentration

Course	Title
Global Engagement	
1 quarter of study abroad or 3 quarters of foreign language or equivalent.	
Heterogeneities, Systems, and Inequalities	
1 course counted towards the concentration: HDC 305-0, LOC 214-0, LOC 214-BR, LOC 351-0 (Identities, Intersection, and Organizations), LRN_SCI 202-0, LRN_SCI 214-0, LRN_SCI 302-0, LRN_SCI 309-0, SESP 251-0 (Finding Your Path: Future Possibilities and Social Change) and (Community Research Methods: Educational Justice), SESP 317-0, SESP 320-0, SESP 323-0, SESP 324-0, SESP 325-0, SESP 351-0 (Computing, Ethics, and Society or Public Learning Through the Arts), SOC_POL 313-0, SOC_POL 315-0, SOC_POL 331-0, SOC_POL 333-0, SOC_POL 351-0 (Intersectional Identities and Public Policy or Urban Education Policy and Practice) TEACH_ED 302-0, TEACH_ED 351-0 (Cognition and Culture in Teaching and Learning), TEACH_ED 341-0	
Methods in Context	

1 course counted towards the concentration: HDC 330-0, HDC 351-0 (Mapping and Spatial Analysis for Social Issues), LOC 308-0, LOC 311-0, LRN_SCI 301-0, LRN_SCI 309-0, LRN_SCI 313-0, LRN_SCI 326, LRN_SCI 351-0 (Sports, Technology and Learning), LRN_SCI 372-0, SESP 204-0, SESP 251-0 (Demystifying Quantitative Data and Community Research Methods: Educational Justice), SESP 310-0, SESP 323-0, SESP 324-0, SESP 351-0 (Public Learning or The Life Story Interview) , SOC_POL 330-0, SOC_POL 331-0, SOC_POL 332-0, SOC_POL 333-0, SOC_POL 334-0

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 weekly Practicum Analysis Seminar.

During Summer Session any Northwestern undergraduate student is able to complete the program in 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.

Civic Engagement Certificate

sesp.northwestern.edu/ugrad/civic-engagement-program

Open to first year, second year, and third year students 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 6 units of coursework and 100 hours of community engagement.

Coursework includes:

Course	Title
SESP 195-0	Community Engagement (2-3 units) [1]
SESP 295-0	Theory and Practice of Community Consulting (taken in fall of the second year)
Students can complete the second year in two modes: [2]	
SESP 295-0	Theory and Practice of Community Consulting
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.)
OR	
SESP 295-0	Theory and Practice of Community Consulting
SESP 295-0	Theory and Practice of Community Consulting
SESP 295-0	Theory and Practice of Community Consulting

[1] Students may start the first year of the certificate in the fall quarter (3 units of SESP 195-0) or in the winter quarter (2 units of SESP 195-0). If a student elects to take 2 units of SESP 195, they must take SOC_POL 312-0 Social Policymaking and Implementation at some time during the completion of the certificate.

[2] Both modes result in the student completing the certificate. For more information, please visit the SESP website (https://www.sesp.northwestern.edu/ugrad/civic-engagement-program/).

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. 169)
- biomedical engineering (p. 135)
- chemical engineering (p. 139)
- civil engineering (p. 143)
- computer engineering (p. 161)
- computer science (p. 153)
- electrical engineering (p. 161)
- environmental engineering (p. 143)
- industrial engineering (p. 175)
- manufacturing and design engineering (p. 186)
- materials science and engineering (p. 178)
- mechanical engineering (p. 182)

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/ (https://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 (p. 131) 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 (27 units)

Mathematics (4 units)

- Standard for all degree programs

Course	Title
MATH 220-1	Single-Variable Differential Calculus
MATH 220-2	Single-Variable Integral Calculus
MATH 228-1	Multivariable Differential Calculus for Engineering
MATH 228-2	Multivariable Integral Calculus for Engineering

[1] ES_APPM 252-1 Honors Calculus for Engineers, ES_APPM 252-2 Honors Calculus for Engineers may substitute for MATH 228-1 Multivariable Differential Calculus for Engineering and MATH 228-2 Multivariable Integral Calculus for Engineering.

[2] The computer science degree program requires COMP_SCI 212-0 Mathematical Foundations of Comp Science instead of MATH 228-2 Multivariable Integral Calculus for Engineering.

Engineering Analysis and Computer Proficiency (4 units)

- Standard for all degree programs

Course	Title
GEN_ENG 205-1	Engineering Analysis I [1]
or GEN_ENG 206-1	Honor Engineering Analysis
GEN_ENG 205-2	Engineering Analysis II
GEN_ENG 205-3	Engineering Analysis III

GEN_ENG 205-4	Engineering Analysis IV [1&2]
or GEN_ENG 206-4	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 COMP_SCI 111-0 Fundamentals of Computer Programming instead of Engineering Analysis IV.

Basic Sciences (4 units)

- At least 1 course with an associated required laboratory co-registration (.34 units) from the following list of courses is required
- Eligible courses may vary by degree program; see program for details.

Course	Title
At least 1 unit (with required lab) from the options below	
BIOL_SCI 202-0 & BIOL_SCI 232-0	Cell Biology and Molecular and Cellular Processes Laboratory
CHEM 131-0 & CHEM 141-0	General Chemistry 1 and General Chemistry Laboratory 1
or CHEM 151-0 & CHEM 161-0	Accelerated General Chemistry 1 and Accelerated General Chemistry Laboratory 1
or CHEM 171-0 & CHEM 181-0	Advanced General Inorganic Chemistry and Advanced General Inorganic Chemistry Laboratory
PHYSICS 135-2 & PHYSICS 136-2	General Physics and General Physics Laboratory
or PHYSICS 125-2 & PHYSICS 126-2	General Physics for ISP and Physics for ISP Laboratory
or PHYSICS 140-2 & PHYSICS 136-2	Fundamentals of Physics and General Physics Laboratory

- Remaining units can be taken from the courses above or from the approved list of courses below.

Course	Title
Biological Sciences	
BIOL_SCI 150-0	Human Genetics
BIOL_SCI 201-0	Molecular Biology
BIOL_SCI 203-0 & BIOL_SCI 233-0	Genetics and Evolution and Genetics and Molecular Processes Laboratory
BIOL_SCI 234-0	Investigative Laboratory
CHEM_ENG 275-0	Molecular & Cell Biology for Engineers
CIV_ENV 202-0	Biological and Ecological Principles
Chemistry	
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
CHEM 215-1 & CHEM 235-1	Organic Chemistry I and Organic Chemistry Lab I
CHEM 215-2 & CHEM 235-2	Organic Chemistry II and Organic Chemistry Lab II
Earth and Planetary Sciences/Astronomy	
ASTRON 220-1	Introduction to Astrophysics I: Life Cycle of Stars and Planets
ASTRON 220-2	Introduction to Astrophysics II: Galactic Evolution and Cosmology
CIV_ENV 201-0	Engineering Possibilities: Decision Science in the Age of Smart Technologies
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
GEOG 235-0	Atmosphere and Climate
Physics	
PHYSICS 135-3 & PHYSICS 136-3	General Physics and General Physics Laboratory
or PHYSICS 125-3 & PHYSICS 126-3	General Physics for ISP and Physics for ISP Laboratory
or PHYSICS 140-3 & PHYSICS 136-3	Fundamentals of Physics and General Physics Laboratory
PHYSICS 239-0	Foundations of Modern Physics
Neuroscience and Cognition	
COG_SCI 210-0	Language and the Brain
CSD 202-0	Neurobiology of Communication
CSD 303-0	Brain and Cognition
PSYCH 221-0	Introduction to Neuroscience

- Students must complete 4 units of Basic Science courses, selected from the approved list of courses.
- 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.

Social Sciences/Humanities (Theme) (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

- Students who transfer from another university or who earn study abroad credit may petition to exceed the 100-level course limit.
- 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 (21 units)

Each degree program in the McCormick School finds its depth in the major program's 21 units. These 21 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 (https://www.mccormick.northwestern.edu/students/undergraduate/advising-registration/course-duplicates.html)

McCormick students may use no more than 4 units of transfer credit based on work completed elsewhere within the 21-unit Major Program portion of degree requirements. Any such use of transfer credit must be approved by both the department and school. The 4-unit limit does not apply to transfer credit used to satisfy other categories within McCormick degree requirements, although all McCormick students are required to satisfy the Undergraduate Registration Requirement (URR).

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 21 units in the major program must also be at least 2.0; no more than 3 of these units may carry grades of D. Grades for courses fulfilling a minor must be C– or higher (unless otherwise noted in the minor requirements), 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. 27).

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 (https://www.mccormick.northwestern.edu/academics/undergraduate/programs/integrated-engineering-studies.html)

Students must complete 4 units of Basic Science courses, selected from the approved menu of course options.

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 (https://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 and Exemptions

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), or special examinations in subject areas. Students may be exempted from certain McCormick requirements (with a corresponding reduction in degree requirements) on the basis of proficiency exams, or analysis of coursework completed elsewhere. 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. 43) 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 www.mccormick.northwestern.edu/research (https://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 (https://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. Students pursuing two BS degrees within McCormick are held to the same Undergraduate Registration Requirement (URR) (p. 27) used for single degree seeking undergraduates.

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/ (https://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. 38). For information on applying to one of these programs see Application to Dual Bachelor's Degree Programs (p. 12).

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.

- Architectural engineering and design (p. 152)
- Biotechnology and biochemical engineering (p. 142)
- Computer science (p. 159)
- Data Science and Engineering (p. 160)
- Entrepreneurship (p. 171)
- Environmental engineering (p. 153)
- Materials science (p. 324) (minor offered by the Weinberg College of Arts & Sciences)
- Transportation and logistics (p. 33) (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. 33) 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. **Of special note: Guidelines on certificates issued by Northwestern's Office of the Provost state that "a certificate requires academic course work of at least four units that are not applied**

to a major or minor." (In McCormick, 'major' refers to the 21-unit Major Program.) Individual certificate programs may set more stringent rules.

- Human Computer Interaction (p. 174): The HCI Certificate allows Northwestern students from all departments to develop their interest and exposure to ideas and research in HCI, including the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.
- Segal Design Certificate (p. 188): 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/ (https://www.mccormick.northwestern.edu/career-development/programs/co-op/)

Honors Program in Medical Education

The Honors Program in Medical Education (HPME) is designed for exceptionally well-prepared high school students who seek careers in medicine or medical science. Undergraduate students entering Northwestern are admitted simultaneously to the Feinberg School of Medicine. HPME is no longer accepting new students. Details regarding requirements can be found in the 2020-2021 or earlier Undergraduate Catalogs (https://catalogs.northwestern.edu/archives/).

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/ (https://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/ (https://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 mccormick-school@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 (https://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: https://www.mccormick.northwestern.edu/academics/undergraduate/student-groups/

Applied Mathematics

See Engineering Sciences and Applied Mathematics (p. 169).

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 21 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. 138)

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 207-0 BME Lab: Experimental Design (0.5 Unit) A laboratory course focusing on quantitative physiological measurements and analyses, instrument characterization, statistical design of experiments, and training in preparation and organization of laboratory notes and reports. Prerequisite: BMD_ENG 220-0 or IEMS 303-0 or MECH_ENG 359-0.

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 228-1; 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: BMD_ENG 271-0, GEN_ENG 205-4 and MATH 228-2.

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: Students must have taken MATH 228-1 or be a BME graduate student in order to register for this course; 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 308-0 Biomedical Signals and Circuits (1.25 Units) 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 207-0 (can be taken concurrently).

BMD_ENG 309-0 Biomedical Systems Analysis (1.25 Units) Introduction to linear systems analysis. Time and frequency domain techniques for analyzing linear systems, emphasizing their applications to biomedical systems. Python-based problem sets and a summative instrumentation and analysis lab project illustrate topics covered in class. Prerequisites: BMD_ENG 207-0; BMD_ENG 308-0; BMD_ENG 220-0; GEN_ENG 205-4.

BMD_ENG 311-0 Computational Genomics (1 Unit)
The course introduces state-of-the-art genomic sequencing technologies and computational modeling of high-throughput sequencing datasets. Through the course, students will learn how to apply these experimental and computational genomics technologies to study gene expression regulation underlying various biological processes, such as oncogenesis. Students will also apply computational and statistical skills, using linux and R/Matlab/Python.
Prerequisites: BMD_ENG 220; BIOL_SCI 201 or BIOL_SCI 202.

BMD_ENG 317-0 Biochemical Sensors (1 Unit)
Theory, design, and applications of biochemical sensors used in medical diagnosis, biomedical research, and patient monitoring. Detection of

biomolecules with optical, electrochemical, mass spectrometry and other sensors. Start-up translation of sensor technology.
Prerequisites: BIOL_SCI 201-0; CHEM 215-1; 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 220-1; MATH 220-2; 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 201-0; BIOL_SCI 202-0; 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 201-0 and BIOL_SCI 202-0; MAT_SCI 201-0. Concurrent enrollment in BIOL_SCI 202-0 is acceptable.

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 201-0; BIOL_SCI 202-0.

BMD_ENG 347-0 Foundations of Regenerative Engineering (1 Unit)
Embryonic development, stem cell engineering, somatic regeneration, genome and transcriptome modifications, cell and tissue-level regenerative engineering.
Prerequisite: BIOL_SCI 201-0 or BIOL_SCI 202-0.

BMD_ENG 348-0 Applications of Regenerative Engineering (1 Unit)
Mechanisms of human disease, development and application of molecular, cellular, and tissue-level regenerative engineering strategies to selected human disorders, including neurodegenerative disorders, stroke, cystic fibrosis, cirrhosis, diabetes, muscular degenerative disorders, and skin injury.
Prerequisite: BIOL_SCI 201-0 or BIOL_SCI 202-0.

BMD_ENG 353-0 Bioelectronics (1 Unit)
Development and design of sensors, stimulators, and their medical devices for biointegrated electronics. Materials design and fabrication of passive and active components for sensitive, multimodal, and robust wearable and implantable devices.

BMD_ENG 354-0 Bioelectronics Lab (1 Unit)
Laboratories focused on the practical implementation, instrumentation, and fabrication of wearables and skinsensing. Applications range from vital sign monitoring to rehabilitation.

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 228-1; 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 Health Systems Engineering (1 Unit)
Introduction to health systems in the context of disease burden with special emphasis in developing countries. We examine healthcare systems, financing, data and analytics. The course focuses primarily on health-related issues confronting South Africa and the associated social and economic impact.
Prerequisite: consent of instructor.

BMD_ENG 389-SA Health Technology Management (1 Unit)
This course provides an introduction to formal concepts and methodologies used in support of health technology planning, assessment and adoption - and related decision making - as part of cost-effective healthcare delivery. Open to participants in the Global Health Technologies Program only.

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. Prerequisites: BMD_ENG 207-0, BMD_ENG 220-0, BMD_ENG 250-0, BMD_ENG 270-0, BMD_ENG 271-0, BMD_ENG 308-0, BMD_ENG 309-0 and MAT_SCI 201-0.

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 Techology Innovation and Design (1 Unit) Principles and practice of medical device design for the developing world. Evaluation of user needs in the environment of under-resourced segments of South African health care system. Validation and verification of engineering design solutions. Open to participants in the Global Health Technologies Program only.

BMD_ENG 395-0 Topics in Biomedical Engineering (1 Unit) Special Topics in Biomedical Engineering.

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. 27) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units) [1]

Course	Title
4 mathematics courses (p. 131)	
4 units of basic science: [2]	
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
4 engineering analysis and computer proficiency courses (p. 131)	
3 design and communications courses (p. 131)	
7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	

Major Program (21 units)

Course	Title
BMD_ENG 101-0	Introduction to Biomedical Engineering (noncredit)
15 core courses	
BIOL_SCI 201-0	Molecular Biology
CHEM 215-1	Organic Chemistry I
MAT_SCI 201-0	Introduction to Materials
BMD_ENG 207-0	BME Lab: Experimental Design
BMD_ENG 220-0	Introduction to Biomedical Statistics
or IEMS 303-0	Statistics
BMD_ENG 250-0	Thermodynamics
or MECH_ENG 222-0	Thermodynamics & Statistical Mechanics - I
BMD_ENG 270-0	Fluid Mechanics
BMD_ENG 271-0	Introduction to Biomechanics
BMD_ENG 301-0	Quantitative Systems Physiology
BMD_ENG 302-0	Quantitative Systems Physiology
BMD_ENG 303-0	Quantitative Systems Physiology
BMD_ENG 308-0	Biomedical Signals and Circuits
BMD_ENG 309-0	Biomedical Systems Analysis
BMD_ENG 378-0	Transport Fundamentals
BMD_ENG 390-1	Biomedical Engineering Design
4 biomedical engineering elective courses	
2 category A courses (p. 138)	
2 category B courses (p. 138)	
2 technical elective courses, preferably with an emphasis on engineering design, may include:	
BIOL_SCI 202-0	Cell Biology
BIOL_SCI 301-0	Principles of Biochemistry
CHEM 215-2	Organic Chemistry II
CHEM 215-3	Advanced Organic Chemistry
DSGN 240-0	Introduction to Solid Modeling: Solidworks
DSGN 321-0	Advanced Solid Modeling
COMP_SCI 211-0	Fundamentals of Computer Programming II
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. 131) for details.

2 PHYSICS 125-2 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-2 General Physics. PHYSICS 125-3 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-3 General Physics. Associated labs are PHYSICS 126-2 Physics for ISP Laboratory or PHYSICS 136-2 General Physics Laboratory and PHYSICS 126-3 Physics for ISP Laboratory or PHYSICS 136-3 General Physics Laboratory.

Biomedical Engineering Electives

Category A Courses

Course	Title
BMD_ENG 311-0	Computational Genomics
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 344-0	Biological Performance of Materials
BMD_ENG 346-0	Tissue Engineering
BMD_ENG 347-0	Foundations of Regenerative Engineering
BMD_ENG 353-0	Bioelectronics
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 202-0	Cell Biology *
BIOL_SCI 301-0	Principles of Biochemistry *
BMD_ENG 311-0	Computational Genomics
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 344-0	Biological Performance of Materials
BMD_ENG 346-0	Tissue Engineering
BMD_ENG 347-0	Foundations of Regenerative Engineering
BMD_ENG 348-0	Applications of Regenerative Engineering
BMD_ENG 353-0	Bioelectronics
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 388-SA	Health Systems Engineering
BMD_ENG 395-0	Topics in Biomedical Engineering (Check with UG Program Chair)
CIV_ENV 327-0	Finite Element Methods in Mechanics
CHEM_ENG 361-0	Introduction to Polymers
CHEM_ENG 376-0	Principles of Synthetic Biology
CHEM_ENG 379-0	Computational Biology: Analysis and Design of Living Systems
DSGN 360-0	Design Competition
COMP_SCI 211-0	Fundamentals of Computer Programming II
ELEC_ENG 302-0	Probabilistic Systems
ELEC_ENG 332-0	Introduction to Computer Vision
ELEC_ENG 360-0	Introduction to Feedback Systems
ELEC_ENG 379-0	Lasers and Coherent Optics
ELEC_ENG 382-0	Photonic Information Processing
ELEC_ENG 395-0	Special Topics in Electrical Engineering (Please consult BME UG Program Chair)
ES_APPM 370-1	Introduction to Computational Neuroscience
IEMS 385-0	Introduction to Health Systems Management
MAT_SCI 318-0	Materials Selection
MAT_SCI 360-0	Introduction to Electron Microscopy
MECH_ENG 301-0	Introduction to Robotics Laboratory
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 362-0	Stress Analysis
MECH_ENG 382-0	Experiments in Micro- and Nano Science and Engineering
MECH_ENG 390-0	Intro to Dynamic Systems
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. 141)
- Biotechnology and Biochemical Engineering Minor (p. 142)

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.
Prerequisites: MATH 220-1, MATH 220-2, MATH 228-1, & MATH 228-2 (formerly listed as 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 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 selected topics related to sustainability, sustainable development, global climate changes, natural and renewal resources and utilization, industrial ecology, eco-efficiency, technology related to sustainability such as biofuel, electrification of transportation, and water purification, and role of policy and business risk assessment.
Prerequisites: junior standing in science or engineering; familiarity with process system analysis, energy and material balances (such as found in CHEM_ENG 210-0 or CIV_ENV 260-0).

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 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 228-1 (formerly listed as 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.
Prerequisite: CHEM_ENG 275-0 or BIOL_SCI 201-0 or BIOL_SCI 202-0 (formerly 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 201-0 or BIOL_SCI 202-0 (formerly BIOL_SCI 215-0 or BIOL_SCI 219-0).

CHEM_ENG 379-0 Computational Biology: Analysis and Design of Living Systems (1 Unit)
This course provides an introduction to fundamental principles and methods for computational and mathematical analysis of natural and engineered biological systems. Emphasis is placed upon understanding and designing biological systems based upon conceptual framings including multi-scale networks, dynamic control, genetic circuits, and biological programs.

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 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. 27) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units) [1]

Course	Title
4 mathematics courses (p. 131)	
4 units of basic science: [2]	
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
4 engineering analysis and computer proficiency courses (p. 131)	
3 design and communications courses (p. 131)	
7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	

Major Program (21 units)

Course	Title
16 required courses	
CHEM 215-1 & CHEM 215-2	Organic Chemistry I and Organic Chemistry II
MAT_SCI 301-0	Materials Science Principles
CHEM_ENG 210-0	Analysis of Chemical Process Systems
CHEM_ENG 211-0	Thermodynamics
CHEM_ENG 212-0	Phase Equilibrium and Staged Separations
CHEM_ENG 275-0	Molecular & Cell Biology for Engineers [3]
CHEM_ENG 307-0	Kinetics and Reactor Engineering
CHEM_ENG 312-0	Probability and Statistics for Chemical Engineering
or IEMS 303-0	Statistics
CHEM_ENG 321-0	Fluid Mechanics
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 elective courses	
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. 131) for details.

2 PHYSICS 125-2 General Physics for ISP or PHYSICS 140-2 Fundamentals of Physics may be substituted for PHYSICS 135-2 General Physics. PHYSICS 125-3 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-3 General Physics. Associated labs are PHYSICS 126-2 Physics for ISP Laboratory or PHYSICS 136-2 General Physics Laboratory and PHYSICS 126-3 Physics for ISP Laboratory or PHYSICS 136-3 General Physics Laboratory.

3 BIOL_SCI 201-0 Molecular Biology or BIOL_SCI 202-0 Cell Biology may substitute for CHEM_ENG 275-0 Molecular & Cell Biology for Engineers. Exemptions from this one unit of biology coursework are NOT granted for students testing out of and skipping BIOL_SCI 201-0 Molecular Biology through the Biological Sciences Department's placement test. These students may use CHEM_ENG 275-0 Molecular & Cell Biology

for Engineers or BIOL_SCI 202-0 Cell Biology to complete the required biology unit.

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 201-0	Molecular Biology [1, 2, 3]
BIOL_SCI 202-0	Cell Biology [1, 2, 3]
BIOL_SCI 203-0	Genetics and Evolution [2, 3]
BIOL_SCI 301-0	Principles of Biochemistry
CHEM_ENG 375-0	Biochemical Engineering
CHEM_ENG 377-0	Bioseparations
Laboratory experience:	
The complete series of 0.34-unit laboratories or one unit of 399 independent study in an approved laboratory [4]	
BIOL_SCI 232-0 & BIOL_SCI 233-0 & BIOL_SCI 234-0	Molecular and Cellular Processes Laboratory and Genetics and Molecular 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. 142)	
2 courses from Extended Electives (p. 142)	

1 CHEM_ENG 275-0 Molecular & Cell Biology for Engineers may substitute for either one

2 Prior to 2020, the introductory Biological Science sequence consisted of BIOL_SCI 215-0 Genetics and Molecular Biology, BIOL_SCI 217-0 Physiology, and BIOL_SCI 219-0 Cell Biology. The new intro sequence no longer includes Physiology. Students who have taken ALL of the older intro sequence courses will petition to use the older courses when completing the Minor Declaration form in MAS. Students who have taken only SOME of the older intro courses can discuss with the minor coordinator which additional courses to take and then petition to use the old courses in the Minor Declaration form in MAS. In general, students missing BIOL_SCI 215-0 Genetics and Molecular Biology will take BIOL_SCI 201-0 Molecular Biology, students missing BIOL_SCI 219-0 Cell Biology will take BIOL_SCI 202-0 Cell Biology, and students missing BIOL_SCI 217-0 Physiology will take BIOL_SCI 203-0 Genetics and Evolution to complete the intro sequence. Students should consult the minor advisor for guidance on completing these requirements.

3 The Biotech Minor requires 3 units of Biology coursework. Exemptions or course reductions are NOT granted for students taking the Biological Sciences Department placement test, and who test out of and skip BIOL_SCI 201-0 Molecular Biology. These students may complete BIOL_SCI 202-0 Cell Biology and BIOL_SCI 203-0 Genetics and Evolution and petition to use an upper level Biology course to complete the required 3 units of Biology coursework.

4 Biological Science laboratories are now connected to the intro sequence courses, and registration in the lab is required. Biological Science laboratories were previously numbered BIOL_SCI 220-0, BIOL_SCI 221-0, and BIOL_SCI 222-0. Students who have already completed these laboratory courses with the older numbering may continue to use them toward the minor, or use a previously approved independent study.

- 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 units may be double-counted to fulfill requirements in the major program.
- A maximum of 2 units 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 the Biological Sciences intro sequence BIOL_SCI 201-0 Molecular Biology, BIOL_SCI 202-0 Cell Biology, BIOL_SCI 203-0 Genetics and Evolution (former intro sequence was BIOL_SCI 215-0 Genetics and Molecular Biology, BIOL_SCI 217-0 Physiology, BIOL_SCI 219-0 Cell Biology), and BIOL_SCI 301-0 Principles of 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 an up to date minor declaration form in MAS (McCormick Advising System) (https://mas.mccormick.northwestern.edu/) before the beginning of their final quarter as undergraduates.

Minor Electives

Core Electives

Course	Title
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: Analysis and Design of Living Systems
CHEM_ENG 382-0	Regulatory Sciences in Biotechnology
CHEM_ENG 470-0	Molecular Folding and Function
CHEM_ENG 478-0	Advances in Biotechnology
CHEM_ENG 395-0	Special Topics in Chemical Engineering (must be approved by petition)

Extended Electives

Course	Title
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: Analysis and Design of Living Systems
CHEM_ENG 382-0	Regulatory Sciences in Biotechnology
CHEM_ENG 470-0	Molecular Folding and Function
CHEM_ENG 478-0	Advances in Biotechnology
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 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 302-0	Quantitative Systems Physiology
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 347-0	Foundations of Regenerative Engineering
BMD_ENG 348-0	Applications of Regenerative Engineering
BMD_ENG 446-0	Biomaterials in Synthetic Biology
CHEM 215-3	Advanced Organic Chemistry (Formerly CHEM 210-3)
CIV_ENV 361-1	Environmental Microbiology
CIV_ENV 441-0	Chemical Microbial Interactions
CIV_ENV 442-0	Environmental Biotechnology for Resource Recovery
MAT_SCI 353-0	Bioelectronics
MAT_SCI 370-0	Biomaterials
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 minors in environmental engineering and in architectural engineering and design.

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 interests and professional goals. Students develop study plans suited to their unique interests, including options such as the Architectural Engineering and Design Minor and the Environmental Engineering Minor within our Department, and the 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. A 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 go 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:

a. The identification and measurement of potentially harmful physical, chemical, and biological agents in the environment,
b. The transport and fate of these agents,
c. The effects of these agents on people and the environment, and
d. 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 principles 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. A sample of their employers include AECOM, ARCADIS, Black & Veatch, EPA, Jacobs, RAMBOLL, Tetra Tech, WSP, and many energy start-ups. Many of our graduates continue their education in schools of engineering, law, medicine, public health, and management.

Programs of Study

- Civil Engineering Degree (p. 151)
- Environmental Engineering Degree (p. 152)
- Architectural Engineering and Design Minor (p. 152)
- Environmental Engineering Minor (p. 153)

CIV_ENV 101-0 Introduction to Civil and Environmental Engineering (0 Unit) In this seminar course we discuss the grand challenges facing society in the coming decades, and how Civil and Environmental Engineers are meeting these challenges. Seminars will focus on key CE and EE topics, the CE & EE curricula at NU, and the career paths of recent CE & EE graduates.

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 (0-1 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 220-2; 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 220-2; CHEM 131-0, CHEM 151-0, or CHEM 171-0 is highly recommended. *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 220-1; 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. Corequisite: MATH 220-2; CHEM 131-0, CHEM 151-0, or CHEM 171-0 highly recommended.

CIV_ENV 280-1 Architectural Engineering & Design Seminar I (0.5 Unit)
First course in the AED seminar series. Students will learn from practicing architects and engineers, and will also conduct independent studies culminating in their own seminars to the class.

CIV_ENV 280-2 Architectural Engineering & Design Seminar II (0.5 Unit) Second course in the AED seminar series. Students will learn from practicing architects and engineers, and will also conduct independent studies culminating in their own seminars to the class.

CIV_ENV 280-3 Architectural Engineering & Design Seminar III (0.5 Unit) Third course in the AED seminar series. Students will learn from practicing architects and engineers, and will also conduct independent studies culminating in their own seminars to the class.

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 220-2 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 308-0 Environmental Justice (1 Unit)
This course will examine evidence that there is not equal environmental protection in this country and analyze why this inequality exists. Course participants will review evidence of environmental injustice, with attention to perspectives of grassroots organizations, the U.S. EPA, and businesses. The course will explore why civil and human rights have become important aspects of environmental protection activities worldwide.

CIV_ENV 309-0 Climate and Energy - Law and Policy (1 Unit)
This course is a survey of the major laws that regulate the acquisition of energy resources, the conversion of energy resources into usable energy, the energy transmission and transportation infrastructure and the climate change implications of these activities.

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 328-0 Computational Forensics and Failure Analysis (1 Unit)
The course will cover the use of the scientific method for accident investigation, hypothesis development, and the use of the finite element method to analyze the root cause of a failure. Practical application problems for both civil and mechanical structures will be analyzed using commercial finite element codes (Abaqus, Hypermesh, LS-Dyna)
Prerequiste: CIV_ENV 327-0 or MECH_ENG 327-0.

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; resource allocation and resource leveling; earned value analysis; linear scheduling; PERT, CPM in dispute resolution and litigation, computer scheduling.
Prerequisite: CIV_ENV 330-0.

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 353-0 Energy Geostructures & Geosystems (1 Unit)
This course focuses on energy geostructures and geosystems: novel earth-contact technologies that provide renewable energy supply and structural support to any built environment. The course comprises theoretical and practical sessions. The theoretical sessions expand on the analysis and design of such technologies from energy, geotechnical and structural perspectives. The practical sessions simulate an actual design project of energy geostructures.

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.
Prerequisite: 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 357-0 Terramechanics (1 Unit)
Problems defined by the interaction between machines and terrain—or by organisms and terrain—are ubiquitous on Earth, and they are beginning to play important roles elsewhere as we explore, exploit, and perhaps eventually occupy the moon and other planets. While aspects of these problems are understood, much remains to be learned in the field of terramechanics.

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 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.
Prerequisite: 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.
Prerequisite: 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 377-0 Choice Modelling in Engineering (1 Unit)
"This course focuses on the theory and practice of survey design, data and analysis. In this course students will learn the theories and scientific debates around the design, ad- ministration and analysis of various types of behavioral data-collection methods."

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 matrics 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". Prerequisites: 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 388-1 Building Science I: Fundamentals for Sustainable Buildings (1 Unit) The course is the first of a two-part series focusing on Building Science. This course aims to provide the fundamental knowledge of the physics related to buildings, focusing on heat and mass transfer, moisture, and the energy consumed in buildings to guarantee the comfort of their occupants.

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)
Experimental techniques in measuring stress and strain. Strain gauge, photoelastic, brittle coating, and Moire techniques studies and applied with selected laboratory experiments. CIV_ENV 413-0 and MECH_ENG 413-0 are co-listed.

CIV_ENV 414-1 Mechanics of Composite Materials 1 (1 Unit)
Introduction to basic concepts: fabrication of composite materials, micromechanics, macro-mechanics of unidirectional lamina, failure theories, mechanics of multidirectional laminate, lamination theory, hydrothermal effects, inter-laminar stresses, stress concentrations, structural design and optimization, and nondestructive evaluation. CIV_ENV 414-1 and MECH_ENG 414-1 are co-listed.

CIV_ENV 414-2 Mechanics of Composite Materials II (1 Unit)
Introduction to basic concepts: fabrication of composite materials, micromechanics, macro-mechanics of unidirectional lamina, failure theories, mechanics of multidirectional laminate, lamination theory, hydrothermal effects, inter-laminar stresses, stress concentrations, structural design and optimization, and nondestructive evaluation. CIV_ENV 414-2 and MECH_ENG 414-2 are co-listed.

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 416-0 Computational Nanodynamics (1 Unit)
The objective of this course is to learn how to use theoretical and computational modeling tools to simulate dynamic solid mechanics phenomena at small scales. Topics covered include elementary concepts in dynamics, statistical mechanics, molecular interactions, coarse-graining strategies, and application of the molecular dynamics methodology to elasticity, self-assembly, vibrations, fragmentation and fracture problems of relevance to nanoscale, biological and biomolecular systems.

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 419-0 Elastic Wave Propagation in Periodic Solids (1 Unit)
Introduction of elastodynamic wave equations in anisotropic solids, plane longitudinal, transverse, and surface waves, harmonic waves and pulses, energy considerations, reflection, transmission, and mode conversion, scattering and diffraction problems, reciprocity relations, piezoelectric materials, and band engineering using periodic solids and metamaterials.
Prerequisites: CIV_ENV 415-0, MECH_ENG 363-0 or MECH_ENG 390-0, 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. Co-listed with MECH_ENG 426-1.

CIV_ENV 426-2 Advanced Finite Element Methods 2 (1 Unit)
This course will cover the fundamentals of non-standard finite element formulations such as Moving Least Squares (MLS), Element Free Galerkin (EFG), Reproducing Kernel Particle Method (RKPM), Material Point Method (MPM), Aribitrary Lagrangian Eulerian (ALE) Formulations, and the eXtendended Finite Element Method (XFEM). The course will also provide an in-depth investigation of advanced application of finite element analysis and interfacing user-developed material models with commercial finite element codes (Abaqus/LS-DYNA). Theory and implementation of computational plasticity, nonlinear elasticity, pressure-sensitive plasticity, and damage-based plasticity will be discussed. Material classes to be discussed are those commonly found in manufacturing, geomechanical, and biological applications such as ductile metals, soil, and tissue. Co-listed with MECH_ENG 426-2.

CIV_ENV 428-1 Structural Design I (1 Unit)
First course in the structural design studio. Students will learn fundamental topics of structural mechanics, materials, and engineering, and then apply them to a realistic design project, coordinated by practicing structural engineers.

CIV_ENV 428-2 Structural Design II (1 Unit)
Second course in the structural design studio. Students will learn fundamental topics of structural mechanics, materials, and engineering, and then apply them to a realistic design project, coordinated by practicing structural engineers.

CIV_ENV 428-3 Structural Design III (1 Unit)
Third course in the structural design studio. Students will learn fundamental topics of structural mechanics, materials, and engineering, and then apply them to a realistic design project, coordinated by practicing structural engineers.

CIV_ENV 430-0 Quasibrittle 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; accounting methods; estimating process and bid preparation; labor cost; earned value analysis; accounting for equipment; cost-control concepts; cash flow management, changes and extras; claims.
Prerequisites: PROJ_MGT 403-0 and PROJ_MGT 405-0.

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 Environmental Biotechnology for Resource Recovery (1 Unit)
Theory and practice of microbiological processes used for pollution control and resource recovery: kinetics of suspended-growth and fixed-film processes, activated sludge, biofilm processes, nitrogen and phosphorus removal, methanogenesis.
Prerequisites: CIV_ENV 440-0, CIV_ENV 361-1.

CIV_ENV 443-0 Microbial Ecology for Resource Recovery (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 440-0 or equivalent.

CIV_ENV 445-0 Environmental Systems Laboratory (1 Unit)
Use of a variety of experimental methods to probe processes occuring 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 447-0 Molecular Microbiology (1 Unit)
An in-depth look at current molecular methods used to study environmental microbiology. Fundamentals of molecular microbiology, creative and critical analysis of literature through proposal writing and reviewing. Topics focus on polymerase chain reaction and derivatives; DNA sequencing; proteomics & proteogenomics, and metabolomics.

CIV_ENV 448-0 Computational Chemodynamics (1 Unit)
An in-depth understanding of the processes that govern the fate of chemicals in the environment by developing computational tools used to quantify the concentrations of contaminants and nutrients. Numerical methods focus on solving: multiphase equilibrium problems, box models, reaction networks and kinetics, the interplay between transport and reaction, partitioning, and trophic relationships.

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 Plasticity and Limit Analysis (1 Unit)
Fundamental theory of and computational tools for plasticity, including the concepts of yielding and plastic flow in materials and, by extension, the concepts of limit (collapse) loads and collapse mechanisms in boundary value problems.

CIV_ENV 456-0 Computational Geotechnics (1 Unit)
Fundamentals of the finite element method for geotechnical analysis. This course provides an essential skillset to those entering the practice of geotechnical engineering, and builds a foundation for future study and inquiry to those who are engaged primarily in research.

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 contiminant 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 Structural System Capstone Pre-design Seminar (0 Unit)
Preliminary discussion and planning of a structural system with realistic constraints to be designed by students in the M.S. program with specialization in structural engineering and geotechnical engineering.

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 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. 27) and the degree requirements of their home school.

Requirements (48 units)

Core courses (27 units)[1]

Course	Title
4 mathematics courses (p. 131)	
4 units of basic science: [2]	
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 (200-level or higher), 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
4 engineering analysis and computer proficiency courses (p. 131)	
3 design and communications courses (p. 131)	
7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	
1 unit of unrestricted electives is from Chemistry lab, PHYSICS 136-2, and CIV_ENV 301-1	

Major Program (21 units)[3]

Course	Title
2 basic courses chosen from the options below	
CIV_ENV 201-0	Engineering Possibilities: Decision Science in the Age of Smart Technologies
CIV_ENV 202-0	Biological and Ecological Principles
CIV_ENV 220-0	Structural Art
5 basic engineering courses	
CIV_ENV 216-0	Mechanics of Materials I
CIV_ENV 304-0	Civil and Environmental Engineering Systems Analysis
CIV_ENV 306-0	Uncertainty Analysis
MECH_ENG 222-0	Thermodynamics & Statistical Mechanics - I
or BMD_ENG 250-0	Thermodynamics
or CHEM_ENG 211-0	Thermodynamics
MECH_ENG 241-0	Fluid Mechanics I
4 civil engineering breadth courses	
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 courses chosen from the focus areas below [4,5]	
Architectural Engineering & Design	
Environmental	
Geotechnics	
Management	
Structures	
Transportation	
2 capstone design courses (0.5 units each)	
CIV_ENV 382-1 & CIV_ENV 382-2	Capstone Design I and Capstone Design II
5 technical elective courses [6]	
300 level or higher in mathematics, science, engineering, or another area supporting the area of specialization	
1 professional development course (0.34 units) [7]	
CIV_ENV 301-1	Professional Development Seminar I

1 See **general requirements** for details.
2 PHYSICS 125-2 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-2 General Physics. Associated lab is PHYSICS 126-2 Physics for ISP Laboratory or PHYSICS 136-2 General Physics Laboratory.
3 At least 17 out of the 21 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.
4 Must select from an approved list available in Undergraduate CIV_ENV Handbook; must choose at least 2 design courses[3] from 2 focus areas.
5 Design is defined as courses taught by licensed Professional Engineer or equivalent as defined by ABET and use appropriate codes and/or standards.
6 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.

7 0.34 units may count towards unrestricted electives.

Environmental Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units)[1]

Course	Title
4 mathematics courses (p. 131)	
4 units of basic science:	
PHYSICS 135-2 & PHYSICS 136-3	General Physics and General Physics Laboratory
or PHYSICS 125-2 & PHYSICS 126-2	General Physics for ISP and Physics for ISP Laboratory
or PHYSICS 140-2 & PHYSICS 136-2	Fundamentals of Physics and General Physics Laboratory
CHEM 131-0 & CHEM 132-0 & CHEM 141-0 & CHEM 142-0	General Chemistry 1 and General Chemistry 2 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
4 engineering analysis and computer proficiency courses (p. 131)	
3 design and communications courses (p. 131)	
7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	

Major Program (21 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
5 basic engineering courses	
BMD_ENG 250-0	Thermodynamics
or CHEM_ENG 211-0	Thermodynamics
CIV_ENV 304-0	Civil and Environmental Engineering Systems Analysis
CIV_ENV 306-0	Uncertainty Analysis
MAT_SCI 201-0	Introduction to Materials
MECH_ENG 241-0	Fluid Mechanics I
8 environmental engineering core courses	
CHEM 215-1	Organic Chemistry I
CIV_ENV 260-0	Environmental Systems and Processes
CIV_ENV 340-0	Hydraulics and Hydrology
CIV_ENV 361-1	Environmental Microbiology
CIV_ENV 346-0	Ecohydrology
CIV_ENV 364-0	Sustainable Water Systems
CIV_ENV 365-0	Environmental Laboratory
CIV_ENV 367-0	Chemical Processes in Aquatic Systems
2 capstone design courses (0.5 units each)	
CIV_ENV 382-1 & CIV_ENV 382-2	Capstone Design I and Capstone Design II
4 technical elective courses [2]	
1 professional development course (0.34 units) [3]	
CIV_ENV 301-1	Professional Development Seminar I

1 See general requirements (p. 131) for details.

2 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.

3 0.34 units may count toward unrestricted electives.

Architectural Engineering and Design Minor

The Minor in Architectural Engineering and Design trains students in the fundamental principles and practice of architectural and engineering design. Students completing this program will learn architectural conceptualization, programming, and design implementation in conjunction with analysis of the engineering materials and systems used in the construction of buildings and other structures. A key element of the program is aesthetic skills, which will be honed through the creative iterations of design. Students completing this program will be uniquely prepared for advanced study in either architecture or engineering, and regardless of their ultimate career track, will be prepared as leaders of the building design profession.

Course	Title
Minor Requirements (8 units)	
Core courses - 3 required units	
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
History of Design - choose 1 unit	
ART_HIST 232-0	Introduction to the History of Architecture: 1400 to Present
CIV_ENV 220-0	Structural Art
Architectural Seminar - 1 unit	
CIV_ENV 280-1	Architectural Engineering & Design Seminar I
CIV_ENV 280-2	Architectural Engineering & Design Seminar II
CIV_ENV 280-3	Architectural Engineering & Design Seminar III
Design and Analysis Techniques - choose 3 units	
CIV_ENV 323-0	Structural Steel Design
CIV_ENV 325-0	Reinforced Concrete
CIV_ENV 352-0	Foundation Engineering
CIV_ENV 368-0	Sustainability: The City
CIV_ENV 386-0	High Performance Architectural Design
CIV_ENV 387-0	Design of Sustainable Urban Developments

Additional Conditions for Awarding Minor in AED

- Course with grades lower than a "C" or taken P/N will not be acceptable for this minor.
- For McCormick BS degrees, at least 4 courses used to meet the AED Minor requirements must not be counted towards the 16 units of major program requirements.
- To declare the AED minor, students should submit the minor declaration form in **MAS (McCormick Advising System)** by the end of their junior year.

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)	
Core Courses (6 units)	
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 346-0	Ecohydrology
CIV_ENV 364-0	Sustainable Water Systems
Electives (2 units): choose 2 courses from below	
CIV_ENV 340-0	Hydraulics and Hydrology
CIV_ENV 361-1	Environmental Microbiology
CIV_ENV 361-2	Public & Environmental Health
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.
- To declare the Environmental Engineering minor, students should submit the minor declaration form in **MAS (McCormick Advising System)** by the end of their junior year.

Computer Engineering

See Electrical and Computer Engineering (p. 161).

Computer Science

mccormick.northwestern.edu/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

Programs of Study

- Computer Science Degree (p. 157)
- Computer Science Minor (McCormick School of Engineering) (p. 159)

COMP_SCI 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*

COMP_SCI 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 COMP_SCI 111-0. *Formal Studies Distro Area*

COMP_SCI 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*

COMP_SCI 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.

COMP_SCI 150-0 Fundamentals of Computer Programming 1.5 (1 Unit) An introduction to Object-oriented programming: focus on Python but including a brief introduction to a statically typed language (e.g. C++). Students will use some approaches from Artificial Intelligence and Machine Learning to complete programming assignments. Required for the computer science degree. Prerequisite: COMP_SCI 110-0 or COMP_SCI 111-0 or GEN_ENG 205-1 or GEN_ENG 206-1.

COMP_SCI 211-0 Fundamentals of Computer Programming II (1 Unit) 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 COMP_SCI 230-0. Prerequisite: COMP_SCI 111-0 or COMP_SCI 150-0.

COMP_SCI 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: (EECS 110 or EECS 111) and Math 228-1 or 230-0.

COMP_SCI 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: COMP_SCI 211-0.

COMP_SCI 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: COMP_SCI 111 and (COMP_SCI 150 or COMP_SCI 211).

COMP_SCI 217-0 Data Management & Information Processing (1 Unit) This class offers a hands-on introduction to data representation, data modelling, and the SQL language for accessing and analyzing data in relational databases. Students access and analyze data in real-world large-scale databases from the public domain. Not for computer science or computer engineering degree candidates. Prerequisite: COMP_SCI 110-0 or COMP_SCI 111-0 or COMP_SCI 150-0 or COMP_SCI 211-0 or consent of instructor.

COMP_SCI 295-0 Special Topics in Computer Science (1 Unit) Topics suggested by students or faculty and approved by the department.

COMP_SCI 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: COMP_SCI 110-0, COMP_SCI 111-0, or consent of instructor.

COMP_SCI 310-0 Scalable Software Architectures (1 Unit) Teaches software design principles for building high-scale Internet services. Focuses on challenges arising when assembling software services that run on many machines in parallel and which require the coordination of multiple software applications.
Prerequisites: COMP_SCI 213-0, COMP_SCI 214-0.

COMP_SCI 311-0 Inclusive Making (1 Unit) Inclusive Making is about centering disability within computer science. The class explores the promises and shortcomings of making through a critical disability studies lens. It also looks at existing making practices within disability communities. Throughout the class, students reflect on their assumptions about disability and computer science, and wrestle with tensions related to making and accessibility alongside community organizations.

COMP_SCI 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: COMP_SCI 110-0.

COMP_SCI 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.

COMP_SCI 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).

COMP_SCI 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: COMP_SCI 111 and, COMP_SCI 211, and COMP_SCI 214 or Graduate standing.

COMP_SCI 322-0 Compiler Construction (1 Unit) The compiler is the programmer's primary tool. Understanding the compiler is therefore critical for programmers, even if they never build one. Furthermore, many design techniques that emerged in the context of compilers are useful for a range of other application areas. This course introduces students to the essential elements of building a compiler: parsing, context-sensitive property checking, code linearization, register allocation, etc. To take this course, students are expected to already understand how programming languages behave, to a fairly detailed degree. The material in the course builds on that knowledge via a series of semantics preserving transformations that start with a fairly high-level programming language and culminate in machine code.
Prerequisite: COMP_SCI 213-0 or consent of instructor.

COMP_SCI 323-0 Code Analysis and Transformation (1 Unit) Fast, highly sophisticated code analysis and code transformation tools are essential for modern software development. Before releasing its mobile apps, Facebook submits them to a tool called Infer that finds bugs by static analysis, i.e., without even having to run the code, and guides developers in fixing them. Google Chrome and Mozilla Firefox analyze and optimize JavaScript code to make browsers acceptably

responsive. Performance-critical systems and application software would be impossible to build and evolve without compilers that derive highly optimized machine code from high-level source code that humans can understand. 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. In this class, you will learn the fundamentals of code analysis and transformation, and you will apply them by extending LLVM, a compiler framework now in production use by Apple, Adobe, Intel and other industrial and academic enterprises.
Prerequisite: COMP_SCI 213-0.

COMP_SCI 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: COMP_SCI 110-0, COMP_SCI 111-0, or programming experience.

COMP_SCI 329-0 HCI Studio (1 Unit)
Human-Computer Interaction (HCI) serves as the bridge between computing and humanity. In this class we will develop our critical thinking skills by learning effective structures for designing HCI systems. We will also soften into a deeper understanding of people's problems by developing our capacities for humility, empathy, and curiosity. Learning occurs through instructional activities, team projects, and studio critique.
Prerequisite: COMP_SCI 214-0 or Graduate Standing or Consent of instructor.

COMP_SCI 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: COMP_SCI 211-0 or Graduate standing or Consent of instructor.

COMP_SCI 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.
Prerequisite: COMP_SCI 150 or COMP_SCI 211 or Consent of Instructor.

COMP_SCI 333-0 Interactive Information Visualization (1 Unit)
This course covers theory and techniques for information visualization: the use of interactive interfaces to visualize abstract data. The course targets students interested in using visualization in their work or in building better visualization tools and systems. Students will learn to design and implement effective visualizations, critique others' visualizations, conduct exploratory visual analysis, and navigate research on information visualization.
Prerequisites: COMP_SCI 214-0 or consent of instructor.

COMP_SCI 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: COMP_SCI 212-0 or consent of instructor.

COMP_SCI 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: COMP_SCI 111-0, COMP_SCI 212-0, or CS Graduate Standing or consent of instructor.

COMP_SCI 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: COMP_SCI 348-0 or consent of instructor.

COMP_SCI 338-0 Practicum in Intelligent Information Systems (1 Unit)
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.

COMP_SCI 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.
Prerequisites: COMP_SCI 214-0 and (COMP_SCI 213-0 or COMP_ENG 205-0) or CS Graduate Standing.

COMP_SCI 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.
Prerequisites: COMP_SCI 214-0 and (COMP_SCI 213-0 or COMP_ENG 205-0).

COMP_SCI 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.

COMP_SCI 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, microkernals); file systems (directory structures, file organization, RAID); protection (access control, capabilities, encryption, signatures, authentication). Requires substantial programming projects.
Prerequisites: COMP_SCI 214-0 and COMP_SCI 213-0, or COMP_SCI 214-0 and COMP_ENG 205-0.

COMP_SCI 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: COMP_SCI 348-0 and COMP_SCI 325-1 or equivalent LISP experience.

COMP_SCI 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: COMP_SCI 213-0 and COMP_SCI 214-0.

COMP_SCI 347-0 Conversational AI (1 Unit) Principles and practices of creating AI systems which interact with people through conversations. This includes knowledge-rich natural language understanding, multimodal interactions (i.e. speech and sketching), principles of dialogue drawn from cognitive science, question-answering, and architectures for building conversational AI systems. Involves substantial programming and project work. Class sessions include both lectures

and studio instruction. Prerequisites: COMP_SCI 371 or permission of instructor.

COMP_SCI 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.
Prerequisites: COMP_SCI 111 and COMP_SCI 214 or COMP_SCI 111 and CogSci major or CS Graduate Standing.

COMP_SCI 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.
Prerequisites: COMP_SCI grad standing OR (COMP_SCI 214 and (MATH 240-0 or GEN_ENG 205-1 or GEN_ENG 206-1) and (IEMS 201-0 or IEMS 303-0 or ELEC_ENG 302-0 or STAT 210-0 or MATH 310-1).

COMP_SCI 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: COMP_SCI 213-0 or equivalent or consent of instructor; COMP_SCI 340-0 highly recommended.

COMP_SCI 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: COMP_SCI 214-0 or Graduate standing.

COMP_SCI 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: COMP_SCI 214-0 and COMP_SCI 351-1 or Graduate standing.

COMP_SCI 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: COMP_SCI 211-0 and COMP_SCI 214-0.

COMP_SCI 354-0 Computer System Security (1 Unit)
The past decade has seen an explosion in the concern for the security of information. This course introduces students to the basic principles and practices of computer system and networking security, with detailed analysis of real-world examples and hands-on practice. Topics include the basic crypto, authentication, reverse engineering, buffer overflow attacks, vulnerability scanning, web attacks, firewalls, intrusion detection/prevention systems, etc. We will first introduce the basic theory for each type of attack; then we will actually carry them out in 'real-world' settings. The goal is to learn security by learning how to view your machine from a hacker's perspective. In addition, we encourage students to participate in the UCSB International Capture the Flag Competition. Capture the Flag is a network security exercise where the goal is to exploit other machines while defending your own. In fact, this course should prepare you for any one of many capture the flag competitions that take place year-round. We will learn about different types of hacks and perform them. After learning how to execute such exploits and penetrate a network, we will discuss ways to protect a network from others exploiting the same vulnerabilities. Understanding security is essential in all fields of software development and computing. For major or minors in Computer Science, this course can satisfy the system breadth.
Prerequisite: COMP_SCI 211-0 and COMP_SCI 213-0 or COMP_SCI 211-0 and COMP_ENG 205-0.

COMP_SCI 355-0 Digital Forensics and Incident Response (1 Unit)
This course aims to teach students the concepts of Digital Forensics and Incident Response. The technical content taught in the class consists of deep knowledge of filesystems and operating systems so that students know which digital artifacts to investigate in data breach scenarios. Labs and assignments are a sanitized version of real-world intrusions by nation-state actors and cybercriminals.

COMP_SCI 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.

COMP_SCI 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: COMP_SCI 214-0; 1 unit of COMP_SCI 322-0, COMP_SCI 343-0, COMP_SCI 348-0, or COMP_SCI 351-1, COMP_SCI 351-2.

COMP_SCI 371-0 Knowledge Representation and Reasoning (1 Unit)
Principles and practices of knowledge representation, including logics, ontologies, commonsense knowledge, and semantic web technologies.
Prerequisite: COMP_SCI 348-0, COMP_SCI 325-1, or equivalent experience with artificial intelligence.

COMP_SCI 372-0 Designing and Constructing Models with Multi-Agent Languages (1 Unit) This course will begin with an introduction to the multi-agent language NetLogo. Students will design and implement several NetLogo models and analyze their behavioral regimes. Students will also learn to build models of interaction on social networks (or other types of networks). We will cover methodology for verifying, validating and replicating agent-based models and comparisons with systems dynamics and equation-based models. NetLogo comes with many extensions that support a variety of additional features. Students can use these extensions to create specialized models, such as complex networks, real-time data extraction, data mining, connections to physical devices, etc.. Students will also have an opportunity to explore existing and create their own participatory simulations using the HubNet architecture as well as exploring connecting real world sensors and motors to models. Students can also explore multi-level agent-based modeling in which hundreds or thousands of models are connected with NetLogo's LevelSpace extension.

COMP_SCI 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.
Prerequisite: COMP_SCI 214-0.

COMP_SCI 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.
Prerequisite: COMP_SCI 214 and COMP_SCI 376-0.

COMP_SCI 393-0 Software Construction (1 Unit)
Building software is a craft that requires careful design. This course teaches software design principles in a studio setting. Each week, students present their programs to the class for review. Together, the class evaluates the programs for correctness and, more importantly, clarity and design. Expect to learn how to build reliable, maintainable, extensible software and how to read others' codes.
Prerequisites: COMP_SCI 211-0 and COMP_SCI 214-0.

COMP_SCI 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.
Prerequisites: Consent of instructor.

COMP_SCI 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.

COMP_SCI 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.

COMP_SCI 399-0 Projects (1 Unit) Seminar and projects for advanced undergraduates on subjects of current interest in electrical and computer engineering.

Computer Science Degree

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units) [1]

Course	Title
4 mathematics courses	
MATH 220-1	Single-Variable Differential Calculus
MATH 220-2	Single-Variable Integral Calculus
MATH 228-1	Multivariable Differential Calculus for Engineering
COMP_SCI 212-0	Mathematical Foundations of Comp Science
4 units of basic science chosen according to McCormick basic science guidelines (p. 131)	
4 engineering analysis and computer proficiency courses	
GEN_ENG 205-1 & GEN_ENG 205-2 & GEN_ENG 205-3	Engineering Analysis I and Engineering Analysis II and Engineering Analysis III
or GEN_ENG 206-1 & GEN_ENG 206-2 & GEN_ENG 206-3	Honor Engineering Analysis and Honors Engineering Analysis and Honors Engineering Analysis
COMP_SCI 111-0	Fundamentals of Computer Programming [2]
3 design and communications courses (p. 131)	
7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	

Major Program (21 units)

Course	Title
5 required courses	
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
COMP_SCI 211-0	Fundamentals of Computer Programming II
COMP_SCI 213-0	Introduction to Computer Systems
COMP_SCI 214-0	Data Structures & Algorithms
IEMS 201-0	Introduction to Statistics
or IEMS 303-0	Statistics
or ELEC_ENG 302-0	Probabilistic Systems
3 advanced elective courses	
Any 300-level or higher class, or introductory courses that directly support computer science (MECH_ENG 233-0, COMP_ENG 203-0, COMP_ENG 205-0)	
5 breadth courses chosen from the options below	
6 technical electives chosen from the options below	
2 project courses chosen from the options below	

1 See general requirements (p. 131) for details.
2 COMP_SCI 110-0 Introduction to Computer Programming may be used as an unrestricted elective if taken before COMP_SCI 111-0 Fundamentals of Computer Programming. It may not, however, be applied to the computer science major requirements.

Breadth Courses

Majors must take one course from each area. Minors must take one course from each of any three areas.

Theory

Course	Title
COMP_SCI 335-0	Introduction to the Theory of Computation
COMP_SCI 336-0	Design & Analysis of Algorithms

Systems

Course	Title
COMP_SCI 322-0	Compiler Construction
COMP_SCI 339-0	Introduction to Database Systems
COMP_SCI 340-0	Introduction to Networking
COMP_SCI 343-0	Operating Systems
COMP_SCI 345-0	Distributed Systems
COMP_SCI 350-0	Introduction to Computer Security
COMP_SCI 354-0	Computer System Security
COMP_SCI 440-0	Advanced Networking
COMP_SCI 441-0	Resource Virtualization
COMP_SCI 443-0	Advanced Operating Systems
COMP_SCI 446-0	Kernel and Other Low-level Software Development
COMP_SCI 450-0	Internet Security
COMP_ENG 303-0	Advanced Digital Design
COMP_ENG 346-0	Microprocessor System Design
COMP_ENG 358-0	Introduction to Parallel Computing
COMP_ENG 361-0	Computer Architecture I

Artificial Intelligence

Course	Title
COMP_SCI 325-1	Artificial Intelligence Programming
COMP_SCI 337-0	Natural Language Processing
COMP_SCI 344-0	Design of Computer Problem Solvers
COMP_SCI 348-0	Introduction to Artificial Intelligence
COMP_SCI 349-0	Machine Learning
COMP_SCI 371-0	Knowledge Representation and Reasoning
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages

Interfaces

Course	Title
COMP_SCI 329-0	HCI Studio
COMP_SCI 313-0	Tangible Interaction Design and Learning
COMP_SCI 315-0	Design, Technology, and Research
COMP_SCI 330-0	Human Computer Interaction
COMP_SCI 331-0	Introduction to Computational Photography
COMP_SCI 333-0	Interactive Information Visualization
COMP_SCI 351-1	Introduction to Computer Graphics
COMP_SCI 352-0	Machine Perception of Music & Audio
COMP_SCI 370-0	Computer Game Design
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages
COMP_SCI 376-0	Computer Game Design and Development
COMP_SCI 377-0	Game Design Studio
ELEC_ENG 332-0	Introduction to Computer Vision

Software Development and Programming Languages

Course	Title
COMP_SCI 310-0	Scalable Software Architectures
COMP_SCI 321-0	Programming Languages
COMP_SCI 338-0	Practicum in Intelligent Information Systems
COMP_SCI 377-0	Game Design Studio
COMP_SCI 393-0	Software Construction
COMP_SCI 394-0	Agile Software Development
COMP_SCI 473-1	NUvention: Web - Part 1
COMP_SCI 473-2	NUvention: Web - Part 2

Project Courses

Majors must take two courses from this list.

Project course list

Course	Title
COMP_SCI 311-0	Inclusive Making
COMP_SCI 315-0	Design, Technology, and Research
COMP_SCI 322-0	Compiler Construction
COMP_SCI 329-0	HCI Studio
COMP_SCI 330-0	Human Computer Interaction
COMP_SCI 331-0	Introduction to Computational Photography
COMP_SCI 337-0	Natural Language Processing
COMP_SCI 338-0	Practicum in Intelligent Information Systems
COMP_SCI 339-0	Introduction to Database Systems
COMP_SCI 340-0	Introduction to Networking
COMP_SCI 343-0	Operating Systems
COMP_SCI 344-0	Design of Computer Problem Solvers
COMP_SCI 345-0	Distributed Systems
COMP_SCI 351-1	Introduction to Computer Graphics
COMP_SCI 351-2	Intermediate Computer Graphics
COMP_SCI 354-0	Computer System Security
COMP_SCI 355-0	Digital Forensics and Incident Response
COMP_SCI 367-0	Wireless and Mobile Health: Passive Sensing Data Analytics
COMP_SCI 370-0	Computer Game Design
COMP_SCI 371-0	Knowledge Representation and Reasoning
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages
COMP_SCI 377-0	Game Design Studio
COMP_SCI 393-0	Software Construction
COMP_SCI 394-0	Agile Software Development
COMP_SCI 397-0	Special Projects in Computer Science
COMP_SCI 441-0	Resource Virtualization
COMP_SCI 446-0	Kernel and Other Low-level Software Development
COMP_SCI 450-0	Internet Security
COMP_SCI 473-2	NUvention: Web - Part 2
COMP_SCI 497-0	Special Projects in Computer Science
COMP_ENG 366-0	Embedded Systems
COMP_ENG 466-0	Embedded Systems
ELEC_ENG 332-0	Introduction to Computer Vision

Technical electives

Majors must take six technical electives. **Any 300- or 400-level COMP_SCI course** may be taken as a technical elective. In addition the following courses may also be taken as technical electives:

Additional technical electives

Course	Title
COMP_ENG 303-0	Advanced Digital Design
COMP_ENG 329-0	The Art of Multicore Concurrent Programming
COMP_ENG 334-0	Fundamentals of Blockchains and Decentralization
COMP_ENG 346-0	Microprocessor System Design
COMP_ENG 355-0	ASIC and FPGA Design
COMP_ENG 356-0	Introduction to Formal Specification & Verification
COMP_ENG 357-0	Design Automation in VLSI
COMP_ENG 358-0	Introduction to Parallel Computing
COMP_ENG 361-0	Computer Architecture I
COMP_ENG 362-0	Computer Architecture Projects
COMP_ENG 365-0	Internet-of-things Sensors, Systems, And Applications
COMP_ENG 366-0	Embedded Systems
COMP_ENG 368-0	Programming Massively Parallel Processors with CUDA
COMP_ENG 452-0	Adv Computer Architecture
COMP_ENG 453-0	Parallel Architectures
COMP_ENG 456-0	Modern Topics in Computer Architecture
COMP_ENG 459-0	VLSI Algorithmics
COMP_ENG 465-0	Internet-of-things Sensors, Systems, And Applications
COMP_ENG 466-0	Embedded Systems
COMP_ENG 468-0	Programming Massively Parallel Processors with CUDA
ELEC_ENG 332-0	Introduction to Computer Vision
ELEC_ENG 375-0	Machine Learning: Foundations, Applications, and Algorithms
ELEC_ENG 433-0	Statistical Pattern Recognition

ELEC_ENG 435-0	Deep Learning: Foundations, Applications, and Algorithms

Note

Courses that fulfill the breadth and project courses also fulfill the technical elective requirement. However, a given course may only be applied to a single requirement for the major. In such cases where a single course could be applied to multiple requirements, a student must choose which requirement to apply a given course to. A course may not be counted toward multiple requirements at once.

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.

Students should begin the minor before the end of their first quarter of their junior year. To declare the McCormick Computer Science minor, students should submit the minor declaration form in **MAS (McCormick Advising System)** by the end of their junior year. At least 4 courses used for the minor may not be used (double-counted) to fulfill requirements in the student's 21-unit major program.

Course	Title
Requirements (15 units)	
Prerequisites (6 units)	
MATH 220-1	Single-Variable Differential Calculus
MATH 220-2	Single-Variable Integral Calculus
MATH 228-1	Multivariable Differential Calculus for Engineering
Engineering Analysis (3 units):	
GEN_ENG 205-1 & GEN_ENG 205-2 & GEN_ENG 205-3	Engineering Analysis I and Engineering Analysis II and Engineering Analysis III
or GEN_ENG 206-1 & GEN_ENG 206-2 & GEN_ENG 206-3	Honor Engineering Analysis and Honors Engineering Analysis and Honors Engineering Analysis
Minor Requirements (9 units)	
Core Courses (6 units of computer science) [1]	
COMP_SCI 111-0	Fundamentals of Computer Programming
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
COMP_SCI 211-0	Fundamentals of Computer Programming II
COMP_SCI 212-0	Mathematical Foundations of Comp Science
COMP_SCI 213-0	Introduction to Computer Systems
COMP_SCI 214-0	Data Structures & Algorithms
Breath Courses (3 units from three different areas, see below)	

[1] Students without prior programming experience may wish to take COMP_SCI 110-0 Introduction to Computer Programming before COMP_SCI 111-0 Fundamentals of Computer Programming

Breadth Courses

Majors must take one course from each area. Minors must take one course from each of any three areas.

Theory

Course	Title
COMP_SCI 335-0	Introduction to the Theory of Computation
COMP_SCI 336-0	Design & Analysis of Algorithms

Systems

Course	Title
COMP_SCI 322-0	Compiler Construction
COMP_SCI 339-0	Introduction to Database Systems
COMP_SCI 340-0	Introduction to Networking
COMP_SCI 343-0	Operating Systems
COMP_SCI 345-0	Distributed Systems
COMP_SCI 350-0	Introduction to Computer Security
COMP_SCI 354-0	Computer System Security
COMP_SCI 440-0	Advanced Networking
COMP_SCI 441-0	Resource Virtualization
COMP_SCI 443-0	Advanced Operating Systems
COMP_SCI 446-0	Kernel and Other Low-level Software Development
COMP_SCI 450-0	Internet Security
COMP_ENG 303-0	Advanced Digital Design
COMP_ENG 346-0	Microprocessor System Design
COMP_ENG 358-0	Introduction to Parallel Computing
COMP_ENG 361-0	Computer Architecture I

Artificial Intelligence

Course	Title
COMP_SCI 325-1	Artificial Intelligence Programming
COMP_SCI 337-0	Natural Language Processing
COMP_SCI 344-0	Design of Computer Problem Solvers
COMP_SCI 348-0	Introduction to Artificial Intelligence
COMP_SCI 349-0	Machine Learning
COMP_SCI 371-0	Knowledge Representation and Reasoning
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages

Interfaces

Course	Title
COMP_SCI 329-0	HCI Studio
COMP_SCI 313-0	Tangible Interaction Design and Learning
COMP_SCI 315-0	Design, Technology, and Research
COMP_SCI 330-0	Human Computer Interaction
COMP_SCI 331-0	Introduction to Computational Photography
COMP_SCI 333-0	Interactive Information Visualization
COMP_SCI 351-1	Introduction to Computer Graphics
COMP_SCI 352-0	Machine Perception of Music & Audio
COMP_SCI 370-0	Computer Game Design
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages
COMP_SCI 376-0	Computer Game Design and Development
COMP_SCI 377-0	Game Design Studio
ELEC_ENG 332-0	Introduction to Computer Vision

Software Development and Programming Languages

Course	Title
COMP_SCI 310-0	Scalable Software Architectures
COMP_SCI 321-0	Programming Languages
COMP_SCI 338-0	Practicum in Intelligent Information Systems

COMP_SCI 377-0	Game Design Studio
COMP_SCI 393-0	Software Construction
COMP_SCI 394-0	Agile Software Development
COMP_SCI 473-1	NUvention: Web - Part 1
COMP_SCI 473-2	NUvention: Web - Part 2

Data Science and Engineering

mccormick.northwestern.edu/data-science-engineering/ (https://www.mccormick.northwestern.edu/data-science-engineering/)

The McCormick minor in Data Science & Engineering provides students with practical knowledge fundamental to the data science lifecycle. Students will gain experience with a variety of data models and techniques used for collecting data, cleaning it, and analyzing it. They will also learn how to glean insights from data through multiple modern computational tools, as well as the ability to think critically about the construction and implications of analysis and models for data-driven decision making.

The minor is anchored by a pair of specialized studio courses. Foundations of Data Science launches the student experience and provides hands-on training with the tools needed to work effectively with large data sets in the cloud or on their own machines. Their studies culminate with Data Engineering Studio, where they will synthesize their in-depth knowledge of statistics, machine learning, and computing with a quarter-long project using real-world data. This project will enable them to apply their skills to a sustainable, reproducible manner. This program also includes two elective courses to either enrich each student's major study or broaden their experience in data-intensive analysis in other disciplines.

The minor is designed to be accessible to students across Northwestern Engineering. It will empower them to develop comprehensive data science pipelines, using computational data analysis for the estimation, prediction, design, and control of engineering systems.

Programs of Study

- Data Science and Engineering Minor (p. 160)

Data Science and Engineering Courses

DATA_ENG 200-0 Foundations of Data Science (1 Unit) This course will cover the fundamentals of data science and the context within which this field operates. Students will learn how to design their data analysis by learning to think critically about what questions are answerable with data and they will learn about common pitfalls in data analytics such as algorithmic bias and best practices for handling the sensitive data of others. It will also introduce students to computational thinking, a methodology for problem-solving the technological challenges they will encounter as data scientists. This course will also introduce the steps of the data science lifecycle and common tools and techniques for data science. We will cover data exploration, the principles of data cleaning and integration, version control, and building reproducible data science pipelines. This course is reserved for students pursuing the McCormick Data Science and Engineering Minor. We encourage students to take this early in their studies for the minor. It is the first part of a two-part sequence with DATA_ENG 300-0. Prerequisite: COMP_SCI 150-0.

DATA_ENG 300-0 Data Engineering Studio (1 Unit) Data Engineering Studio will teach students how to build a sustainable data science lifecycle. Students will analyze data in multiple contexts (e.g., SQL, building machine learning models), share their findings with peers, and practice iteratively refining their analysis based on feedback from the instructor, course staff, and peers. Students will also hone their practical skills and they will become acquainted with the common pitfalls in applying data analytics to real-world datasets. Moreover, students will learn how to analyze and visualize data from multiple data models, including graph analytics, time series data, and relational data. This course is reserved for students pursuing the McCormick Data Science and Engineering Minor. We encourage students to take this course at the end of their studies in the minor. It is the second part of a two-part sequence with DATA_ENG 200-0. DATA_ENG 300-0 has a "flipped classroom" format. Students are responsible for watching a lecture before each class. Then they will work collaboratively with their teams, the instructor, and course staff to learn how to solve various challenges in the data science pipeline. Prerequisite: DATA_ENG 200-0 and 1 unit from each of the following core areas; Statistics Foundations, Intermediate Programming/Algorithmic Skills, and Applied Machine Learning.

Data Science and Engineering Minor

The Data Science and Engineering minor requires 8 courses: 4 core courses, 2 studio courses, and 2 elective courses. No more than 4 courses may be double counted within a student's 21-unit major program. Courses with a grade lower than "C-" cannot be applied to the minor.

Core courses (4 units):

Course	Title
Statistics Foundations (1 course)	
BMD_ENG 220-0	Introduction to Biomedical Statistics
CHEM_ENG 312-0	Probability and Statistics for Chemical Engineering
CIV_ENV 306-0	Uncertainty Analysis
IEMS 201-0	Introduction to Statistics
IEMS 303-0	Statistics

Course	Title
Programming Foundations (1 course)	
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
COMP_SCI 211-0	Fundamentals of Computer Programming II

Course	Title
Intermediate Programming/Algorithmic Skills (1 course)	
COMP_SCI 214-0	Data Structures & Algorithms
COMP_SCI 217-0	Data Management & Information Processing

Course	Title
Applied Machine Learning (1 course)	
COMP_SCI 349-0	Machine Learning
ELEC_ENG 375-0	Machine Learning: Foundations, Applications, and Algorithms
IEMS 304-0	Statistical Learning for Data Analysis

Data Science Studio Courses (2 units):

Course	Title
DATA_ENG 200-0	Foundations of Data Science
DATA_ENG 300-0	Data Engineering Studio

Elective Courses (2 units):

Course	Title
BMD_ENG 311-0	Computational Genomics
BMD_ENG 395-0	Topics in Biomedical Engineering (Biomedical Applications in Machine Learning)
CHEM_ENG 379-0	Computational Biology: Analysis and Design of Living Systems
CIV_ENV 304-0	Civil and Environmental Engineering Systems Analysis
CIV_ENV 377-0	Choice Modelling in Engineering
CIV_ENV 413-0	Experimental Solid Mechanics
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 495-0	Selected Topics in Civil Engineering (Data Analytics for Transportation and Urban Infrastructure Applications)
COMP_SCI 348-0	Introduction to Artificial Intelligence
COMP_SCI 394-0	Agile Software Development
COMP_SCI 396-0	Special Topics in Computer Science (Deep Learning) or (Interactive Information Visualization) or (Computing, Ethics, and Society) or (Visualization for Scientific Communication)
COMP_SCI 397-0	Special Projects in Computer Science (Rapid Prototyping for Software Innovation)
ELEC_ENG 328-0	Information Theory & Learning
ELEC_ENG 335-0	Deep Learning Foundations from Scratch
ELEC_ENG 373-0	Deep Reinforcement Learning
ELEC_ENG 395-0	Special Topics in Electrical Engineering (Optimization Techniques for Machine Learning and Deep Learning)
ELEC_ENG 424-0	Distributed Optimization
ELEC_ENG 433-0	Statistical Pattern Recognition
ES_APPM 345-0	Applied Linear Algebra
ES_APPM 375-1	Quantitative Biology I: Experiments, Data, Models, and Analysis
ES_APPM 375-2	Quantitative Biology II: Experiments, Data, Models, and Analysis
ES_APPM 472-0	Introduction to the Analysis of RNA Sequencing Data
ES_APPM 479-0	Data Driven Methods for Dynamical Systems
IEMS 307-0	Quality Improvement by Experimental Design
IEMS 308-0	Data Science and Analytics
IEMS 313-0	Foundations of Optimization
IEMS 340-0	Qualitative Methods in Engineering Systems
IEMS 341-0	Social Networks Analysis
IEMS 351-0	Optimization Methods in Data Science
MAT_SCI 358-0	Modeling and Simulation in Materials Science and Engineering
MAT_SCI 391-0	Process Design
MECH_ENG 301-0	Introduction to Robotics Laboratory
MECH_ENG 341-0	Computational Methods for Engineering Design
MECH_ENG 395-0	Special Topics in Mechanical Engineering (Mechanistic Data Science)
MECH_ENG 413-0	Experimental Solid Mechanics
MECH_ENG 441-0	Engineering Optimization for Product Design and Manufacturing
MECH_ENG 469-0	Machine Learning and Artificial Intelligence for Robotics
MECH_ENG 495-0	Selected Topics in Mechanical Engg (Sensory Navigation and Machine Learning for Robotics)

Design Engineering (Engineering Design)

See Segal Design Institute (p. 186)(including the Bachelor of Science in Manufacturing and Design Engineering as well as the Segal Design Certificate).

Electrical and Computer Engineering

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The Department of Electrical and Computer Engineering offers two programs for undergraduate students leading to the bachelor of science degree in electrical engineering and the bachelor of science degree in computer engineering. It also offers graduate programs leading to the MS and PhD degrees in those 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.

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.

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.

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 computing systems, embedded systems, computer vision, VLSI design, electronic design automation, robotics, solid-state devices, fiber optics, lasers, computational electromagnetics, electronic materials, and biomedical engineering.

Programs of Study

- Computer Engineering Degree (p. 166)
- Electrical Engineering Degree (p. 167)

COMP_ENG 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.

COMP_ENG 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: COMP_SCI 111-0 or GEN_ENG 205-1; COMP_ENG 203-0 recommended.

COMP_ENG 295-0 Special Topics in Computer Engineering (1 Unit)
Topics suggested by students or faculty and approved by the department.

COMP_ENG 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: COMP_ENG 203-0.

COMP_ENG 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, locking, non-blocking synchronization, and transactional memory.
Prerequisite: COMP_SCI 110-0 or COMP_SCI 111-0.

COMP_ENG 334-0 Fundamentals of Blockchains and Decentralization (1 Unit)
This course is partly an introduction to the fundamentals of blockchains and decentralized applications and partly a springboard toward

deeper understanding and further exploration. The course explains how blockchains work; teaches the underlying fundamentals of distributed consensus; provides hands-on experience through computer assignments; and also touches upon economic and policy issues.
Prerequisites: COMP_SCI 212-0 or ELEC_ENG 302-0 or equivalent or graduate standing and basic programming skills.

COMP_ENG 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: COMP_SCI 211-0 and (COMP_ENG 205-0 or COMP_SCI 213-0).

COMP_ENG 347-1 Microprocessor Systems Project I (1 Unit)
Design, prototype and test individual projects involving microprocessors and related devices such as PAL/FPGA and special purpose ICs. Embedded-system tools such as special purpose compilers and ICE (in-circuit emulation). Manufacturing issues such as PCB layout. Survey of microprocessor platforms. Part I deals with specification and design.
Prerequisite: COMP_ENG 346-0.

COMP_ENG 347-2 Microprocessor Systems Project II (1 Unit)
Design, prototype and test individual projects involving microprocessors and related devices such as PAL/FPGA and special purpose ICs. Embedded-system tools such as special purpose compilers and ICE (in-circuit emulation). Manufacturing issues such as PCB layout. Survey of microprocessor platforms. Part II deals with implementation, testing, and documentation.
Prerequisite: COMP_ENG 347-1.

COMP_ENG 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: COMP_ENG 303-0.

COMP_ENG 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.

COMP_ENG 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: COMP_SCI 214-0, COMP_ENG 303-0.

COMP_ENG 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.
Prerequisite: COMP_SCI 211-0 or graduate standing.

COMP_ENG 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: (COMP_ENG 205-0 or COMP_SCI 213-0) AND (COMP_ENG 303-0 or COMP_ENG 355-0).

COMP_ENG 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: COMP_ENG 361-0.

COMP_ENG 364-0 CyberPhysical Systems Design and Application (1 Unit) This course will introduce trends and challenges of modern cyber-physical systems, and review state-of-the-art design paradigms and tools in academia and industry. It will introduce fundamental concepts in the modeling of cyber-physical systems, important models of computation such as dataflow, state machine, and synchronous-reactive semantics, real-time embedded architectures, and synthesis methodologies for generating efficient, correct, and predictable implementations.

COMP_ENG 365-0 Internet-of-things Sensors, Systems, And Applications (1 Unit) In-depth review of advanced technology surrounding the Internet-of-Things; including wireless sensing networks, wearables, drones, privacy, machine learning, and energy-efficient computing. Application domains in health, infrastructure monitoring, green computing and others are explored. Following a seminar format with alongside exploration of new research areas through a project proposal.

COMP_ENG 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.

COMP_ENG 368-0 Programming Massively Parallel Processors with CUDA (1 Unit)
A hands-on introduction to parallel programming and optimizations for 1000+ core GPU processors, their architecture, the CUDA programming model, and performance analysis. Students implement various optimizations in massively-parallel workloads on modern GPUs. May not receive credit for both COMP_ENG 368-0 and COMP_ENG 468-0.
Prerequisites: (COMP_SCI 213-0 and (COMP_SCI 211-0 or COMP_SCI 230-0)) or permission of instructor.

COMP_ENG 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: COMP_SCI 343-0 or COMP_SCI 340-0.

COMP_ENG 391-0 CMOS VLSI Circuit Design (1 Unit)
Design of modern CMOS very large-scale integrated (VLSI) circuits.

COMP_ENG 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: COMP_ENG 391-0 or COMP_ENG 355-0.

COMP_ENG 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.

COMP_ENG 395-0 Special Topics in Computer Engineering (1 Unit) Topics suggested by students or faculty and approved by the department.

COMP_ENG 399-0 Projects (1 Unit) Seminar and projects for advanced undergraduates on subjects of current interest in electrical and computer engineering.

ELEC_ENG 100-0 Electrons, Photons, and Bits: Adventures in Electrical and Computer Engineering (1 Unit) Introduction to contemporary topics in electrical engineering (5 weeks) and computer engineering (5 weeks) via lectures, demonstrations, and lab tours. No exams, but two in-depth term papers are required: the first on an electrical engineering topic reviewed during the first half of the course, and the second on a computer engineering topic reviewed during the second half of the course.

ELEC_ENG 195-0 Special Topics in Electrical Engineering (1 Unit) Topics suggested by students or faculty and approved by the department.

ELEC_ENG 202-0 Introduction to Electrical Engineering (1 Unit) Introduction to fundamental concepts and applications of electrical engineering. Topics include: circuit analysis from dc resistive networks to networks of impedances operating in the sinusoidal steady-state; circuit simplification and the Thevenin equivalent circuit; complex numbers and phasors; series and parallel inductor-capacitor resonance; simple analog filters; power transfer and impedance matching; op amps realizing active filters; signal spectra and the Fourier transform; signal sampling and aliasing; bandwidth and channel capacity; simple feedback and control systems; semiconductor electronics and devices including diodes, transistors, light-emitting diodes, and lasers.

ELEC_ENG 221-0 Fundamentals of Circuits (1 Unit) Fundamental concepts in electrical circuits; circuit analysis and network theorems; linearity and superposition; series/parallel combinations of R, L, and C circuits; sinusoidal forcing; complex frequency and Bode plots; mutual inductance and transformers; two port networks. Prerequisite: ELEC_ENG 202-0.

ELEC_ENG 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: ELEC_ENG 202-0.

ELEC_ENG 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: ELEC_ENG 202-0; PHYSICS 135-3; MATH 228-2.

ELEC_ENG 224-0 Fund of Electromagnetics & Photonics (1 Unit) Introduction to electromagnetic waves in electrical engineering. Topics include: analysis of transmission lines in the time domain and the sinusoidal steady-state; fundamentals of electrostatics and magnetostatics; Maxwell's equations for time-varying electromagnetic fields; plane electromagnetic wave propagation, reflection, and transmission at material interfaces; Poynting's theorem; introduction to fiber optics and photonics. Prerequisites: (ELEC_ENG 202-0 and ELEC_ENG 221-0 and PHYSICS 135-2 and MATH 228-2) or consent of instructor.

ELEC_ENG 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: ELEC_ENG 221-0, ELEC_ENG 223-0.

ELEC_ENG 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: ELEC_ENG 221-0; PHYSICS 135-2.

ELEC_ENG 295-0 Special Topics in Electrical Engineering (1 Unit) Topics suggested by students or faculty and approved by the department.

ELEC_ENG 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. May not receive credit for both ELEC_ENG 302-0 and any of the following: IEMS 202-0; MATH 310-1; STAT 320-1; ELEC_ENG 383-0, ELEC_ENG 385-0.
Corequisite: MATH 228-2 or equivalent.

ELEC_ENG 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: ELEC_ENG 222-0, ELEC_ENG 302-0 or equivalent.

ELEC_ENG 308-0 Applied Electromagnetics and Photonics (1 Unit)
Electromagnetic wave behavior and design of metallic, dielectric, and optical waveguides and antennas and antenna arrays. Electromagnetic wave fundamentals of wireless communications systems and radar techniques.
Prerequisite: ELEC_ENG 224-0.

ELEC_ENG 326-0 Electronic System Design I (1 Unit)
This fast-paced course will teach a student how to go from a project idea to a fully functional prototype implementation. This involves a printed circuit design using PCB CAD software, surface mount soldering, MCU programming, CAD design for 3D printing, and web design. This course has been approved as an Electrical Engineering Technical Elective to be included in the 2020-2021 Catalog. Current electrical engineering students can petition to use it as a technical elective.
Prerequisite: Students must have completed (ELEC_ENG 225-0 and COMP_SCI 211-0), or MECH_ENG 333-0, or graduate standing, or instructor consent.

ELEC_ENG 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: ELEC_ENG 326-0 or instructor consent.

ELEC_ENG 328-0 Information Theory & Learning (1 Unit) This course gives students analytical tools to quantify information, perform inference, and study the relationship of information and learning. The course covers information measures, the source and the channel coding theorems, statistical inference, and learning with neural networks. In particular, the course explores a common set of models and tools used by both machine learning and state-of-the-art data compression and error-control codes. This course is aimed at undergraduate students in

engineering, science, mathematics, and computing. It expects familiarity with undergraduate-level calculus, probability theory, and linear algebra.
Prerequisite: Basic probability theory (ELEC_ENG 302-0 or equivalent).

ELEC_ENG 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.
Prerequisite: COMP_SCI 150 or COMP_SCI 211 or Consent of Instructor.

ELEC_ENG 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: COMP_SCI 212-0 or ELEC_ENG 302-0 or equivalent or graduate standing.

ELEC_ENG 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: ELEC_ENG 302-0 or equivalent.

ELEC_ENG 334-0 Fundamentals of Blockchains and Decentralization (1 Unit)
This course is partly an introduction to the fundamentals of blockchains and decentralized applications and partly a springboard toward deeper understanding and further exploration. The course explains how blockchains work; teaches the underlying fundamentals of distributed consensus; provides hands-on experience through computer assignments; and also touches upon economic and policy issues.
Prerequisites: COMP_SCI 212-0 or ELEC_ENG 302-0 or equivalent or graduate standing and basic programming skills.

ELEC_ENG 335-0 Deep Learning Foundations from Scratch (1 Unit)
The course covers the fundamentals of deep learning and numerical optimization, with many application examples.

ELEC_ENG 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: COMP_ENG 203-0, ELEC_ENG 225-0.

ELEC_ENG 359-0 Digital Signal Processing (1 Unit)
Discrete-time signals and systems. Discrete-time Fourier transform, z-transform, discrete Fourier transform, digital filters.
Prerequisite: ELEC_ENG 222-0.

ELEC_ENG 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: ELEC_ENG 222-0 or MECH_ENG 390-0 or BMD_ENG 309-0 or equivalent.

ELEC_ENG 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: ELEC_ENG 359-0.

ELEC_ENG 372-1 Robot Design Studio (1 Unit)
In this course, teams of students will design and build robots. For instance, teams may build robots inspired by the Summer Olympics: a robot that can perform on the uneven bars, that can skate a half-pipe, or or that can do flips on a BMX bike. The ultimate goal is to build a robust, elegant machine capable of performing exciting dynamic feats. Along the way, students will refine skills in mechatronics, electromechanical design, real-time programming, sensor selection and integration, motor/transmission design, and feedback control.
Prerequisite: Consent of Instructor.

ELEC_ENG 372-2 Robot Design Studio (1 Unit)
In this course, teams of students will design and build robots. For instance, teams may build robots inspired by the Summer Olympics: a robot that can perform on the uneven bars, that can skate a half-pipe, or that can do flips on a BMX bike. The ultimate goal is to build a robust, elegant machine capable of performing exciting dynamic feats. Along the way, students will refine skills in mechatronics, electromechanical design, real-time programming, sensor selection and integration, motor/transmission design, and feedback control.
Prerequisite: ELEC_ENG 372-1.

ELEC_ENG 373-0 Deep Reinforcement Learning (1 Unit) Fundamentals of Deep Reinforcement Learning starting from its roots in dynamic programming and optimal control, and ending with some of the most popular applications in practice today; basic Q-Learning algorithm and its extensions; deep Q-Learning. Through exercises and a final course project students will gain significant hands-on experience coding up and testing reinforcement systems on a variety of interesting problems.
Prerequisites: ELEC_ENG 375-0 and ELEC_ENG 335-0.

ELEC_ENG 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-lmatching controllers.
Prerequisite: ELEC_ENG 360-0.

ELEC_ENG 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.

ELEC_ENG 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.
Prerequisite: ELEC_ENG 302-0 or equivalent.

ELEC_ENG 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.

ELEC_ENG 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: ELEC_ENG 378-0.

ELEC_ENG 381-0 Electronic Properties of Materials (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.
Prerequisite: ELEC_ENG 223-0 or consent of instructor.

ELEC_ENG 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: ELEC_ENG 222-0 and ELEC_ENG 224-0 or consent of instructor.

ELEC_ENG 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: ELEC_ENG 223-0, ELEC_ENG 224-0.

ELEC_ENG 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: ELEC_ENG 381-0 or consent of instructor.

ELEC_ENG 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: ELEC_ENG 381-0 or consent of instructor.

ELEC_ENG 387-0 Advanced Digital Systems Design with FPGAs (1 Unit)
This course covers the systematic design of advanced digital systems using field programmable gate arrays (FPGAs). The course presents a top-down design methodology, where students learn how to translate software applications in high-level level languages (such as C/C++) into SystemVerilog models to run on FPGAs. The course focuses on designing real-time high-performance computing applications using industry-standard methodologies, with an emphasis on simulation-based verification and debugging.

ELEC_ENG 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: ELEC_ENG 223-0 or consent of instructor.

ELEC_ENG 389-0 Superconductivity and Its Applications (1 Unit)
Properties of materials in the superconducting state; charge flow dynamics of type II superconductors; highTc superconductors; applications for computers and high-frequency devices.
Prerequisite: ELEC_ENG 381-0 or consent of instructor.

ELEC_ENG 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: COMP_SCI 230-0.

ELEC_ENG 395-0 Special Topics in Electrical Engineering (1 Unit)
Topics suggested by students or faculty and approved by the department.

ELEC_ENG 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.

ELEC_ENG 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. 27) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units) [1]

Course	Title
4 mathematics courses (p. 131)	
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 categories of Chemistry, Physics, Biological Science, Earth & Planetary Science or Astronomy (p. 131) [2, 3]	
4 engineering analysis and computer proficiency courses (p. 131)	
3 design and communication courses (p. 131)	
7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	

Major Program (21 units)

Course	Title
10 required courses	
COMP_ENG 203-0	Introduction to Computer Engineering
COMP_ENG 205-0	Fundamentals of Computer System Software
COMP_ENG 303-0	Advanced Digital Design
COMP_ENG 361-0	Computer Architecture I
COMP_SCI 111-0	Fundamentals of Computer Programming
COMP_SCI 211-0	Fundamentals of Computer Programming II
ELEC_ENG 202-0	Introduction to Electrical Engineering
ELEC_ENG 302-0	Probabilistic Systems
ELEC_ENG 221-0	Fundamentals of Circuits
1 additional course from a McCormick department at 200-level or higher comprised of 100% Engineering Topics based on ABET Course Partitioning Table	
10 technical elective courses	
2 courses chosen from the options below	
COMP_SCI 213-0	Introduction to Computer Systems
ELEC_ENG 222-0	Fundamentals of Signals & Systems
ELEC_ENG 223-0	Fundamentals of Solid State Engineering
ELEC_ENG 224-0	Fund of Electromagnetics & Photonics
ELEC_ENG 225-0	Fundamentals of Electronics
5 courses from the areas below	
Architecture and high-performance computing (see below)	
VLSI and CAD (see below)	
Embedded systems (see below)	
Software systems (see below)	
Networks and security (see below)	
3 elective courses chosen from the options below	
300-level technical courses in science, mathematics, computer science, or engineering [4]	
BIOL_SCI 201-0	Molecular Biology
BIOL_SCI 202-0	Cell Biology

BIOL_SCI 203-0	Genetics and Evolution
CHEM 215-1 & CHEM 215-2 & CHEM 215-3	Organic Chemistry I and Organic Chemistry II and Advanced Organic Chemistry
1 design course chosen from the options below	
COMP_ENG 347-1	Microprocessor Systems Project I
COMP_ENG 362-0	Computer Architecture Projects
COMP_ENG 392-0	VLSI Systems Design Projects

1 See general requirements (p. 131) for details.
2 Maximum of 3 basic science units may come from any one area.
3 PHYSICS 125-2 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-2 General Physics. PHYSICS 125-3 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-3 General Physics. Associated labs are PHYSICS 126-2 Physics for ISP Laboratory or PHYSICS 136-2 General Physics Laboratory and PHYSICS 126-3 Physics for ISP Laboratory or PHYSICS 136-3 General Physics Laboratory.
4 No more than 2 units of COMP_ENG 399-0 Projects will be counted as technical electives. Additional units of COMP_ENG 399-0 Projects may be taken but will be counted as unrestricted electives.

Area Electives

Architecture and High-Performance Computing

Course	Title
COMP_ENG 329-0	The Art of Multicore Concurrent Programming
COMP_ENG 358-0	Introduction to Parallel Computing
COMP_ENG 362-0	Computer Architecture Projects
COMP_ENG 368-0	Programming Massively Parallel Processors with CUDA
COMP_ENG 452-0	Adv Computer Architecture
COMP_ENG 453-0	Parallel Architectures
COMP_ENG 468-0	Programming Massively Parallel Processors with CUDA

VLSI and CAD

Course	Title
COMP_ENG 355-0	ASIC and FPGA Design
COMP_ENG 357-0	Design Automation in VLSI
COMP_ENG 391-0	CMOS VLSI Circuit Design
COMP_ENG 392-0	VLSI Systems Design Projects
COMP_ENG 459-0	VLSI Algorithmics
ELEC_ENG 353-0	Digital Microelectronics
COMP_ENG 393-0	Advanced Low Power VLSI and Mixed-signal IC Design
COMP_ENG 493-0	Advanced Low Power VLSI and Mixed-signal IC Design

Embedded Systems

Course	Title
COMP_SCI 301-0	Introduction to Robotics Laboratory
COMP_ENG 346-0	Microprocessor System Design
COMP_ENG 347-1	Microprocessor Systems Project I
COMP_ENG 347-2	Microprocessor Systems Project II
COMP_ENG 364-0	CyberPhysical Systems Design and Application
COMP_ENG 365-0	Internet-of-things Sensors, Systems, And Applications
COMP_ENG 366-0	Embedded Systems
COMP_ENG 369-0	Introduction to Sensor Networks
COMP_ENG 464-0	Cyber-Physical Systems Design and Application
COMP_ENG 465-0	Internet-of-things Sensors, Systems, And Applications
COMP_ENG 466-0	Embedded Systems
ELEC_ENG 326-0	Electronic System Design I
ELEC_ENG 327-0	Electronic System Design II: Project
ELEC_ENG 332-0	Introduction to Computer Vision
ELEC_ENG 360-0	Introduction to Feedback Systems
ELEC_ENG 390-0	Introduction to Robotics
ELEC_ENG 432-0	Advanced Computer Vision
MECH_ENG 333-0	Introduction to Mechatronics
MECH_ENG 433-0	Advanced Mechatronics

Software Systems

Course	Title
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
COMP_SCI 212-0	Mathematical Foundations of Comp Science
COMP_SCI 214-0	Data Structures & Algorithms
COMP_SCI 321-0	Programming Languages
COMP_SCI 322-0	Compiler Construction
COMP_SCI 336-0	Design & Analysis of Algorithms
COMP_SCI 339-0	Introduction to Database Systems
COMP_SCI 343-0	Operating Systems
COMP_SCI 394-0	Agile Software Development

Networks and Security

Course	Title
COMP_SCI 340-0	Introduction to Networking
COMP_SCI 350-0	Introduction to Computer Security
COMP_SCI 354-0	Computer System Security
ELEC_ENG 333-0	Introduction to Communication Networks
COMP_ENG 334-0	Fundamentals of Blockchains and Decentralization

Electrical Engineering Degree

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units) [1]

Course	Title
4 mathematics courses (p. 131)	
4 units of basic science: [2]	
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 categories of Chemistry, Physics, Biological Science, Earth & Planetary Science or Astronomy (p. 131)	
4 engineering analysis and computer proficiency courses (p. 131)	
3 design and communications courses (p. 131)	
7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	

Major Program (21 units)

Course	Title
10 required courses	
COMP_ENG 203-0	Introduction to Computer Engineering
COMP_SCI 211-0	Fundamentals of Computer Programming II
or COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
ELEC_ENG 202-0	Introduction to Electrical Engineering
ELEC_ENG 221-0	Fundamentals of Circuits
ELEC_ENG 222-0	Fundamentals of Signals & Systems
ELEC_ENG 223-0	Fundamentals of Solid State Engineering
ELEC_ENG 224-0	Fund of Electromagnetics & Photonics
ELEC_ENG 225-0	Fundamentals of Electronics
ELEC_ENG 302-0	Probabilistic Systems
1 additional McCormick course at 200-level or higher comprised of 100% Engineering Topics based on ABET Course Partitioning Table	
10 technical elective courses [3]	
6 courses chosen from the technical elective tracks below	
Biomedical engineering track (p. 168)	
Circuits and electronics track (p. 168)	
Communications systems track (p. 168)	
Control systems track (p. 168)	
Signal processing and machine learning track (p. 168)	
Electromagnetics and optics track (p. 168)	
Solid-state engineering track (p. 168)	
2 courses at the 300- or 400-level in COMP_SCI, ELEC_ENG, or COMP_ENG technical electives (which may include COMP_ENG 205-0 and the courses above)	
2 courses chosen from the options below	
300-level technical courses in science, mathematics, computer science, or engineering or the courses above	
BIOL_SCI 201-0	Molecular Biology
BIOL_SCI 202-0	Cell Biology
BIOL_SCI 203-0	Genetics and Evolution
CHEM 215-1 & CHEM 215-2 & CHEM 215-3	Organic Chemistry I and Organic Chemistry II and Advanced Organic Chemistry
1 design course from the options below [4]	
ELEC_ENG 327-0	Electronic System Design II: Project
COMP_ENG 347-1	Microprocessor Systems Project I
COMP_ENG 392-0	VLSI Systems Design Projects
ELEC_ENG 398-0	Electrical Engineering Design
ELEC_ENG 399-0	Projects

1 See general requirements (p. 131) for details.

2 PHYSICS 125-2 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-2 General Physics. PHYSICS 125-3 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-3 General Physics. Associated labs are PHYSICS 126-2 Physics for ISP Laboratory or PHYSICS 136-2 General Physics Laboratory and PHYSICS 126-3 Physics for ISP Laboratory or PHYSICS 136-3 General Physics Laboratory.

3 No more than 2 units of ELEC_ENG 399-0 Projects will be counted as technical electives. Additional units of ELEC_ENG 399-0 Projects may be taken but will be counted as unrestricted electives.

4 When ELEC_ENG 399-0 Projects is a design project and the student has senior standing

Technical Elective Tracks

Biomedical Engineering Track

Course	Title
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
COMP_ENG 303-0	Advanced Digital Design
COMP_ENG 346-0	Microprocessor System Design
COMP_ENG 347-2	Microprocessor Systems Project II
COMP_ENG 355-0	ASIC and FPGA Design
COMP_ENG 391-0	CMOS VLSI Circuit Design
COMP_ENG 393-0	Advanced Low Power VLSI and Mixed-signal IC Design
ELEC_ENG 326-0	Electronic System Design I
ELEC_ENG 327-0	Electronic System Design II: Project
ELEC_ENG 353-0	Digital Microelectronics

Communications Systems Track

Course	Title
ELEC_ENG 307-0	Communications Systems
ELEC_ENG 328-0	Information Theory & Learning
ELEC_ENG 333-0	Introduction to Communication Networks
ELEC_ENG 334-0	Fundamentals of Blockchains and Decentralization
ELEC_ENG 378-0	Digital Communications
ELEC_ENG 380-0	Wireless Communications

Control Systems Track

Course	Title
ELEC_ENG 360-0	Introduction to Feedback Systems
ELEC_ENG 374-0	Introduction to Digital Control
ELEC_ENG 390-0	Introduction to Robotics
MECH_ENG 333-0	Introduction to Mechatronics

Signal Processing and Machine Learning Track

Course	Title
ELEC_ENG 332-0	Introduction to Computer Vision
ELEC_ENG 335-0	Deep Learning Foundations from Scratch
ELEC_ENG 359-0	Digital Signal Processing
ELEC_ENG 363-0	Digital Filtering
ELEC_ENG 373-0	Deep Reinforcement Learning
ELEC_ENG 375-0	Machine Learning: Foundations, Applications, and Algorithms

Electromagnetics Engineering Track

Course	Title
ELEC_ENG 308-0	Applied Electromagnetics and Photonics
ELEC_ENG 379-0	Lasers and Coherent Optics
ELEC_ENG 382-0	Photonic Information Processing
ELEC_ENG 383-0	Fiber-Optic Communications

Solid-State Engineering Track

Course	Title
ELEC_ENG 250-0	Physical Electronics and Devices
ELEC_ENG 381-0	Electronic Properties of Materials

ELEC_ENG 384-0	Solid State Electronic Devices
ELEC_ENG 385-0	Optoelectronics
ELEC_ENG 388-0	Nanotechnology
MECH_ENG 381-0	Introduction to Micro-electro-mechanical Systems

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. 169)

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 228-1 and MATH 228-2. 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 228-1 and MATH 228-2. Prerequisite: invitation or consent of instructor.

ES_APPM 311-0 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.
Prerequisites: MATH 250-0, or GEN_ENG 205-4, or GEN_ENG 206-4.

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: GEN_ENG 205-4, GEN_ENG 206-4, or MATH 250-0. ES_APPM 311-1 is recommended.

ES_APPM 344-0 High Performance Scientific Computing (1 Unit)
Solving partial differential equations using high performance computing platforms. Basic C programming. Distributed computing using MPI. GPU programming using CUDA. Adaptation of algorithms for solving PDE's to different architectures.

ES_APPM 345-0 Applied Linear Algebra (1 Unit)
Understanding and implentation 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 228-2, 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 375-1 Quantitative Biology I: Experiments, Data, Models, and Analysis (1 Unit)
High-resolution, high-throughput, and dynamic imaging and sequencing data is the substrate of modern biology. The course consists of case-studies where we learn how to computational work with, analyze, and make sense of experimental dataset using fundamental principles of mathematics, statistics, and physics. No formal course prerequisites. Programming in python.

ES_APPM 375-2 Quantitative Biology II: Experiments, Data, Models, and Analysis (1 Unit)
High-resolution, high-throughput, and dynamic imaging and sequencing data is the substrate of modern biology. In this course we learn how to perform experiments, and computational work with, analyze, and make sense of experimental dataset using fundamental principles of mathematics, statistics, and physics. No formal course prerequisites. Programming in python.

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. 27) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units) [1]

Course	Title
4 mathematics courses (p. 131)	
4 units of basic science: [2, 3]	
PHYSICS 135-2 & PHYSICS 135-3	General Physics and General Physics

2 units chosen from McCormick-approved basic science courses	
4 engineering analysis and computer proficiency courses (p. 131)	
3 design and communication courses (p. 131)	
7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	

Major Program (21 units)

Course	Title
5 basic technical courses	
COMP_SCI 211-0	Fundamentals of Computer Programming II
Plus 4 courses from at least 3 different McCormick departments, Mathematics, Statistics, and Data Science (at 200-level or above)	
7 engineering sciences and applied mathematics courses	
ES_APPM 311-0	Methods of Applied Mathematics [4]
ES_APPM 312-0	Complex Variables
or MATH 325-0	Complex Analysis
ES_APPM 322-0	Applied Dynamical Systems
ES_APPM 346-0	Modeling and Computation in Science & Engineering
ES_APPM 345-0	Applied Linear Algebra
or MATH 334-0	Linear Algebra: Second Course
ES_APPM 421-1	Models in Applied Mathematics
1 additional unit of any 300- or 400-level ES_APPM course	
2 courses chosen from the options below	
ELEC_ENG 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 the options below	
ES_APPM 370-1	Introduction to Computational Neuroscience
ES_APPM 375-1	Quantitative Biology I: Experiments, Data, Models, and Analysis
ES_APPM 399-0	Projects
ES_APPM 495-0	Selected Topics in Applied Mathematics (subject to department approval, one whole unit or two half units)
Other modeling course subject to department approval	
4 courses in engineering or the sciences at the 300 level or higher leading to an approved concentration [4]	
2 technical electives at the 300 level or higher in engineering, science, or mathematics [4]	

1 See general requirements (p. 131) for details.

2 Maximum of 3 basic science units may come from any one area

3 PHYSICS 125-2 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-2 General Physics. PHYSICS 125-3 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-3 General Physics. Associated labs are PHYSICS 126-2 Physics for ISP Laboratory or PHYSICS 136-2 General Physics Laboratory and PHYSICS 126-3 Physics for ISP Laboratory or PHYSICS 136-3 General Physics Laboratory.

4 Since ES_APPM 311-0 Methods of Applied Mathematics is a required, Math 351 cannot be used to satisfy any ESAM degree requirements due to content overlap with ES_APPM 311-0.

Environmental Engineering

See Civil and Environmental Engineering (p. 143).

Farley Center for Entrepreneurship

farley.northwestern.edu

The Farley Center for Entrepreneurship and Innovation evolves engineering beyond the application of the sciences to the creation of businesses that capitalize on innovations. We bring together faculty from an array of disciplines to develop a unique interdisciplinary curriculum in which students experience the entire entrepreneurial life cycle—from ideation to prototyping and business plan development.

Program of Study

- Entrepreneurship Minor (p. 171)

ENTREP 225-0 Principles of Entrepreneurship (1 Unit) This survey-style course serves as the foundational course for the undergraduate minor in entrepreneurship. It is also a good choice for students who simply wish to familiarize themselves with the world of entrepreneurship. Students will learn to think like entrepreneurs, and will be introduced to key topics relevant to entrepreneurship, including customer discovery, finance, and marketing. They will also learn how to understand and analyze a broad range of entrepreneurial activity, and will have the opportunity to locate their own goals and values within the field of entrepreneurship. Taught with IEMS 225-0; may not receive credit for both courses.

ENTREP 310-0 Personal Branding (1 Unit)
This course meets a core requirement for the undergraduate minor in entrepreneurship. It is designed for freelancers, artists, and individual entrepreneurs who are looking to grow their careers. Students will learn how to use marketing and brand-building tactics in the service of their own goals and will be challenged to identify and pursue new professional opportunities. As part of their work in this course, students will create assets related to their developing brand, which may include social media content and a personal website.

ENTREP 325-0 Engineering Entrepreneurship (1 Unit)
This experiential course is a capstone option for the undergraduate minor in entrepreneurship. It is also a valuable course for graduate students in engineering fields. The goal of the course is to introduce students to innovation-driven entrepreneurship, a process by which emergent technology serves as the catalyst for new venture formation. In partnership with Northwestern's Innovation and New Ventures Office, this course challenges student teams to develop strategies for commercializing cutting-edge technologies. Each year, the course focuses on a significant innovation space. 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)
This class teaches students how to manage the finances of small and early-stage businesses using accounting software. Students also learn foundational accounting principles, and will work in teams on projects driven by case studies.

ENTREP 331-0 Entrepreneurial Sales and Marketing (1 Unit)
This course meets a core requirement for the undergraduate minor in entrepreneurship. The goal of the course is to teach students about the tools and strategies that startups use to generate revenue. It covers a broad range of topics related to sales and marketing including branding, positioning, lead generation, direct selling, social media, content

marketing, influencer marketing, SEO, paid search, email marketing and other current trends. The class is a mixture of lecture, breakout groups and guest speakers.

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 experiential course is focused on venture creation in the social impact space. Interdisciplinary teams of students use human-centered design and lean start-up principles to develop an impact-focused product or service and a plan to bring it to market.

ENTREP 360-0 Leadership, Ethics, and You (1 Unit) This class satisfies a core requirement for the undergraduate minor in entrepreneurship. It can also be applied as an elective class for students in the graduate minor program. The class is designed for students who want to explore how ethics and integrity are tied to leadership, and how leadership skills can contribute to future success in both entrepreneurial endeavors and traditional career paths.

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's undergraduate minor in entrepreneurship is open to students from all undergraduate schools at Northwestern. It is designed to give students the practical tools, education, and mindset needed to start a business, grow a venture, or make innovation a part of their chosen career path.

The minor requires 8 courses, including 5 core courses and 3 electives. No more than 4 courses may be double counted between a student's major program and the minor. Students with a primary major outside of McCormick may also be subject to the double counting rules of their home schools. Courses with a grade lower than "C-" cannot be applied to the minor. To declare the Entrepreneurship minor, students should submit the minor declaration form in **MAS (McCormick Advising System)** by the end of their junior year.

Please also note that many of our graduate level courses are open to undergraduate students. Refer to the Farley Center website (https://www.farley.northwestern.edu/) for a complete listing of all courses and the most up-to-date information on the minor program.

Core courses:

- ENTREP 225-0 Principles of Entrepreneurship
- ENTREP 310-0 Personal Branding or ENTREP 331-0 Entrepreneurial Sales and Marketing
- ENTREP 330-1 Startup Accounting and Finance
- ENTREP 360-0 Leadership, Ethics, and You
- Any Farley Center experiential course: includes all NUvention courses, ENTREP 325-0 Engineering Entrepreneurship, ENTREP 340-0 Innovate for Impact, ENTREP 425-0 Consulting for Wearable Technology, and ENTREP 495-0 Special Topics (Product Management)

Electives:

- Any Farley Center course
- 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 user-centered design process and technical communication. Students will address challenges proposed by project partners by identifying unmet needs, conducting research, generating and evaluating potential solutions, and finally, presenting a final design concept with supporting documentation. Students also enhance their abilities in equitable teamwork, project management, fabrication skills, and producing written, oral, graphical, and interpersonal communication. One lecture, two section meetings, and lab. Co-registration with ENGLISH 106-1 required. Primarily intended for first-year engineering students.

DSGN 106-2 Design Thinking and Communication (0.5 Unit)
Integrated iteration on the user-centered design process and technical communication. This course will build on the learning objectives from DTC-1 while adding more focus on ethics in design and communication, equitable distribution of teamwork, project management, documenting and communicating progress, and exploring a wider variety of project topics. One lecture, two section meetings, and lab. Co-registration with ENGLISH 106-2 required. Primarily intended for first-year engineering 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 220-1.

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 220-2.

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 (0-1 Unit) Broad engineering or interdisciplinary subjects of current interest.

GEN_ENG 205-MG-2 Midquarter Study Group: GEN_ENG 205-2 Engineering Analysis II (0 Unit) Peer-guided study group for students enrolled in GEN_ENG 205-2. Meets weekly, starting at midquarter, in small groups along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

GEN_ENG 205-SG-1 Peer-Guided Study Group: Engineering Analysis I (0 Unit) Peer-guided study group for students enrolled in GEN_ENG 205-1. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

GEN_ENG 205-SG-2 Peer-Guided Study Group: Engineering Analysis II (0 Unit) Peer-guided study group for students enrolled in GEN_ENG 205-2. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

GEN_ENG 205-SG-3 Peer-Guided Study Group: Engineering Analysis III (0 Unit) Peer-guided study group for students enrolled in GEN_ENG 205-3. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

GEN_ENG 205-SG-4 Peer-Guided Study Group: Engineering Analysis IV (0 Unit) Peer-guided study group for students enrolled in GEN_ENG 205-4. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

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/ (https://www.mccormick.northwestern.edu/academics/undergraduate/programs/honors-and-combined-degrees/murphy-institute/)

GEN_ENG 195-1 Engineering Dialog I (0.33-0.34 Unit) 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 Unit) 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 Unit) 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 Unit) 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/ (https://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	Cooperative Engineering Education
or CRDV 310-1-GM	International Cooperative Engineering Education
CRDV 310-2	Cooperative Engineering Education
or CRDV 310-2-GM	International Cooperative Engineering Education
CRDV 310-3	Cooperative Engineering Education
or CRDV 310-3-GM	International Cooperative Engineering Education
CRDV 310-4	Cooperative Engineering Education
or CRDV 310-4-GM	International Cooperative Engineering Education
CRDV 310-5	Cooperative Engineering Education
or CRDV 310-5-GM	International Cooperative Engineering Education
CRDV 310-6	Cooperative Engineering Education
or CRDV 310-6-GM	International Cooperative Engineering Education
CRDV 310-7	Cooperative Engineering Education: Half-time
or CRDV 310-7-GM	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 seeking University recognition of their internship experience, or participating in an approved internship during the regular academic year.

Course	Title
CRDV 311-1	Professional Engineering Internship
or CRDV 311-1-GM	International Engineering Internship
CRDV 311-2	Professional Engineering Internship
or CRDV 311-2-GM	International Engineering Internship
CRDV 311-3	Professional Engineering Internship
or CRDV 311-3-GM	International Engineering Internship
CRDV 311-7	Engineering Internship: Half-time
or CRDV 311-7-GM	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	Undergraduate Engineering Projects in Service Learning
or CRDV 312-1-GM	International Engineering Service Learning
CRDV 312-2	Undergraduate Engineering Projects in Service Learning
or CRDV 312-2-GM	International Engineering Service Learning
CRDV 312-3	Undergraduate Engineering Projects in Service Learning
or CRDV 312-3-GM	International Engineering Service Learning
CRDV 312-7	Engineering Projects in Service Learning: Half-time
or CRDV 312-7-GM	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	Undergraduate Engineering Research
or CRDV 313-1-GM	International Engineering Research Experience
CRDV 313-2	Undergraduate Engineering Research
or CRDV 313-2-GM	International Engineering Research Experience
CRDV 313-3	Undergraduate Engineering Research
or CRDV 313-3-GM	International Engineering Research Experience
CRDV 313-7	Engineering Research Experience: Half-time
or CRDV 313-7-GM	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/ (https://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 300-0 Designing Your Life (1 Unit) This course approaches 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. Prerequisite: Reserved for Juniors and Seniors.

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 Application (0.5 Unit) This course builds on Improv I and takes students deeper into concepts and applications. Prerequisite: PRDV 335-1 Engineering Improv 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*

Human Computer Interaction

hci.northwestern.edu (https://hci.northwestern.edu)

"Human-computer interaction (HCI) is a multidisciplinary field of study focusing on the design of computer technology and, in particular, the interaction between humans (the users) and computers. While initially concerned with computers, HCI has since expanded to cover almost all forms of information technology design." -Interaction Design Foundation (https://www.interaction-design.org/literature/topics/human-computer-interaction/)

The HCI Certificate allows Northwestern students from all departments to develop their interest and exposure to ideas and research in HCI, including the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.

Programs of Study

- Human Computer Interaction Certificate (p. 174)

Human Computer Interaction Courses

Courses for this interdisciplinary program are drawn from across the university. The program requires at least 6 courses: including 1 course from a list of foundational courses in HCI, 3 courses from one of the technical domain options, and at least 2 courses from a list of Social Science and Design topics intended to give students interdisciplinary experience across the fields of HCI. For a list of courses, see the HCI program (p. 174).

Human Computer Interaction Certificate

This certificate provides undergraduates with a basic familiarity in HCI. The program requires at least 6 courses, including 1 course from a list of foundational courses in HCI, 3 courses from one of the technical domain options, and at least 2 courses from a list of Social Science and Design topics intended to give students interdisciplinary experience across the fields of HCI. Certificate coursework must include at least 4 units that are NOT counted toward a student's major, minor, or other certificate requirements. However, certificate coursework may count toward distribution, theme, or elective requirements.

Foundations of HCI Requirement (1 course)

Course	Title
COMM_ST 227-0	Communication & Technology
COMM_ST 351-0	Technology & Human Interaction
COMP_SCI 314-0	Technology and Human Interaction
COMP_SCI 311-0	Inclusive Making
COMP_SCI 329-0	HCI Studio
COMP_SCI 330-0	Human Computer Interaction
LRN_SCI 313-0	Tangible Interaction Design and Learning
LRN_SCI 351-0	Topics in Learning Sciences (Inclusive Making)
LRN_SCI 413-0	Tangible Interaction Design and Learning
LRN_SCI 451-0	Topics in Learning Sciences (Inclusive Making)

Technical Domain Requirement (3 courses)

Students MUST complete the 3 courses in ONE of the technical domain options below:

Course	Title
Interfaces (CS) (suggested for Computer Science majors)	
COMP_SCI 111-0	Fundamentals of Computer Programming

COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
COMP_SCI 214-0	Data Structures & Algorithms

Course	Title
Interfaces (suggested for SESP, SoC, and WCAS students)	
COMP_SCI 110-0	Introduction to Computer Programming (or COMP_SCI 111-0 Fundamentals of Computer Programming 1)
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
COMP_SCI 130-0	Tools and Technology of the World-Wide Web (or COMP_SCI 396-0 Topics in HCL and the Web)

Course	Title
Hardware and Robotics (suggested for Mechanical Engineering majors)	
MECH_ENG 224-0	Scientific and Embedded Programming in Python
MECH_ENG 333-0	Introduction to Mechatronics
And 1 additional course from the Technical Electives table below	

Course	Title
Data Science (suggested for SESP, SoC, and WCAS students)	
COMP_SCI 110-0	Introduction to Computer Programming (or COMP_SCI 111-0 Fundamentals of Computer Programming 1)
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
And 1 additional course from the Technical Electives table below	

Course	Title
Journalism (suggested for Medill students)	
COMP_SCI 110-0	Introduction to Computer Programming (or COMP_SCI 111-0 Fundamentals of Computer Programming 1)
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
JOUR 342-1	Knight Lab: Studio (or JOUR 376-0 Media Design or JOUR 377-0 Data Analysis and Visualization)

Course	Title
Technical Electives	
COMP_ENG 346-0	Microprocessor System Design
COMP_ENG 365-0	Internet-of-things Sensors, Systems, And Applications
COMP_ENG 465-0	Internet-of-things Sensors, Systems, And Applications
COMP_SCI 110-0	Introduction to Computer Programming
COMP_SCI 111-0	Fundamentals of Computer Programming
COMP_SCI 130-0	Tools and Technology of the World-Wide Web
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
COMP_SCI 330-0	Human Computer Interaction
COMP_SCI 349-0	Machine Learning
COMP_SCI 352-0	Machine Perception of Music & Audio
COMP_SCI 376-0	Computer Game Design and Development
COMP_SCI 377-0	Game Design Studio
COMP_SCI 396-0	Special Topics in Computer Science (Interactive Information Systems) or (Conversational Interfaces)
JOUR 376-0	Media Design
JOUR 377-0	Knight Lab: Data Analysis & Visualization
LRN_SCI 351-0	Topics in Learning Sciences (Multimodal Learning Analytics)
LRN_SCI 451-0	Topics in Learning Sciences (Multimodal Learning Analytics)
MECH_ENG 224-0	Scientific and Embedded Programming in Python
MECH_ENG 233-0	Electronics Design
MECH_ENG 314-0	Machine Dynamics
MECH_ENG 333-0	Introduction to Mechatronics
MECH_ENG 341-0	Computational Methods for Engineering Design

Social Sciences & Design Breadth Requirements (2 courses)

Students must complete at least 1 course listed in Social Science Electives Table AND at least 1 course listed in the Design Electives Table below:

Course	Title
Social Science Electives	
COMM_ST 227-0	Communication & Technology
COMM_ST 351-0	Technology & Human Interaction
COMM_ST 352-0	Social Network Analysis
COMM_ST 378-0	Online Communities and Crowds
COMP_SCI 314-0	Technology and Human Interaction
COMP_SCI 397-0	Special Projects in Computer Science (Algorithms and Society)
COMP_SCI 497-0	Special Projects in Computer Science (Algorithms and Society)
IEMS 341-0	Social Networks Analysis

Course	Title
Design Electives	
COMM_ST 395-0	Topics in Communication Studies (Knight Lab Studio)
COMP_SCI 396-0	Special Topics in Computer Science (Computing and Socioeconomic Mobility) or (Computing, Ethics, and Society)
COMP_SCI 497-0	Special Projects in Computer Science (Digital Musical Instrument Design)
DSGN 305-0	Human-Centered Service Design
DSGN 306-0	UX Design
DSGN 308-0	Human-Centered Product Design
DSGN 395-0	Special Topics (Bay Area Service Design)
LRN_SCI 351-0	Topics in Learning Sciences (Computing and Socioeconomic Mobility)
LRN_SCI 429-0	Design of Learning Environments
LRN_SCI 451-0	Topics in Learning Sciences (Computing and Socioeconomic Mobility)
RTVF 376-0	Topics in Interactive Media (Digital Musical Instrument Design)

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 Challenge 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. 177)

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: ELEC_ENG 302-0; MATH 310-1, MATH 314-0, MATH 385-0; STAT 320-1, STAT 383-0. Prerequisite: concurrent enrollment in MATH 228-2.

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, BMD_ENG 220-0, or CHEM_ENG 312-0. May not be taken for credit with or after STAT 320-1.
Prerequisites: IEMS 202-0 or equivalent; COMP_SCI 150-0 or equivalent.

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 COMP_SCI 150-0 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; COMP_SCI 217-0.

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: GEN_ENG 205-1; MATH 228-1; COMP_SCI 110-0 or COMP_SCI 111-0 or COMP_SCI 150-0; 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; COMP_SCI 150-0; GEN_ENG 205-1; and prior completion of or concurrent enrollment in IEMS 303-0.

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. Business models for startups. Lectures, guest speakers, and case studies. Taught with IEMS 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 340-0 Qualitative Methods in Engineering Systems (1 Unit) Use of field research methods to solve management problems. Students define projects, design field studies and pilot tests of data collection instruments, and present results. Prerequisites: DSGN 106-1 and DSGN 106-2, or consent of instructor for non-McCormick students.

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 Whole-Brain Leadership (1 Unit)
This course examines whole-brain thinking and leading. Students will draw upon previous work and leadership experience to identify their own thinking and leading preferences and those of team member, and will examine contrasting thinking and leading styles in an effort to appreciate and combine these to produce optimal outcomes. A number of leadership theories and ways of leading will be examined including creative and agile leadership. Analytical thinkers/leaders will be challenged to spend more time with innovation and creativity, while creative thinkers/leaders will be presented with opportunities to engage in analytical problem-solving. Work experience recommended.
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: COMP_SCI 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 202-0, IEMS 303-0 or equivalents, 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 Operations Engineering and Management (1 Unit)
Applications of operations research methods in managing and control of operations processes in manufacturing and service systems: including operations strategy; process-flow analysis; forecasting; capacity management; variability analysis; flow time and inventory management; flexible operations; lean operations; and production and workforce scheduling in manufacturing and service systems. Case studies, homework, and exams.
Prerequisites: IEMS 202-0; IEMS 310-0 or IEMS 313-0.

IEMS 383-0 Service Engineering and 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. 27) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units) [1]

Course	Title
4 mathematics courses (p. 131)	
4 units of basic science chosen according to McCormick basic science guidelines (p. 131)	
4 engineering analysis and computer proficiency courses (p. 131)	
3 design and communications courses (p. 131)	

7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	

Major Program (21 units)

Course	Title
1 engineering economics course	
CIV_ENV 205-0	Economics and Finance for Engineers [2]
3 computer programming courses	
COMP_SCI 111-0	Fundamentals of Computer Programming
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
COMP_SCI 217-0	Data Management & Information Processing
6 industrial engineering 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 the options below	
IEMS 381-0	Supply Chain Modeling and Analysis
IEMS 382-0	Operations Engineering and Management
IEMS 383-0	Service Engineering and Management
IEMS 385-0	Introduction to Health Systems Management
1 client project course	
IEMS 394-0	Industrial Engineering Client Project Challenge
5 IEMS elective courses	
3 industrial engineering/operations research electives (p. 178)	
2 management science electives (p. 178)	
4 general technical elective courses chosen from areas below	
Any IEMS course not applied towards another degree requirement	
Any 200-level or higher course in McCormick, excluding CRDV and PRDV courses	
Any 200-level or higher course in Biology, Chemistry or Physics, except for exclusions listed below	
Any 300-level or higher course in Math, Statistics, or MMSS, except for exclusions listed below	
Other Approved Non-engineering Technical Electives (p. 178)	
The following courses may not be used as General Technical Electives: 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 301-1, STAT 301-2, STAT 301-3, STAT 303-1, STAT 303-2, STAT 303-3, STAT 320-1, STAT 383-0	
May include up to 2 units of IEMS 399-0	
At most 2 General Technical Electives may be taken P/N; no other electives may be taken P/N.	

[1] See general requirements (p. 131) for details.

[2] 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 the following list. Course used towards Production & Logistics requirement may not be used here.	
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	Operations Engineering and Management
IEMS 383-0	Service Engineering and Management
IEMS 385-0	Introduction to Health Systems Management
IEMS 395-0	Special Topics in Industrial Engineering (pre-approved topics only)

Management Science Electives

Course	Title
2 courses chosen from:	
IEMS 325-0	Engineering Entrepreneurship
IEMS 340-0	Qualitative Methods in Engineering Systems
IEMS 341-0	Social Networks Analysis
IEMS 342-0	Organizational Behavior
IEMS 343-0	Project Management for Engineers
IEMS 344-0	Whole-Brain Leadership
IEMS 345-0	Negotiations and Conflict Resolution for Engineers
IEMS 395-0	Special Topics in Industrial Engineering (pre-approved topics only)

Other Approved Non-engineering Technical Electives

Course	Title
BUS_INST 302-0	Marketing Management
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

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 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 ultra-large-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 micro-structures 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. 182)

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, or CHEM 1X1; major in materials science and engineering or chemical and biological engineering; concurrent enrollment in MAT_SCI 302.

MAT_SCI 302-0 Introduction to Materials Laboratories (0.34 Unit)
Lab for students taking MAT_SCI 301. Topics related to: Bonding, crystal structure and defects in solids. Phase diagrams in condensed matter systems. Equilibrium and nonequilibrium development of microstructures. Processing/structure/property/performance relationships underlying behavior of metals, ceramics, polymers, and composites. Mechanical, electrical, chemical properties of engineering materials. To be taken concurrently with MAT_SCI 301-0.

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, CHEM 172-0 or CHEM 1X2; MATH 228-1 or MATH 230-1; 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 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 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 353-0 Bioelectronics (1 Unit)
Development and design of sensors, stimulators, and their medical devices for biointegrated electronics. Materials design and fabrication of passive and active components for sensitive, multimodal, and robust wearable and implantable devices.

MAT_SCI 354-0 Bioelectronics Lab (1 Unit)
Laboratories focused on the practical implementation, instrumentation, and fabrication of wearables and skinsensing. Applications range from vital sign monitoring to rehabilitation.

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 Modeling and Simulation in Materials Science and Engineering (1 Unit)
The course covers the essential methods and principles for modeling and simulating the structure, properties, and behavior of materials. It focuses on constructing models and identifying approaches to test either theoretical descriptions or experimental observations of materials phenomena on a computer. The course balances breadth versus depth of topics with the goal of producing researchers literate in computational materials science and its applicability across different length scales. Students will construct structure-property models of atomic assemblies, molecules, and solids using first-principles electronic structure (such as density-functional theory), deterministic (molecular dynamics), statistical methods (Monte Carlo and (Un)Supervised Learning), and finite elements models. Computational laboratories will give students extensive hands-on experience with several powerful modern materials modeling codes.
Prerequisite: MAT_SCI 314-0, MAT_SCI 315-0, MAT_SCI 316-1, and MAT_SCI 351-1.

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 or equivalent; PHYSICS 135-2, PHYSICS 135-3.

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. May not receive credit for both MAT_SCI 370-0 and BMD_ENG 343-0.

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. Familiarity with quantum mechanics and the concept of density-of-states for electrons and phonons. MAT_SCI 351-1 or equivalent is recommended but not required.

MAT_SCI 387-0 Solar Energy Conversion (1 Unit)
This course will focus on the design, fabrication, and manufacturing of the next generation solar cells. Topics include: basic principle of cell operation; how charge transport, exciton diffusion, and plasmonic fields can affect cell efficiency; the importance of interfaces between dissimilar materials in optimizing cell performance; internal cell photon management; how to synthesize, fabricate and characterize complex nanostructure materials; protect intellectual properties; and design manufacturing capacity for marketing.

Prerequisite: senior standing or consent of instructor.

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 the materials science and engineering or 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 the materials science and engineering or 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. 27) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units) [1]

Course	Title
4 mathematics courses (p. 131)	
4 units of basic science: [2]	
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
4 engineering analysis and computer proficiency courses (p. 131)	
3 design and communications courses (p. 131)	
7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	

Major Program (21 units)

Course	Title
15 required 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
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
6 technical elective courses in engineering, natural sciences (usually chemistry or physics), and mathematics chosen to fulfill an area of concentration	
No more than 3 of the 6 units may be 200-level courses.	
At least 2 of the 6 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.	

1 See general requirements (p. 131) for details.
2 PHYSICS 125-2 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-2 General Physics. PHYSICS 125-3 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-3 General Physics. Associated labs are PHYSICS 126-2 Physics for ISP Laboratory or PHYSICS 136-2 General Physics Laboratory and PHYSICS 126-3 Physics for ISP Laboratory or PHYSICS 136-3 General Physics Laboratory.

Mechanical Engineering

mccormick.northwestern.edu/mechanical

Mechanical engineering is critical to nearly all engineered systems. From large-scale highly-integrated systems such as aircraft down to nanoscale bio-inspired materials design, if physical motion or mechanics is involved, mechanical engineers play a central role.

The interdisciplinarity of modern mechanical engineering is represented in the diversity of the backgrounds and research of the mechanical engineering faculty. For example, the mechanical engineering faculty have degrees in civil engineering, computer science, electrical engineering, neuroscience, physics, robotics, and other fields, in addition to mechanical engineering. Similarly, Northwestern mechanical

engineering graduates move on to a wide variety of professions and graduate programs, as the fundamental skills provided by the mechanical engineering degree are in high demand in many fields.

The first part of the curriculum is devoted to mathematics, physics, chemistry, computer programming, and design thinking. With this background, the core of the mechanical engineering degree includes study in electronics design, solid mechanics, fluid mechanics, thermodynamics, manufacturing, and dynamics and design of machines.

The mechanical engineering degree culminates in a two-quarter capstone design project, where students work in teams to hone their skills in human-centered design, mathematical and computer-aided analysis, mechanical design, advanced manufacturing and prototyping, systematic experimentation and testing, and professional documentation.

The mechanical engineering degree provides tremendous flexibility to customize the curriculum to the student's interests and professional goals. This flexibility also reflects the expertise of the faculty and rapidly emerging areas of mechanical engineering.

Curricular flexibility is provided in the form of six courses in one of nine concentrations: a "breadth" concentration, providing advanced training in core and emerging areas of mechanical engineering, and eight specialized concentrations, including aerospace engineering; design; energy and sustainability; engineering mechanics of materials and structures; fluids, energy, and thermal systems; manufacturing; micro-nano engineering; and robotics.

ME Breadth: The ME Breadth concentration gives students the flexibility to tailor their academic program to their own interests in this rapidly diversifying field, encompassing areas such as robotics, automated manufacturing, biological molecular machines, thermodynamics, fluid dynamics, computational mechanics, composite materials, and tribology.

Aerospace Engineering: The Aerospace Engineering concentration includes the design and development of aerial and space vehicles. It emphasizes a combination of mechanics (solids and thermo-fluids), materials science (such as advanced composites, ceramics, and polymers), and control systems.

Design: The Design concentration focuses on methodologies for product design supported by innovation, systematic design processes, computational design methods, and design thinking incorporating manufacturing and life cycle considerations.

Energy and Sustainability: The Energy and Sustainability concentration emphasizes the mechanical engineering aspects of energy conversion, life cycle analysis, conservation, policy, and energy economics and management.

Engineering Mechanics of Materials and Structures: The Engineering Mechanics of Materials and Structures concentration emphasizes fundamental concepts in materials applicable to a wide variety of industries.

Fluids, Energy, and Thermal Systems: The Fluids, Energy, and Thermal Systems concentration uses analysis to unravel the physical content of fundamental equations. Topics include supersonic flow and the study of jet engines; thermodynamic analysis of the performance and efficiency of engineered systems; viscous boundary layers and drag on airplane wings; design of nature-inspired surfaces with applications to sustainability; vorticity in phenomena such as tornadoes; and psychrometry.

Manufacturing: The Manufacturing concentration is directed toward planning and selecting manufacturing methods, design for manufacture, computer-aided flexible automation and robotics, digital manufacturing, and increasing the efficiency and productivity of current and emerging manufacturing technologies.

Micro-Nano Engineering: The Micro-Nano Engineering concentration emphasizes fundamental concepts in multiphysics, design, and fabrication of engineered systems at the micro- and nanoscales, with applications in biomedical, energy, nanomaterials, and other industries.

Robotics: The Robotics concentration includes design of robotic hardware, dynamics, motion planning and control, human-robot interaction, sensing, and artificial intelligence for robots.

A listing of courses that satisfy the requirements of each concentration may be found on the department website (https://www.mccormick.northwestern.edu/mechanical/).

Program of Study

- Mechanical Engineering Degree (p. 185)

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. Prerequisite: MATH 220-2.

MECH_ENG 224-0 Scientific and Embedded Programming in Python (1 Unit) Python is arguably now the world's foremost programming language. It is the go-to coding language for data scientists, machine learning researchers, design engineers, and anyone who needs to grab and process the vast amounts of data online, from networked sensors, or smart devices. Recently Python has become practical for coding in embedded systems, as well. Embedded microcontrollers are relevant for our annual robot design competition, NU engineering teams (Solar car, Baja), internships, and experimental apparatuses. Our approach to coding emphasizes algorithm creation, debugging, methodical creation and partitioning in a modern notebook framework, as well as hardware-level access for microcontroller applications. The course is taught in an active learning format. Prerequisite: GEN_ENG 205-1 or GEN_ENG 206-1.

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 and Manufactrng (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. Prerequisites: MATH 228-2 (may be taken concurrently) and 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). Cross-listed as COMP_SCI 301-0.

MECH_ENG 314-0 Machine Dynamics (1 Unit)
This class covers the foundations of rigid multi-body mechanics. Topics include geometry of rigid bodies, rotating bodies, Lagrangian mechanics and variational principles, conservation of energy and momentum, symmetries, impact dynamics, and numerical methods that may be used to simulate mechanical systems. Students numerically simulate rigid body systems and use rigid body geometry to visualize simulations.
Prerequisite: GEN_ENG 205-4.

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. Prerequisite: MECH_ENG 240-0.

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 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 and Statistical Mechanics II (1 Unit)
Classical and statistical thermodynamics.
Prerequisite: MECH_ENG 222-0.

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 328-0 Computational Failure Analysis (1 Unit)
The course will cover the use of the scientific method for accident investigation, hypothesis development, and the use of the finite element method to analyze the root cause of a failure. Practical application problems for both civil and mechanical structures will be analyzed using commercial finite element codes (Abaqus, Hypermesh, LS-Dyna).
Prerequisite: CIV_ENV 327-0 or MECH_ENG 327-0.

MECH_ENG 329-0 Mechanistic Data Science for Engineering (1 Unit)
Introduce mechanistic data science for engineering through the integration of mathematical scientific principles using six basic#data science concepts: multimodal data generation and collection, extraction of mechanistic features, knowledge-driven dimension reduction, reduced order surrogate models, regression and classification models, and system and design. These concepts will be implemented using Python and MATLAB for engineering applications.

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, ELEC_ENG 221-0, or consent of instructor.

MECH_ENG 340-1 Computer Integrated 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 Integrated 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 Integrated Manufacturing: 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 314-0.

MECH_ENG 364-0 Introduction to Aerospace Engineering (1 Unit)
The purpose of the course is to learn the language of aerospace engineering and to explore emerging concepts in this field. This course will cover essential topics in areas relevant to aerospace engineering including Aerodynamics, Flight Dynamics, Propulsion, and Orbital

Mechanics. Computational tools for structural analysis, fluid flow calculations, and flight dynamics modeling will be introduced.
Prerequisites: CIV_ENV 216-0, MECH_ENG 241-0 or equivalent.

MECH_ENG 366-0 Finite Elements for Design & Optimizatn (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 (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 378-0 Applied Computational Fluid Dynamics and Heat Transfer (1 Unit)
This course provides an understanding of the theory and process of computational flow analysis by giving students the opportunity to use commercial simulation software (ANSYS/Fluent) to solve fluid flow problems. Topics covered include conservation of mass, momentum and energy; boundary conditions; turbulence modeling; mesh generation; solution procedures; and verification/validation. Topics will be presented through lectures, hands-on computer lab sessions, and team-based projects.

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.
Prerequisite: 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 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 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 I (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 (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. 27) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units) [1]

Course	Title
4 mathematics courses (p. 131)	
4 units of basic science: [2]	
PHYSICS 135-2	General Physics
& PHYSICS 135-3	and General Physics
& PHYSICS 136-2	and General Physics Laboratory
& PHYSICS 136-3	and General Physics Laboratory
CHEM 131-0	General Chemistry 1
& CHEM 141-0	and General Chemistry Laboratory 1
or CHEM 151-0	Accelerated General Chemistry 1
& CHEM 161-0	and Accelerated General Chemistry Laboratory 1
or CHEM 171-0	Advanced General Inorganic Chemistry
& CHEM 181-0	and Advanced General Inorganic Chemistry Laboratory
4 engineering analysis and computer proficiency courses (p. 131)	
3 design and communications courses (p. 131)	

7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	

Major Program (21 units)

Course	Title
13 required courses	
CIV_ENV 216-0	Mechanics of Materials I
COMP_SCI 212-0	Mathematical Foundations of Comp Science [5]
or CHEM 215-1	Organic Chemistry I
MAT_SCI 201-0	Introduction to Materials
MECH_ENG 222-0	Thermodynamics & Statistical Mechanics - I [4]
MECH_ENG 224-0	Scientific and Embedded Programming in Python
MECH_ENG 233-0	Electronics Design [3]
MECH_ENG 240-0	Intro to Mechanical Design and Manufactrng
MECH_ENG 241-0	Fluid Mechanics I
MECH_ENG 314-0	Machine Dynamics
MECH_ENG 315-0	Theory of Machines: Design of Elements
MECH_ENG 340-1	Computer Integrated Manufacturing: Manufacturing Processes
MECH_ENG 377-0	Heat Transfer
MECH_ENG 390-0	Intro to Dynamic Systems
2 capstone courses	
MECH_ENG 398-1 & MECH_ENG 398-2	Engineering Design I and Engineering Design II (taken sequentially and counting toward the final 12 units taken before graduation)
6 courses to satisfy a concentration area listed below [6]	
Mechanical Engineering Breadth	
Aerospace Engineering	
Design	
Energy and Sustainability	
Engineering Mechanics of Materials and Structures	
Fluids, Energy, and Thermal Systems	
Manufacturing	
Micro-Nano Engineering	
Robotics	

1 See Core Courses Requirements (p. 131) for details.

2 PHYSICS 125-2 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-2 General Physics. PHYSICS 125-3 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-3 General Physics. Associated labs are PHYSICS 126-2 Physics for ISP Laboratory or PHYSICS 136-2 General Physics Laboratory and PHYSICS 126-3 Physics for ISP Laboratory or PHYSICS 136-3 General Physics Laboratory.

3 Students planning to take advanced ELEC_ENG courses may petition to substitute ELEC_ENG 221-0 Fundamentals of Circuits.

4 May not be taken with CHEM 342-1 Thermodynamics or CHEM_ENG 211-0 Thermodynamics .

5 Or take 1 300-level or above mathematics or basic science course.

6 Courses and other concentration requirements are specified on the Mechanical Engineering department website. Students should declare their concentration by the end of their 2nd year.

Segal Design Institute

design.northwestern.edu

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.

Programs of Study

- Manufacturing and Design Engineering Degree (p. 188)
- Segal Design Certificate (p. 188)

DSGN 106-1 Design Thinking and Communication (0.5 Unit) Integrated introduction to the user-centered design process and technical communication. Students will address challenges proposed by project partners by identifying unmet needs, conducting research, generating and evaluating potential solutions, and finally, presenting a final design concept with supporting documentation. Students also enhance their abilities in equitable teamwork, project management, fabrication skills, and producing written, oral, graphical, and interpersonal communication. One lecture, two section meetings, and lab. Co-registration with ENGLISH 106-1 required. Primarily intended for first-year engineering students.

DSGN 106-2 Design Thinking and Communication (0.5 Unit) Integrated iteration on the user-centered design process and technical communication. This course will build on the learning objectives from DTC-1 while adding more focus on ethics in design and communication, equitable distribution of teamwork, project management, documenting and communicating progress, and exploring a wider variety of project topics. One lecture, two section meetings, and lab. Co-registration with ENGLISH 106-2 required. Primarily intended for first-year engineering 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. Prerequisite: Reserved for First-Year Students, Sophomores, and Juniors.

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 Advanced Sketching (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 243-0 Visual Thinking for Design (0.5 Unit) Complements the traditional design research and ideation process using visual stimuli. Students will work with visual thinking methods to help expand their understanding of a problem space resulting in a greater generation of ideas and a more tangible organization of our thoughts. DSGN 220-0 and/or some experience with Adobe Photoshop is helpful but not necessary.

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) This course approaches 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. Prerequisite: Reserved for Juniors and Seniors.

DSGN 305-0 Human-Centered Service Design (1 Unit) A project-based course for students interested in a human-centered design approach to service design, with a focus on the 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 DSGN 208-0.

DSGN 315-0 Design, Technology, and Research (1 Unit)
A jointly offered CS and Segal learning initiative that empowers students to drive cutting-edge research that shapes new experiences with people and technology. Students work with a mentor to identify a direction of research, explore and iterate over designs, prototype at varying fidelities, build working systems, conduct evaluative studies, and report findings through conference publications. DTR adapts agile development and design-based research practices with scrums, sprints, studio critique, design logs, and pair research. This class may be repeated for credit.

DSGN 320-0 Introduction to Industrial Design Methods (1 Unit)
Introduces the process of product development from an industrial design perspective, with a focus on exploring form through design sketching.

DSGN 321-0 Advanced Solid Modeling (0.5 Unit) This course provides advanced instruction on the use of CAD modeling using Solidworks software. Prerequisite: DSGN 240-0 or consent of instructor.

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) Teaches the NX manufacturing environment to program machining operations for CNC milling, as well as the operation of CNC milling machines. Teaches the complete path from part design to manufacture, including operations, tools, and geometry in NX, manufacturing setup and g-code generation, proper machine setup, operation, troubleshooting and optimization for both 2.5D machining and full CNC machining. Prerequisites: DSGN 106-1 and DSGN 106-2 and one of the following: DSGN 240-0 or MECH_ENG 240-0.

DSGN 346-0 Manufacturing Methods for Product Design (1 Unit) An introduction to manufacturing processes including casting, injection molding, additive manufacturing, extrusion, machining, joining, and forming, using materials commonly found in modern consumer and industrial products. In weekly hands-on labs, students apply theory of manufacturing processes to the design of parts and process tooling for various fabrication methods. Focus will be placed on adjusting design and process parameters to obtain an optimal outcome for a given manufacturing process. Prerequisites: DSGN 106-1 and 106-2, and MECH_ENG 240 or instructor approval of previous CAD experience. MaDE students may petition for this course to count in place of the of the ME 340-1 degree requirement.

DSGN 348-0 Rapid Prototyping (0.5-1 Unit) A survey of additive manufacturing methods and hands-on training in the operation of all equipment in the Northwestern Rapid Prototyping lab. Students review the fundamentals and theory behind rapid prototyping methods, materials, applications of RP technology, advanced CAD modeling, and reverse engineering methods. Includes lab work, where students will learn the operation of additive manufacturing machines, laser scanners, and CAD surfacing software. Prerequisites: DSGN 240-0 or MECH_ENG 240-0, or approval of instructor.

DSGN 350-0 Intellectual Property and Innovation (1 Unit)
Explores the critical role of designers, business strategists and engineers in the invention/creative process. All issues relating to patents and patentability of inventions, copyrights and the protection of the expressions of ideas, trademarks and source identifiers are reviewed and analyzed in the context of multiple engineering domains.

DSGN 360-0 Design Competition (1 Unit) Teams of students design, build, and program their robots independently before setting their creations loose on a pre-determined track during a spring competition. Students must pass a milestone durng winter quarter in to be eligible to register for spring.

DSGN 370-0 Portfolio Development & Presentation (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. Prerequisite: Reserved for Juniors and Seniors.

DSGN 380-1 Industrial Design Projects I (1 Unit) Design thinking, user-centric principles of design and DFM. Development of an industrial design project for your personal portfolio. Concept ideation and sketching; use of discovery research and data visualization; problem framing and prototyping; design for manufacturing, Keyshot rendering, rapid prototyping. Pt 1 in two-course sequence; sequence must be taken in consecutive quarters. Prerequisites: DSGN 243-0 and either DSGN 240-0 or MECH_ENG 240-0 and either DSGN 220-0 or DSGN 320-0; or consent of the instructor. Reserved for Juniors and Seniors.

DSGN 380-2 Industrial Design Projects II (1 Unit) Design thinking, user-centric principles of design and DFM. Development of an industrial design project for your personal portfolio. Concept ideation and sketching; use of discovery research and data visualization; problem framing and prototyping; design for manufacturing, Keyshot rendering, rapid prototyping. Prerequisite: DSGN 380-1.

DSGN 382-1 Service Design Studio I (1 Unit) Explores the human centered approach to the design of services. Students will apply design thinking to client sponsored projects and synthesize both user and client needs to the design of tangible consumer touch points. This includes experience plans, digital interface designs, communication models, organizational designs, systems and/or brand tonality deliverables. Pt 1 in two-course sequence; sequence must be taken in consecutive quarters. . Prerequisite: DSGN 305-0 or DSGN 306-0 or DSGN 308-0; or consent of instructor. Reserved for Juniors and Seniors.

DSGN 382-2 Service Design Studio II (1 Unit) Explores the human centered approach to the design of services. Students will apply design thinking to client sponsored projects and synthesize both user and client needs to the design of tangible consumer touch points. This includes experience plans, digital interface designs, communication models,

organizational designs, systems and/or brand tonality deliverables. Prerequisite: DSGN 382-1.

DSGN 384-1 Interdisciplinary Product 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. One of DSGN 305-0, DSGN 306-0, or DSGN 308-0 is recommended before taking this course. Pt 1 in two-course sequence. Prerequisite: DSGN 106-1 or DSGN 208-0. Reserved for Juniors and Seniors.

DSGN 384-2 Interdisciplinary Product 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) A hands-on, team-based survey of lean manufacturing concepts such as DFA (design for assembly), DFM (design for manufacturing), automation, quality control, process planning, tooling design, concurrent engineering, and continuous improvement. Students are given the components of an existing product and are challenged to design the manufacturing specifications and process. Design strategy, manufacturing modeling and optimization, engineering documentation, quality control, manufacturing costing and product manufacturing productivity skills are put into practice in a final pilot run of the manufacturing process by each team. Prerequisite: Any IEMS 300 level, MECH_ENG 340-1, DSGN 308, or consent of instructor. Reserved for Juniors and Seniors.

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. 27) and the degree requirements of their home school.

Requirements (48 units)

Core Courses (27 units) [1]

Course	Title
4 mathematics courses (p. 131)	
4 units of basic science: [2]	
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
4 engineering analysis and computer proficiency courses (p. 131)	
3 design and communications courses (p. 131)	
7 social sciences/humanities courses (p. 131)	
5 unrestricted electives (p. 131)	

Major Program (21 units)

Course	Title
13 core courses	
CIV_ENV 216-0	Mechanics of Materials I
COMP_SCI 150-0 or MECH_ENG 224-0	Fundamentals of Computer Programming 1.5 Scientific and Embedded Programming in Python
DSGN 308-0 or MECH_ENG 315-0	Human-Centered Product Design Theory of Machines: Design of Elements
IEMS 201-0	Introduction to Statistics [3]
IEMS 307-0	Quality Improvement by Experimental Design
IEMS 310-0	Operations Research
IEMS 382-0	Operations Engineering and Management
MAT_SCI 201-0	Introduction to Materials
MAT_SCI 318-0	Materials Selection
MECH_ENG 240-0	Intro to Mechanical Design and Manufactrng
MECH_ENG 233-0	Electronics Design
MECH_ENG 340-1 or DSGN 346-0	Computer Integrated Manufacturing: Manufacturing Processes Manufacturing Methods for Product Design
MECH_ENG 340-2 or MECH_ENG 340-3	Computer Integrated Manufacturing: CAD/CAM Computer Integrated Manufacturing: Automation
3 project courses	
DSGN 384-1 & DSGN 384-2	Interdisciplinary Product Design Projects I and Interdisciplinary Product Design Projects II
DSGN 386-0	Manufacturing Engineering Design (must be taken in the final spring quarter before graduation)
5 technical elective courses	
3 engineering courses at the 200- or 300-level	
2 engineering courses at the 300-level	
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. 131) for details.

2 PHYSICS 125-2 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-2 General Physics. PHYSICS 125-3 General Physics for ISP or PHYSICS 140-3 Fundamentals of Physics may be substituted for PHYSICS 135-3 General Physics. Associated labs are PHYSICS 126-2 Physics for ISP Laboratory or PHYSICS 136-2 General Physics Laboratory and PHYSICS 126-3 Physics for ISP Laboratory or PHYSICS 136-3 General Physics Laboratory.

3 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	Design Thinking and Communication
or DSGN 208-0	Design Thinking and Doing
1 2-quarter design sequence:	
DSGN 384-1 & DSGN 384-2	Interdisciplinary Product Design Projects I and Interdisciplinary Product Design Projects II
or DSGN 380-1 & DSGN 380-2	Industrial Design Projects I and Industrial Design Projects II
or DSGN 382-1 & DSGN 382-2	Service Design Studio I and Service Design Studio II
1 portfolio course:	
DSGN 370-0	Portfolio Development & Presentation
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).	
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 uniquely counted, not also applied to any other academic plan or credential. Such coursework may fulfill other degree requirements such as distribution or required electives. Certificates are conferred concurrent with the student's undergraduate degree. They do not appear on the diploma, but are noted on the transcript.	
Students can declare the certificate and submit updates to their courses in MAS (McCormick Advising System) before the beginning of their final quarter as undergraduates.	

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, turning 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 offers 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. 27).
- Of the 45 units, at least 27 must be earned in courses outside Medill and at least 14 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 Affairs. 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 Fundamentals of Reporting & Writing News, JOUR 201-2 Fundamentals of Video Journalism, JOUR 202-0 Journalism Values, Practice & Trends, JOUR 301-0 Journalism in Practice or JOUR 301-1 Journalism in Practice, a history, representation or business understanding course, JOUR 370-0 Media Law & Ethics and at least two 300-level advanced journalism in practice courses outside the core requirement.
- Students may earn grades of D 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, B–, C+, C, C–, D, F):
  - All distribution requirements
  - All journalism courses except Journalism Residency
  - Courses for the foreign language requirement
  - WCAS concentration courses
- 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 (p. 25) page. 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 D, F, 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 academic adviser and/or the Associate 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 others things, requires adherence to principles of honesty, fairness, and integrity in academic efforts and related professional media, journalism, and marketing communications work, whether students are in school, on an internship or a job, or acting as volunteers in a professional or academic activity.

Academic Options

Dual Bachelor's Degree Program

Northwestern offers talented students the opportunity to earn in five years both a BSJ from Medill and a BMus 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. 38) 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. Students who receive the undergraduate IMC certificate and are admitted into the full-time MSIMC program within five years of their undergraduate graduation can complete the master's program in just four quarters, rather than the five quarters required for students without the certificate. See the Integrated Marketing Communications Certificate (p. 193) 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 four 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 Investigative Lab

Through real-time, on-the-ground reporting in Chicago, Washington, D.C. and beyond, students in the Medill Investigative Lab probe power brokers and programs that promise to provide a safety net to tens of millions of vulnerable Americans. Through this high-profile program, students learn to think, research and write like an investigative reporter, publishing groundbreaking social justice stories from the ground up. Undergraduate and graduate students at Medill apply to take part in the lab and spend two terms—one in Evanston or Chicago and one in Washington, D.C.—working side-by-side with veteran journalists on an investigation of national importance.

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 two 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

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.

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 an academic adviser 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. 27).

Academic Advising

Each entering student is assigned an academic adviser in Medill Student Affairs. 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.

Activities

Through student publications, student broadcast media, and professional organizations, Medill students have many journalism-related opportunities outside the classroom.

Professional organizations that promote high standards among journalists maintain chapters on campus, including the Society of Professional Journalists, the Native American Journalists Association, the Asian American Student Journalists student group, 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. 193)

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 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. Prerequisite: 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 312-0 Finance for Integrated Marketing Communications (1 Unit) "This course provides an overview of the foundations of accounting as it relates to the use of costs from definitions, behaviors, contribution margin statements, and cost systems. Scenarios will be discussed and used in modeling for break-even, target profits, markup pricing and return on investment decision making. Using the ongoing debate of expenses versus investment, marketing costs will be expanded in the areas of budgeting, lifetime value and acquisition costs with the intention of building learning and action-based skills for each student to make impactful outcomes-based decisions that can be communicated with contextual story tell precision."

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: Great Lakes Challenge (1 Unit) The 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. Each winter quarter, the instructors and client will develop and assign a new project that both student teams will complete and present. This total IMC project will build upon your learning from the three core courses. 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:	
COMP_SCI 110-0	Introduction to Computer Programming [1]
or COMP_SCI 111-0	Fundamentals of Computer Programming
or COMP_SCI 130-0	Tools and Technology of the World-Wide Web
One Statistics course (see website for approved courses) [2]	
One Social Science course (see website for approved courses) [2]	
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 310-0	Integrated Marketing and Communication Law, Policy and Ethics
IMC 311-0	Data Governance: Critical Issues in Digital Marketing Communications
IMC 312-0	Finance for Integrated Marketing Communications
IMC 390-0	Special Topics
IEMS 365-0	Analytics for Social Good
THEATRE 397-0	Theatre Marketing

1 Journalism students may use JOUR 377-0 Knight Lab: Data Analysis & Visualization in place of the Computer Science pre-requisite requirement

2 medill.northwestern.edu/imc/undergraduate-imc-certificate/curriculum/index.html

Journalism

medill.northwestern.edu/journalism/undergraduate-journalism

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 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 and includes students from Medill and the McCormick School of Engineering.

Medill Investigative Lab
Through real-time, on-the-ground reporting in Chicago, Washington, D.C. and beyond, students in the Medill Investigative Lab probe power brokers and programs that promise to provide a safety net to tens of millions of vulnerable Americans. Through this high-profile program, students learn to think, research and write like an investigative reporter, publishing groundbreaking social justice stories from the ground up.

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.

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 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. 196)

JOUR 190-BR Bridge Program (1 Unit) This course will introduce you to the fundamentals of reporting and writing while simultaneously considering the role of news reporting in the midst of COVID-19 and civil unrest across the U.S and beyond.

JOUR 201-1 Fundamentals of Reporting & Writing News (1 Unit) This course emphasizes the critical practices of ethical journalism and deadline reporting and writing and builds a strong foundation for all Medill classes. It introduces students to the essentials of accurate journalism regardless of platform or storytelling format.

JOUR 201-2 Fundamentals of Video Journalism (1 Unit) This course continues 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.

JOUR 202-0 Journalism Values, Practice & Trends (1 Unit) This course focuses on the evolving relationship between today's news media landscape and its consumers. Students learn fundamental theories of human behavior and media consumption in order to understand new technologies, content opportunities, and relationship-building with journalism audiences.

JOUR 290-0 Building a Visual Brand (Non-Majors) (1 Unit) This course explores the fundamental tools of design, typographic contrast and color theory. Students will analyze current approaches to newspaper, magazine, web and mobile design and will discuss how planning, and developing visual communication contribute to better design product. Prerequisite: Medill sophomore standing.

JOUR 291-0 Intro to Podcasting (1 Unit) This class is designed for fans of narrative podcasts who have a lot of passion, but little to no practical experience in the audio form. You'll learn not only how to plan, record, edit, and mix audio, but also how to find and shape the kinds of stories that you love so much on This American Life, Serial, Radiolab, 99 Percent Invisible, and other narrative-based shows.

JOUR 292-0 Sports Marketing for Non-Majors (1 Unit) Students will develop an understanding of marketing through the lens of sports and will consider the spectrum of sports marketing, from brands that use sports to capture the attention of customers to teams who want fans to buy season tickets. No journalism or marketing experience required.

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) 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. Prerequisites: JOUR 201-1, JOUR 201-2 and Medill sophomore standing.

JOUR 302-0 Media History (1 Unit) This course will explore how media history has influenced the world we live in today. Students will examine who has had the power and ability to tell the stories that shape people's lives, who has consumed those stories, who has been affected by the stories and whose stories have been neglected or distorted.

JOUR 303-0 Framed: Media and the Marginalized (1 Unit) Through discussion of principles of media professionalism and ethics, and an examination of some of the hot topics featured in today's headlines, this course will set a framework for recognizing and analyzing media narrative framing, as well as the representation of traditionally marginalized groups within that narrative frame. Ultimately, we will develop a deeper appreciation of media responsibility.

JOUR 304-0 Global Journalism History (1 Unit) This course expands the understanding of journalism beyond your own country's borders and experiences to examine the historical development, values and practices across regions throughout the world.

JOUR 305-0 JOURneys (0.5 Unit) Students will explore the worldwide media landscape with these short-term, faculty-led programs designed to provide a window into global media outlets and fascinating international news stories. Includes required course travel.

JOUR 310-0 Media Presentation: Newspaper/Online (1 Unit) This course teaches the essentials of editing content for newspaper and for the Web. Students will learn how to edit for grammar and Associated Press style; achieve accuracy, clarity and objectivity; think critically and exercise news judgment; write headlines and captions for print and online; edit photos and graphics; and design pages for newspapers. Prerequisite: Medill sophomore standing.

JOUR 311-0 Editing & Producing: Magazine (1 Unit) This course will help students develop the fundamental editing skills required of an entry-level magazine editor working on print, digital and mobile platforms.

JOUR 312-0 Editing & Producing: Video (1 Unit) This key Medill class is designed to teach writing to video for television and web newscasts in preparation for your journalism residency placement. The fast-paced course will emphasize the conversational writing styles of broadcast and video productions while continuing to build the journalistic fundamentals of accurate and ethical reporting.

JOUR 319-0 Entrepreneurial Approaches to Media Innovation (1 Unit) In this course, students will study different approaches to media-focused innovative business. Students will examine media products and services, analyze the choices that are being made by media companies, tech entrepreneurs, and investors; and observe how the general public learns about these businesses. By application.

JOUR 320-0 Storytelling: Interactive News (1 Unit) This course explores how newsrooms are using technology in innovative ways to engage their audiences; and also examines how a digital news presentation evolves across various multimedia platforms. It builds on the foundations of audio, photo, and video storytelling and adds interactivity and engagement techniques -- enabling students to design dynamic, creative digital narratives for news and feature reporting.Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 321-0 Storytelling: Magazine & Feature Writing (1 Unit) This course introduces students to feature and magazine storytelling. Students will read and deconstruct an array of non-fiction stories and will report, write, re-write and edit short pieces and one long-form story. The course aims to inspire students to deliver memorable works of narrative, explanatory and service journalism, with particular emphasis on expanding reporting methods and sharpening prose. Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 322-0 Storytelling: Video Reporting, Shooting, & Editing (1 Unit) This is Medill's core video reporting and field-producing class. In weekly assignments, students will practice a variety of research, writing and field reporting techniques that will prepare them for the challenges of creating

video in a professional newsroom or as a freelancer. Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 323-0 Reporting & Producing Social Media Video (1 Unit) This class is about the things in your social media timelines that move and make noise—the news clips, explainers and engaging video stories that populate social media platforms. It's also about the trends, algorithms and business models behind those posts. We'll look at the top innovators of this genre and learn the best practices for social media video reporting.

JOUR 324-0 Advanced Feature Writing (1 Unit) This course is designed to extend the lessons of foundational classes in narrative structure, immersion reporting, feature storytelling, and magazine writing.

JOUR 325-0 Narrative Structure (1 Unit) "Narrative Structure in Storytelling" is an immersive discussion-based course about the art of crafting stories for different media platforms with a pivot toward personal narrative creation in the second half of the quarter.

JOUR 326-0 Advanced Photojournalism (1 Unit) Advanced Photojournalism is recommended for students who are already familiar with DSLR cameras and have some experience using Lightroom/ Photoshop. This class will review basic DSLR usage, how to use Lightroom, composition, photojournalism ethics, but will primarily be a production and editing course centered around the creation of a story-driven character-based photo story.

JOUR 330-0 Reading and Reporting LGBTQ Health (1 Unit) Medill journalism students will learn how to explore, navigate and report on public health by reading LGBTQ+ news media, learning queer writing methods and doing critical media analysis. Meeting with researchers from ISGMH and from the Third Coast Center for AIDS Research, students will read the research of leading scholars and then#have the opportunity to#interview them directly.

JOUR 331-0 Sex and the American Empire (1 Unit) This course will be an intensive study in understanding the relationship between American journalism and the U.S. military in creating an American empire. By focusing on how the U.S. military has segregated service members by race, sexuality, gender and gender identity—and on how on U.S. media has covered the military—students will study how identity roles have been formed by both the military and the media in American society.

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#is a#bilingual#course that explores the history, current state and future of the English, Spanish and#bilingual#audiences and the media outlets that seek to reach them. Students will get to know Chicago's vibrant and diverse LatinX communities and practice research and interviewing, reflection and story production in Spanish and in English. Spanish proficiency required. Prerequisite: Medill sophomore standing.

JOUR 342-1 Knight Lab: Studio (1 Unit) Each quarter, multidisciplinary teams of students, faculty, and professionals come together to collaborate in the Knight Lab Studio to produce cutting-edge digital work, research, and thought, innovating across every part of the media-making process.

JOUR 343-0 The Googlization of American Media (1 Unit) In this course students use recent books, news stories, and other reportage to understand how major tech enterprises are changing journalism, the media business, and democracy itself. Readings, research and writing assignments, group exercises in and outside class, and guest speakers.

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 352-0 Politics, Media and The Republic (1 Unit) This seminar will explore such themes as polarization, political image-making and advertising, voting rights and voter suppression, as well as campaign rhetoric and policy issues. Prerequisite: Medill sophomore standing.

JOUR 353-0 Dilemmas of American Power (1 Unit) This course uses an engaging set of case studies and materials to chart one of the most intriguing stretches of international engagement in U.S. history. Students will work collaboratively to understand why decisions were made, how policies were implemented and sold, and what it all may mean in the end. Prerequisite: Medill sophomore standing.

JOUR 354-0 Sports and Society (1 Unit) Modern sports are nothing if not media-made. Conversely, sports make media. The rise of mass media in 19th century America paralleled and its creators promoted the development of the major American sports, particularly baseball and football, and in the digital world sport is the only form of programming that still commands national and global audiences that number in the billions. 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 357-0 Sports Commentary (1 Unit) Students will develop a distinctive voice that stands out from the cacophony of opinions in the sporting world, to create commentary that is informative, thought-provoking and entertaining and to adapt those messages for delivery across multiple media platforms. Students will learn to coalesce their observations, opinions and experiences into compelling arguments. Prerequisite: Medill junior standing.

JOUR 358-0 Evolution of Sports Media (1 Unit) From the foundational elements in the days of typewriters and telegraphs that are still in use today to the technological innovations that will shape the way we watch sports in the future, Sports Media History examines the evolution of this multibillion-dollar field.

JOUR 359-0 Media History and the Native American Experience (1 Unit) In this media history class, we will generate multimedia content for an "Indigenous Tour of Northwestern." Students will research Native American people, places, policies, and historic social movements that intersect with locations on the Northwestern campus.

JOUR 360-0 Sports Reporting (1 Unit) This course is a dive into the world of sports journalism and how sports reporters do their jobs on a daily basis, utilizing all the fundamentals of good journalism while recognizing that it is also a unique endeavor.

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 367-0 Native American Environmental Issues and the Media (1 Unit) This course introduces students to indigenous issues, such as treaty-based hunting, fishing, and gathering rights; air and water quality issues; mining; land-to-trust issues; and sacred sites. We will focus on how the media cover these issues and how that coverage contributes to the formation of public opinion and public policy. Prerequisite: Medill sophomore standing.

JOUR 368-0 Documentary (1 Unit) This course will provide students with a comprehensive overview of HD video production specifically geared towards producing short documentaries that tell human stories. Emphasis is put on the use of character, conflict, drama and surprise in telling these documentary stories. Students will learn documentary production with a journalism focus: reporting, camera technique, lighting and sound recording in the field. Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 369-0 Audio Documentary (1 Unit) This course explores different forms of audio documentary production for radio broadcast, as well as web-based multi-media distribution. Emphasis is on radio reporting techniques including interviewing, writing to tape, compelling story-telling, as well as integration of sound and music. Prerequisite: JOUR 301-0 or JOUR 301-1.

JOUR 370-0 Media Law & Ethics (1 Unit) This course will review the myriad laws, legal cases and ethical standards essential to being a journalist in the 21st Century -- not only for what you report and publish, but also for what you post on social media -- including defamation, privacy, information access, protecting sources, and copyright. Prerequisites: Medill sophomore standing.

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) This course covers contemporary history in South Africa with a special focus on the role of media. It provides an opportunity to hear from African journalists working in one of the world's newest democracies and to compare and contrast their experience with the increasingly contested role of reporters in the U.S., the world's oldest constitutional republic. Required for South Africa Journalism Residency. Prerequisites: JOUR 301-0 or JOUR 301-1.

JOUR 373-0 Medill Investigative Lab (2 Units) In this dynamic course grounded in real-time investigative reporting, students will expose a problem of significant national or international importance and chronicle its effects on the lives and livelihoods of those most impacted, particularly those in disenfranchised communities. Prerequisite: Medill junior standing and instructor consent.

JOUR 374-0 Intro to Investigative Journalism (1 Unit) In this course, we'll focus on the basics of investigative reporting that you can apply to any reporting course, as well as prepare for advanced investigative courses if you so choose. We'll explore the history, ethics, challenges and successes of investigative reporting and learn the tools used by top investigative reporters.

JOUR 376-0 Media Design (1 Unit) In this course students will be introduced to creating and developing a visual response to communication problems, including understanding of hierarchy, typography, aesthetics, composition and the construction of meaningful images. Prerequisite: Medill sophomore standing and JOUR 301-0 or JOUR 301-1.

JOUR 377-0 Knight Lab: Data Analysis & Visualization (1 Unit) In this course, students will learn how to analyze and present data using available tools, anticipate how readers will visually perceive and make inferences from data graphics, and recognize where they may be prone to misinterpreting statistics.

JOUR 378-0 Introduction to Photojournalism (1 Unit) This class will provide students with an introduction to digital photography with an emphasis on photojournalism. Emphasis will be put on using images to portray human stories – ones that surprise, break stereotypes, and capture emotion in dramatic and intimate situations. This class will also focus on basic picture editing and how proper picture selection enhances the total journalistic package. Prerequisite: Medill sophomore standing.

JOUR 381-0 Business Reporting (1 Unit) In this course, students will learn how to write compelling, informative articles on personal finance, small business, entrepreneurship, Fortune 500 companies, and the economy. Prerequisite: Medill sophomore standing.

JOUR 383-0 Health and Science Reporting (1 Unit) In this combination writing workshop and seminar, students will read some 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: Medill sophomore standing.

JOUR 384-0 Covering Washington, D.C. as a Mobile Journalist (2 Units) This class will give students hands-on experience covering the nation's capital as a mobile journalist on a beat, producing up-to-the-minute political stories for the Medill on the Hill website. The primary focus of the course, instant newsgathering and multi-media reporting, will enhance innovative story-telling and deadline 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 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 394-0 Politics and Presidential Elections (1 Unit) Students will learn and apply Gestalt theory to design problems and expand their visual lexicon. Photo history will be brought into context with the larger visual narrative and explore how light, shape, form and composition help communicate complex thought and emotion.

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.

JOUR 399-3 Experiential Learning (0 Unit) Journalism Travel Program. By application Only.

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. 27) 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, demonstrated proficiency as defined by Weinberg College, or articulated credit from an AP/IB exam in a foreign language

Diverse Cultures and Social Inequalities Requirement (2 units)

- 2 courses from a Medill-approved list

Major Requirements (14-18 units)

Course	Title
Core Courses (8 units)	
JOUR 201-1	Fundamentals of Reporting & Writing News
JOUR 201-2	Fundamentals of Video Journalism
JOUR 202-0	Journalism Values, Practice & Trends
JOUR 301-0	Journalism in Practice
or JOUR 301-1	Journalism in Practice
JOUR 370-0	Media Law & Ethics (required before Journalism Residency)
A history, representation, or business understanding course	
Two 300-level Advanced Journalism in Practice courses	
Journalism Residency or Professional Experience (4 units) [1]	
JOUR 347-0 & JOUR 348-0	Journalism Residency and Journalism Residency
or JOUR 345-SA & JOUR 346-SA	Journalism Residency: Argentina and Journalism Residency: Argentina
or JOUR 355-SA & JOUR 356-SA	Journalism Residency: Qatar and Journalism Residency: Qatar
or JOUR 365-SA & JOUR 366-SA	Journalism Residency: South Africa and Journalism Residency: South Africa
Electives (2–6 units)	
Students must take at least two 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 of more than 2,200 courses each year, including seminars, lectures, supervised laboratory experiences, field studies, and other forms of instruction. The 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. 201).

Students earning the bachelor of arts degree must complete 45 units of credit (p. 200) and fulfill the course and grade requirements (p. 200) described below. These include completing 2 first-year seminars (p. 198), demonstrating proficiency in writing (p. 198) and in a foreign language (p. 198), satisfying distribution requirements (p. 199) in six major areas of intellectual inquiry, and completing the requirements of a major (p. 199) in one of the departments or programs of Weinberg College. They must also complete a specified amount of their coursework within Weinberg College (p. 200).

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. 200)) is not allowed in first-year seminars.

Except for students in HPME (p. 37), ISP (p. 309), and MMSS (p. 325), 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. 309) 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. 400) 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 courses[1] 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. 200)) 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 Special Policy for Area II under Weinberg College Policies: Distribution Requirement Special Cases (p. 200).

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. 200))

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. 200).

In addition to and independent of the requirements set by Weinberg College, all students must satisfy the University's Undergraduate Registration Requirement (p. 27). 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 Weinberg College disciplines. These include the following:

- Units of credit earned in Weinberg College academic areas of study, inclusive of all courses offered by the College as well as courses listed under the COMP_SCI and MAT_SCI subject codes.
- 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 (see list under Bienen School of Music policies (p. 50)) 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 on the webpage under Policies, Procedures, and Forms (https://weinberg.northwestern.edu/undergraduate/advising/policies-forms/).

Additional information can be found under Academic Options and Support (p. 201).

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 Global Learning Office (GLO) is an essential source of information about programs around the world as well as about the rules and process for going abroad. Advisers in GLO, 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. 201)).

The college also awards funds to students working on research projects and creative activities; see Research Funding under Academic Options and Support (p. 201) for information.

Distribution Requirement Special Cases

Special Policy for Area II: Formal Studies

Completing any one course offered by the Department of Mathematics numbered 230-1 or higher with a grade of C- or better satisfies the Weinberg College Formal Studies (Area II) distribution requirement.

Special Policy for Interschool Transfer Students

Students who transfer to Weinberg College from the School of Education and Social Policy, the McCormick School of Engineering, or the Bienen School of Music are eligible to apply specific courses toward the distribution requirements. Details can be found on the Weinberg College webpage describing distribution requirement exceptions for interschool-transfer and dual-degree students (https://weinberg.northwestern.edu/undergraduate/degree/distribution-requirements/interschool-transfer-dual-degree.html).

For More Information

For more information about Weinberg College distribution requirements see Requirements for the Degree of Bachelor of Arts (p. 198). For additional rules and policies pertaining to satisfaction of distribution requirements see Rules and Policies for Distribution Requirements (https://weinberg.northwestern.edu/undergraduate/degree/distribution-requirements/rules.html).

Student Organized Seminars

Weinberg College 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. 200) and the Undergraduate section of the Weinberg College webpage (https://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 first-generation college students, students from low-income backgrounds, and students whose high schools offered little or no AP or IB preparation.

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 open to select Weinberg and Medill students. All students in the program take two half-credit core classes (MATH 100-BR, and HUM 100-1-BR). Weinberg students take one additional half-credit core class (GEN_LA 100-BR) and one of three half-credit elective classes (CHEM 100-BR, ECON 100-BR, or HUM 100-2-BR). Medill students all take an additional one-credit class (JOUR 190-BR). Bridge II is open to rising sophomores intending to enroll in organic chemistry. The Bridge II course is CHEM 199-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.

Peer Mentoring

A three-quarter program pairing first-year students with upperclassmen who have already completed one or more Arch Scholars programs. Mentors and mentees meet weekly to discuss academic and other concerns including study skills, time management, emotional intelligence, and help seeking.

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. 38) section of this catalog.

Honors Program in Medical Education

The Honors Program in Medical Education (HPME) is designed for exceptionally well-prepared high school students who seek a career in medicine or medical science. It provides a plan whereby undergraduate students entering Northwestern are admitted simultaneously to the Feinberg School of Medicine. HPME is no longer accepting new students; details about requirements can be found in the 2020-2021 or earlier Undergraduate Catalog.

Combined Bachelor's/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 programs in chemistry (https://catalogs.northwestern.edu/tgs/chemistry/chemistry-bach-mast/), comparative literary studies (https://catalogs.northwestern.edu/tgs/comparative-literary-studies/comparative-literary-studies-bach-mast/), computer science (https://catalogs.northwestern.edu/tgs/computer-science/computer-science-bach-mast/), economics (https://catalogs.northwestern.edu/tgs/economics/economics-bach-mast/), French (https://catalogs.northwestern.edu/tgs/french-francophone-studies/french-bach-mast/), linguistics (https://catalogs.northwestern.edu/tgs/linguistics/linguistics-bach-mast/), plant biology and conservation (https://catalogs.northwestern.edu/tgs/plant-biology-conservation/plant-biology-conservation-bach-mast/), and public health (https://catalogs.northwestern.edu/tgs/public-health/public-health-bach-mast/) share the goal of selecting and training exceptional students. Students are not self-selected but are recommended by the faculty 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.

Further details and policies are available from advisers in the relevant departments and on the Graduate School's website at Bachelor's/Master's Combined Degree (https://www.tgs.northwestern.edu/admission/academic-programs/explore-programs/combined-degree.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, or political science designation; or certification in English, 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. 120) 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. 29) 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. 33) 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 on the webpage at honors in two departments or programs (https://weinberg.northwestern.edu/undergraduate/enrichment-opportunities/honors-awards/honors-two-departments.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. 244) 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. 33) 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. 43) 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 Global Learning Office (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. 206)
- African American Studies Minor (p. 207)

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

AF_AM_ST 210-0 Introduction to African American Literature (1 Unit) Literature of Black people in the United States from slavery to freedom. Works of major writers and significant but unsung bards of the past. ENGLISH 266-0 and AF_AM_ST 210-0 are taught together. *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. 198) *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. AF_AM_ST 218-0 and ASIAN_AM 218-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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. 198)

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. 198)

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. 198) *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 325-0 Education for Black Liberation (1 Unit) This class considers what it means to conceptualize, articulate, and actualize a liberatory Black educational project within U.S. public schools structured by anti-Blackness. The course treats historical and contemporary manifestations of anti-Blackness in schools, as well as the ways Black students, educators, administrators, community and family members, and scholars have worked towards liberation. *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. 198) *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. 198) *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. 198) *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. 198) *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 394-LK Professional Linkage Seminar (1 Unit)

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. 27) and the degree requirements of their home school.

Course	Title
Department Courses (12 units)	
5 core courses chosen from:	
AF_AM_ST 210-0	Introduction to 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	Historical Archaeology (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 373-0	Power and Culture in American Cities (With DUS Approval for Relevance)

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 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	The Fourteenth Amendment (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)

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

Sociology

Course	Title
SOCIOL 201-0	Social Inequality: Race, Class, and Power
SOCIOL 207-0	Cities in Society (With DUS Approval for Relevance)
SOCIOL 208-0	Race and Society
SOCIOL 218-0	Education and Inequality: Focus on Chicago
SOCIOL 301-0	The City: Urbanization and Urbanism (With DUS Approval for Relevance)
SOCIOL 304-0	Politics of Racial Knowledge
SOCIOL 308-0	Crime, Politics, and Society (With DUS Approval for Relevance)
SOCIOL 323-0	American Subcultures and Ethnic Groups (With DUS Approval for Relevance)
SOCIOL 325-0	Global & Local Inequalities (With DUS Approval for Relevance)
SOCIOL 334-0	Social Protest and Social Change Around the World (With DUS Approval for Relevance)
SOCIOL 345-0	Class and Culture (With DUS Approval for Relevance)
SOCIOL 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. 201)

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	Introduction to 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 students and scholars, is the largest Africana collection in existence with subject matter ranging from art, history, literature, music, science, technology and religion to communications, engineering, management and cooking. 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. 209)
- African Studies Minor (p. 209)

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. 27) 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
If more than three are taken, additional courses from this list may count toward the next group.	
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 their 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. 201).

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 (https://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. 210)

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 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. 27) 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	Seminar for Majors
& AMER_ST 301-2	and Seminar for Majors
& AMER_ST 301-3	and Seminar for Majors
To be taken during senior year:	
AMER_ST 390-1	Senior Project
& AMER_ST 390-2	and Senior Project
Related Courses (10 units) [1]	
1 approved course from African American Studies, Asian American Studies, Latina and Latino Studies, or the Center for Native American and Indigenous Research	
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 (Puritans to Moby Dick)
ENGLISH 270-2	American Literary Traditions (Mid-19th Century to World War I)
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 U.S. 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. 201).

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. 214)
- Anthropology Minor (p. 216)

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 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 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 221-0 and ANTHRO 221-0 taught together, may not receive credit for both.

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 240-0 Anthropology of Money (1 Unit) A survey of cultural and ethnographic approaches to money and finance. Topics of investigation include "primitive money," the uses of money in religious and ritual practices, social and cultural meanings of numbers, mobile money, crypto-currency and other alternative currency systems, and the politics of central banking. Prerequisite: None. *Social Behavioral Sciences Distro Area*

ANTHRO 242-0 Porous Borders? Geography, Power and Techniques of Movement (1 Unit) At the advent of globalization scholars have argued that the movements of capital, commodities and people across nation-states have rendered their borders increasingly porous. The death of the nation-state was announced elsewhere. Yet, in the epoch of offshored refugee processing centers and border walls, this assumed porosity of borders begs a reexamination of broader geographies of power and techniques of movement. *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 307-0 Anthropology of Peace (1 Unit) Cultural and ethnographic approaches to peace, peace building and peace activism. Topics of investigation include the concept of "peaceful societies," cultural mechanisms for conflict resolution, truth and reconciliation, the relationship between peace and commerce, and the role of literature, art and material culture in peace activism. Prerequisite: None. *Social Behavioral 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 311-0 Indians of North America (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.
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 Evolutionary Medicine (1 Unit) In this course we explore how evolution has made our bodies susceptible to the role of environments and social forces, including factors like stress, discrimination and inequality. We consider fields at the interface of the social and biological, including genetics, epigenetics and social epidemiology. *Social Behavioral 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 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 326-0 Archaeologies of Sustainability and Collapse (1 Unit)
Archaeological survey of case studies from the past to interrogate human-environment relationships across time and space, including the present and the future. ANTHRO 326-0 and ENVR_POL 385-0 taught together, may not receive credit for both.
Social Behavioral Sciences Distro Area

ANTHRO 327-0 Historical Archaeology (1 Unit)
Archaeology of the past 500 years in the Americas. Study of the material remains people left behind: architecture, burials, food remains, clothing and jewelry, etc. Analysis of race, class gender and indigeneity are core themes. European colonialism, resistance, capitalism, and power are explored, and presentation or exclusion of groups in depictions of history and in the creation new identities (ethnogenesis).
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 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 351-0 Hope and Futurity (1 Unit)
An in#depth survey of anthropological, sociological, literary, philosophical and religious explorations into the problem of hope.
Ethics Values Distro Area

ANTHRO 353-0 Shady Business: Informal Economies in Contemporary Capitalism (1 Unit) Taking stock of world economic changes such as the collapse of socialism, the advent of globalization as well as the intensification of transnational labor migration, this course aims to reveal the categorical distinctions drawn between formal and informal economies in contemporary capitalism as historically situated and politically charged constructs. *Social Behavioral Sciences 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 358-0 Primate Behavior and Ecology (1 Unit) This course provides an introductory overview of non-human primate behavior and ecology, covering topics nutrition, cognition, sociality, and conservation. No prerequisites. *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.
Historical Studies 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 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 Political Ecology (1 Unit)
Introduction to a multidisciplinary body of theory and research that analyzes the environmental articulations of political, economic, and social difference and inequality. Topics include environmental scarcity and degradation, sustainability, resilience and conservation. ANTHRO 382-0 and ENVR_POL 384-0 taught together, may not receive credit for both.
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 Traveling While Muslim: Islam, Mobility, and Security after 9/11 (1 Unit) What are the stakes of traveling while Muslim in that post 9/11 era of racing Islam? How do we come to understand such mobility? In probing these questions, amongst others, in this seminar we aim to examine the interlocked relationship between Islam, mobility and security. *Social Behavioral Sciences 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 398-0 Senior 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. 27) 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. 214)	
Biological Anthropology (p. 214)	
Cultural Anthropology (p. 214)	
Human Biology (p. 215)	
Linguistic Anthropology (p. 215)	
3 additional 300-level courses selected from any concentration or research course [1]	
Related Course (1 unit)	
1 formal studies course [2,3,4]	

1 For the joint Anthropology/MMSS major, MMSS 300-0 double-counts as a 300-level anthropology course (for triple major limitations see MMSS Adjunct Major (p. 326)).

2 For the biological anthropology and human biology concentrations, the formal studies course must be fulfilled by STAT 202-0, STAT 210-0, PSYCH 201-0, ECON 281-0, SESP 210-0, or equivalent.

3 For the archaeology, cultural anthropology, and linguistic anthropology concentrations, statistics or another formal studies course can fulfill this requirement.

4 For the joint Anthropology/MMSS major, MATH 385-0 counts as the formal methods related course requirement for anthropology.

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	Historical Archaeology
ANTHRO 328-0	The Maya
ANTHRO 343-0	Anthropology of Race
ANTHRO 383-0	Environmental Anthropology
ANTHRO 390-0	Topics In Anthropology
ANTHRO 398-0	Senior Seminar

Biological Anthropology

Course	Title
ANTHRO 306-0	Evolution of Life Histories
ANTHRO 309-0	Human Osteology
ANTHRO 312-0	Human Population Biology
ANTHRO 313-0	Evolutionary Medicine
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 Seminar

Cultural Anthropology

Course	Title
ANTHRO 307-0	Anthropology of Peace
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 351-0	Hope and Futurity
ANTHRO 353-0	Shady Business: Informal Economies in Contemporary Capitalism
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 373-0	Power and Culture in American Cities
ANTHRO 376-0	Socialization
ANTHRO 377-0	Psychological Anthropology
ANTHRO 378-0	Law and Culture
ANTHRO 384-0	Traveling While Muslim: Islam, Mobility, and Security after 9/11
ANTHRO 390-0	Topics In Anthropology
ANTHRO 398-0	Senior 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 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 309-0	Human Osteology
ANTHRO 312-0	Human Population Biology
ANTHRO 313-0	Evolutionary Medicine
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 Seminar
3 additional 300-level courses selected from any concentration or research course	
Related Courses [1]	
BIOL_SCI 201-0	Molecular Biology
BIOL_SCI 202-0	Cell Biology
BIOL_SCI 203-0	Genetics and Evolution
BIOL_SCI 232-0	Molecular and Cellular Processes Laboratory (0.34 units)
BIOL_SCI 233-0	Genetics and Molecular Processes Laboratory (0.34 units)
BIOL_SCI 234-0	Investigative Laboratory (0.34 units)
BIOL_SCI 301-0	Principles of 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 215-1 & CHEM 235-1 & CHEM 215-2 & CHEM 235-2	Organic Chemistry I and Organic Chemistry Lab I and Organic Chemistry II and Organic Chemistry Lab II
Students completing the chemistry major organic sequence CHEM 212-1, CHEM 212-2, and CHEM 212-3 with labs may use these courses instead of CHEM 215-1, 215-2 with labs.	
MATH 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus
or MATH 218-1 & MATH 218-2 & MATH 218-3	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
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 and Data Science
STAT 210-0	Introduction to Probability and Statistics
PSYCH 201-0	Statistical Methods in Psychology
ECON 281-0	Introduction to Applied Econometrics
or ECON 381-1	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

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 Seminar in the winter quarter of senior year. ANTHRO 398-0 Senior Seminar (but not ANTHRO 399-0 Independent Study) 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. 201).

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

Arabic is offered by the Middle East and North African Languages Program (https://mena-languages.northwestern.edu). For course listings in this catalog, see Middle East and North African Studies (p. 336).

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, history, film, literature, material science, performance, philosophy, political science, 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 basis for those interested in art history careers in museums, galleries and arts education at all levels. With its liberal arts emphasis on critical reading, writing, speaking, and looking, 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.

Students declaring the major are assigned a faculty advisor who oversees their intellectual and professional development; the Director of Undergraduate Studies handles all official processes such as the petition to graduate and study abroad approval for majors. Students are expected to confer with their faculty advisor at the start of the academic year and are encouraged to do so before each registration period. Students pursing the minor are advised by the Director of Undergraduate Studies, with whom they should meet at the beginning of the academic year.

Programs of Study

- Art History Major (p. 219)
- Art History Minor (p. 219)

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

ART_HIST 220-0 Introduction to African Art (1 Unit) Introduction to art making in Africa; historical periods and regions of focus may vary depending on instructor. *Literature Fine Arts Distro Area*

ART_HIST 222-0 Introduction to Art of the African Diaspora (1 Unit) Introduction to the visual arts and art history of the African diaspora, including the Caribbean, Brazil, and the United States, from the 19th century to present day. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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 Interdisciplinary Distro* - See Rules (p. 198) *Literature Fine Arts Distro Area*

ART_HIST 225-0 Introduction to Medieval Art (1 Unit) Introduction to the art and architecture of Europe and the Middle East from the third to fifteenth centuries CE. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *Literature Fine Arts Distro Area*

ART_HIST 228-0 Introduction to Pre-Columbian Art (1 Unit) Introduction to South, Central and North American art and architecture before extended European contact. *Literature Fine Arts Distro Area*

ART_HIST 230-0 Introduction to Art of the United States (1 Unit) Survey of the art and architecture of the United States in its 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: 1400 to Present (1 Unit) The theory and history of architecture in relation to cities and landscape; historical periods and regions of focus may vary depending on the instructor. *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 Early Modern European Art (1 Unit) Leading centers and artists of Europe from the later Middle Ages to the 19th century, with attention to their global context. Architecture, sculpture, painting, and graphic arts in relation to their social and cultural settings. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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. 198) *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. *Literature Fine Arts Distro Area*

ART_HIST 310-1 Ancient Art: Greece (1 Unit)
Art and architecture of 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: Rome (1 Unit)
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. 198) *Literature Fine Arts Distro Area*

ART_HIST 319-0 Special Topics in Ancient Art (1 Unit) Content varies-for example, monsters and civilization; 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 Byzantine (Eastern Roman) empire in its larger Meditterranean, Middle Eastern and Eastern European context from the fourth to fifteenth century. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *Literature Fine Arts Distro Area*

ART_HIST 320-2 Medieval Art: Early Medieval (1 Unit)
Art and architecture of the Europe from late antiquity to the twelfth century.
Literature Fine Arts Distro Area

ART_HIST 320-3 Medieval Art: Late Medieval (1 Unit) Art and architecture of Europe from the twelfth to fifteenth centuries. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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 Early Modern Art: Southern Europe c. 1400–1500 (1 Unit)
Painting, sculpture, architecture, and the graphic arts in Europe from c.1400–1500.
Prerequisite: 200-level art history course.
Literature Fine Arts Distro Area

ART_HIST 330-2 Early Modern Art: Southern Europe 1500-1600 (1 Unit)
Painting, sculpture, architecture, and the graphic arts in Southern Europe from 1500–1600.
Prerequisite: 200-level art history course.
Literature Fine Arts Distro Area

ART_HIST 330-3 Early Modern Art: Northern Europe 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 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 (primarily Italy and Spain) from c. 1600–1750. Prerequisite: 200-level art history course. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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 Interdisciplinary Distro - See Rules (p. 198) *Literature Fine Arts Distro Area*

ART_HIST 349-0 Special Topics in Baroque and Rococo Art (1 Unit)

Content varies-for example, global baroque; court fashion; early modern prints and drawings; art and science.
Prerequisite: 200-level art history course.

ART_HIST 350-1 19th Century Art 1: 1800–1848 (1 Unit)
Survey of European painting and sculpture from the mid-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 Art 2 (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 Art of the United States 1 (1 Unit)
Survey of the arts and visual culture in the United States, encompassing architecture, painting, sculpture, photography, prints, film, and popular culture from colonial times to the Civil War.
Prerequisite: 200-level art history course.
Literature Fine Arts Distro Area

ART_HIST 365-2 Art of the United States 2 (1 Unit)
Survey of the arts and visual culture in the United States, encompassing architecture, painting, sculpture, photography, prints, film, and popular culture after the 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 Art of the United States (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 and 21st 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, from 1750-1900.
Literature Fine Arts Distro Area

ART_HIST 370-2 Contemporary Architecture and Design (1 Unit)
The history and theory of architecture, especially in relation to cities and landscape, after 1900.
Literature Fine Arts Distro Area

ART_HIST 372-1 Japanese Art (1 Unit) Survey of art in Japan and Japanese culture. Topics may include 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 The Global City (1 Unit)
A critical examination of the city as a socioeconomic system; period and regions of focus vary.
Literature Fine Arts Distro Area

ART_HIST 379-0 Special Topics in Modern and Contemporary Architecture (1 Unit)
Content varies—may focus on particular cities, building types, or individual historical figures as well as on themes such as race or gender.

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 historical examination of the art and visual culture of Africa in selected periods

and regions. 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, rt and ecology; Picasso; World's Fairs; Japanese prints; 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. 27) and the degree requirements of their home school.

Course	Title
Department Courses (12 units) [1]	
2 200-level courses	
10 300-level courses including:	
ART_HIST 391-0	Art Historical Methods Seminar [2]
At least 1 Art History 390 or 395 seminar:	
ART_HIST 390-0	Undergraduate Seminar
or ART_HIST 395-0	Museums
At least 1 Art History course in each of the following three art historical periods: 1) pre-1400 CE; 2) 1400 CE-1800 CE; and 3) post-1800 CE	
At least 2 Art History courses in Non-Euro-American art [3]	
Studio Course (1 unit)	
1 course in art making, design, or other arts course approved by the director of undergraduate studies	

1 One credit of Chicago Field Studies may be substituted for either a 200- or 300-level Art History course when the internship is conducted at an arts organization approved by the director of undergraduate studies. Students conducting honors may count one of the two required ART_HIST 399-0 courses towards the major.

2 Undergraduate methods seminar should ideally be taken in junior year, especially by students who want to write an honors thesis.

3 Defined as art made outside Europe and the continental USA or by diasporic communities in those regions.

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 taken with the faculty thesis advisor, usually in fall and winter terms of senior year (ART_HIST 399-0 Independent Study)
- 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. 201).

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 focused on art made outside Europe and the continental USA or by diasporic communities in those regions. One credit of Chicago Field Studies may be substituted for either a 200- or 300-level Art History course when the internship is conducted at an arts organization approved by the Art History Director of Undergraduate Studies.

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. 120) 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. 220)
- Art Theory and Practice Minor (p. 220)

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 junior or senior standing in the minor.

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 and Junior or Senior standing in major.

ART 372-0 Seminar (1 Unit)
Variable content, seminar-based course. May be repeated for credit with different topic. Note that some sections of this course are not approved for graduate credit. Please consult the course description.

ART 382-0 Studio/Seminar (1 Unit)
Variable content course with both seminar and studio components. May be repeated for credit with different topic. Note that some sections of this course are not approved for graduate credit. Please consult the course description.

ART 390-0 Studio (1 Unit)
Variable content, studio-based course. May be repeated for credit with different topic. Note that some sections of this course are not approved for graduate credit. Please consult the course description.

ART 399-0 Independent Study (1 Unit) For advanced majors pursuing projects outside the context of regularly offered courses. Prerequisite: consent of department chair and director of undergraduate studies.

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. 27) 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 Seminar, ART 382-0 Studio/Seminar, and ART 390-0 Studio 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. 201).

Art Theory and Practice Minor

Course	Title
Minor Requirements (6 units)	
2 200-level courses	
Possible courses: ART 210-0, ART 220-0, ART 230-0, ART 240-0, ART 250-0	
1 history and/or theory course	
ART 270-0	Contemporary Art Survey
or ART 272-0	Critical Methods for Contemporary Art
or ART 260-0	Studio Practice

3 additional courses in the department at the 300-level

Possible courses: ART 372-0, ART 382-0, ART 390-0

- ART 372-0 Seminar, ART 382-0 Studio/Seminar, and ART 390-0 Studio 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 minor.

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. 222)
- Asian American Studies Minor (p. 223)

ASIAN_AM 103-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

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 conservatisms. 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. AF_AM_ST 218-0 and ASIAN_AM 218-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules *(*p. 198*) 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. ASIAN_AM 276-0 and ENGLISH 276-0 are taught together. *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. 198*) 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. 27) 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. 244) 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. 201).

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 125-1	Accelerated Beginning Hindi-Urdu
HIND_URD 125-2	Accelerated Intermediate Hindi-Urdu
HIND_URD 210-0	Hindi-Urdu III: Topics in Intermediate Hindi-Urdu
HIND_URD 310-0	Hindi-Urdu IV
HIND_URD 320-0	Topics Hindi-Urdu Literature
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. 229)
- Asian Humanities Minor (p. 229)
- Advanced Asian Languages Minor (p. 229)

Asian Humanities Courses

These courses are taught in English.

ASIAN_LC 110-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

ASIAN_LC 200-0 Introductory Topics in Chinese Literature and Culture (1 Unit) Introduction to topics in Chinese literature and culture, from precolonial to contemporary periods and contexts. May be repeated for credit with change of topic. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 202-0 Introduction to Modern Chinese Literature and Culture (1 Unit) Introduction to topics in the history of cultural production in modern China between the 19th century and present day. May be repeated for credit with change of topic. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 204-0 Modern Chinese Popular Culture I (1 Unit) Introduction to the history of modern Chinese popular cultural production between the mid-19th century and 1949. The course is designed around the introduction and adaptation of four media technologies: photography, film, mass print culture, and sound recording. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 205-0 Modern Chinese Popular Culture II (1 Unit) Introduction to popular cultural production in Mainland China, Taiwan, and Hong Kong between 1949 and the present. ASIAN_LC 204-0 is recommended. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 220-0 Introductory Topics in Japanese Literature and Culture (1 Unit) Introduction to topics in Japanese literature and culture, from precolonial to contemporary periods and contexts. May be repeated for credit with change of topic. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 221-0 Introduction to Premodern Japanese Literature and Culture (1 Unit) Introduction to Japanese literature and culture from the earliest writings to the dawn of the modern era (8th-19th c.): poetry, narrative fiction, essays, diaries, theater. Focus is on reading literary texts in historical context. May be repeated for credit with change of topic. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 222-0 Introduction to Modern Japanese Literature and Culture (1 Unit) Culture Introduction to Japanese literature, thought, and culture from the mid-19th to mid-20th century: fiction, poetry, theater, essays. Focus is on reading literary texts in relation to historical context. May be

repeated for credit with change of topic. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 223-0 Introduction to Contemporary Japanese Literature and Culture (1 Unit) Culture Introduction to Japanese literature, thought, and culture from the mid-20th to early 21st century: fiction, poetry, theater, essays, animation, manga. Focus is on reading literary texts in relation to historical context. May be repeated for credit with change of topic. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 224-0 Introduction to Japanese Film, Media, and Visual Culture (1 Unit) Introduction to Japanese media and visual culture. Topics may include: pre-modern visual narrative, pre-modern print culture, cinema, animation, manga, video games. Focus is on reading media and visual culture in relation to historical context. May be repeated for credit with change of topic. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 240-0 Introductory Topics in Korean Literature and Culture (1 Unit) Introduction to topics in Korean literature and culture, from precolonial to contemporary periods and contexts. May be repeated for credit with change of topic. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 260-0 Introductory Topics in South Asian Literature and Culture (1 Unit) Introduction to topics in South Asian literature and culture, from precolonial to contemporary periods and contexts. May be repeated with change of topic. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 261-0 South Asian Popular Cultures (1 Unit) This course offers an introduction to the intersecting worlds of popular literature, digital media, folk arts, performance, and politics of South Asia with a focus on the relationship between artistic expression, social reform and political change. May be repeated for credit with change of topic. No prerequisites. *Literature Fine Arts Distro Area*

ASIAN_LC 265-0 South Asian Cinemas (1 Unit) Narrative and aesthetic approaches to understanding popular cinemas in South Asia with special attention to historical, local, and global contexts. May be repeated for credit with change of topic. No prerequisites. *Literature Fine Arts Distro Area*

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 300-0 Advanced Topics in Chinese Literature and Culture (1 Unit)
Advanced study and analysis of topics in Chinese literature and culture, from precolonial to contemporary periods and contexts. May be repeated for credit with change of topic. One 200-level Chinese literary and culture studies course is recommended. No prerequisites.
Literature Fine Arts Distro Area

ASIAN_LC 320-0 Advanced Topics in Japanese Literature and Culture (1 Unit)
Advanced study and analysis of topics in Japanese literature and culture, from precolonial to contemporary periods and contexts. May be repeated for credit with change of topic. One 200-level Japanese literary and culture studies course is recommended. No prerequisites.
Literature Fine Arts Distro Area

ASIAN_LC 321-0 Advanced Topics in Premodern Japanese Literature and Culture (1 Unit)
In-depth examination of specialized topics in premodern Japanese literature and culture. Emphasis on reading, evaluating, and applying scholarship in Japanese studies to inform analysis of primary texts. May be repeated for credit with change of topic. No prerequisites.
Literature Fine Arts Distro Area

ASIAN_LC 322-0 Advanced Topics in Modern and Contemporary Japanese Literature and Culture (1 Unit)
Advanced study in topics related to Japanese literature and culture from the late 19th century to the present. Topics may include, but are not limited to: significant cultural movements in specific historical periods, wartime literature and culture, minority literatures, and major authors and texts. Focus is on interpreting literature and culture in relation to historical contexts and theoretical concerns. May be repeated for credit with change of topic. No prerequisites.
Literature Fine Arts Distro Area

ASIAN_LC 340-0 Advanced Topics in Korean Literature and Culture (1 Unit)
Advanced study and analysis of topics in Korean literature and culture, from precolonial to contemporary periods and contexts. May be repeated for credit with change of topic. ASIAN_LC 240 is recommended. No prerequisites.
Literature Fine Arts Distro Area

ASIAN_LC 360-0 Advanced Topics in South Asian Languages and Cultures (1 Unit)
Advanced study and analysis of topics in South Asian Literature and Culture, from precolonial to contemporary periods and contexts. Includes a research component. May be repeated for credit with change in topic. One 200-level South Asian literary and culture studies course is recommended. No prerequisites.
Literature Fine Arts Distro Area

ASIAN_LC 370-0 Literary Cultures in South Asia (1 Unit)
Advanced study of specific literary cultures in South Asia, and their impacts on South Asian history and contemporary society. Topics vary in historical, regional, and thematic scope. No prerequisite, but a 200-level ASIAN_LC topics courses is recommended. May be repeated for credit with change of topic. One 200-level South Asian literary and culture studies course is recommended. No prerequisites.
Literature Fine Arts Distro Area

ASIAN_LC 373-0 Religious and Textual Traditions in South Asia (1 Unit)
Explores the close relationship between religious practice and belief and literary traditions (Hindu, Muslim, Buddhist, etc.) in South Asia from classical to contemporary periods. Topics vary; may be repeated for credit with a change in topic. One 200-level South Asian literary and culture studies course is recommended. No prerequisites.
Literature Fine Arts Distro Area

ASIAN_LC 375-0 South Asian Societies (1 Unit)
This class will examine how significant moments of social and political transformation (such as colonialism, Partition, and the growth of the South Asian diaspora) has been engaged in literature and popular culture. Content varies; a 200-level course in an area of South Asian literature and culture is recommended. May be repeated for credit with change of topic. No prerequisites.
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 392-0 Advanced Studies in Asian Film, Media, and Visual Culture (1 Unit) Advanced topics in Asian film, media, and visual culture. May be repeated for credit with change of topic. Prerequisite: ASIAN_LC 202-0 or ASIAN_LC 204-0 or ASIAN_LC 205-0

or ASIAN_LC 224-0 or ASIAN_LC 265-0 (C- or better); or consent of instructor. *Literature Fine Arts Distro Area*

ASIAN_LC 393-0 Asian Environmental Humanities (1 Unit)
Topics in the study of environment and culture in Asian contexts. Content varies; may be repeated for credit with change of topic. One 200-level Asian LC course is recommended.
Prerequisite: Consent of instructor.

ASIAN_LC 394-0 Space and Place in Asian Literatures and Cultures (1 Unit)
Advanced undergraduate course examining representations of space and place in Asian cultural contexts, with focus on application of theoretical methods to primary texts. May be repeated for credit with change of topic. One 200-level Asian literary and culture studies course is recommended. No prerequisites.
Literature Fine Arts Distro Area

ASIAN_LC 395-0 Genre in Asian Literatures (1 Unit)
Advanced undergraduate course examining the place of genre in Asian literary traditions. May be repeated for credit with change of topic. One 200-level Asian literary and culture studies course is recommended. No prerequisites.
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 CHINESE 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 CHINESE 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 CHINESE 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 academic writing and speaking in Chinese. Prerequisite: grade of at least C- in CHINESE 215-3; or in three of the following: CHINESE 311-1, CHINESE 311-2, CHINESE 311-3, CHINESE 312-1, CHINESE 312-2.

CHINESE 315-2 Chinese IV - Accelerated: Advanced Reading and Writing (1 Unit) Development of academic reading and writing in Chinese. Prerequisite: grade of at least C- in CHINESE 215-3; or in three of the following: CHINESE 311-1, CHINESE 311-2, CHINESE 311-3, CHINESE 312-1, CHINESE 312-2.

CHINESE 315-3 Chinese IV - Accelerated: Media & Society (1 Unit) Development of skills in reading primary sociocultural sources. Prerequisite: grade of at least C- in CHINESE 215-3; or in three of the following: CHINESE 311-1, CHINESE 311-2, CHINESE 311-3, CHINESE 312-1, CHINESE 312-2.

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. Devanagari script only. Prerequisite - none.

HIND_URD 111-2 Hindi-Urdu I (1 Unit) Beginning college-level sequence to develop basic literacy and oral proficiency in Hindi-Urdu. Devanagari script only. 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. Devanagari script only. 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 instructor.

HIND_URD 121-1 Hindi-Urdu II (1 Unit) Intermediate-level sequence developing literacy and oral proficiency in Hindi-Urdu. Devanagari and Nastaliq scripts. 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. Devanagari and Nastaliq scripts. 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. Devanagari and Nastaliq scripts. Prerequisite: grade of at least C- in HIND_URD 121-2 or equivalent.

HIND_URD 125-1 Accelerated Beginning Hindi-Urdu (1 Unit) Intensive Hindi-Urdu language course, covers one year of HIND_URD 111 (regular first year) in one quarter. Prerequisites: HIND_URD 116-0 OR ability to speak and understand basic Hindi-Urdu AND limited reading-writing skills in the Devanagari/Hindi script (proficiency test/permission of the instructor).

HIND_URD 125-2 Accelerated Intermediate Hindi-Urdu (1 Unit) Intensive Hindi-Urdu language course, covers one year of regular (second year) Hind_Urd 121 in one quarter. Prerequisites: HIND_URD 125-1 OR placement test (requires permission of instructor).

HIND_URD 210-0 Hindi-Urdu III: Topics in Intermediate Hindi-Urdu (1 Unit) A series of independent intermediate Hindi-Urdu courses, developing proficiency through readings and discussions. Devanagari and/or Nastaliq script. May be repeated for credit with change of topic. 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. Prerequisite: 3 iterations of HIND_URD 210-0 (minimum grade C-) or equivalent.

HIND_URD 320-0 Topics Hindi-Urdu Literature (1 Unit) Hindi-Urdu literature. Cultural and historical dimensions of South Asian literature. May be repeated for credit with a different topic. Prerequisites: 2 300-level courses in Hindi-Urdu or equivalent. Proficiency in reading Hindi or Urdu script is required.
Literature Fine Arts Distro Area

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 college-level 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 college-level 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 college-level 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 125-2, 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 profiency 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 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 within 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 testing upon return is 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.

Students must also complete the Undergraduate Registration Requirement (p. 27) 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 are encouraged to contact the director of undergraduate studies in the spring of their 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 (https://www.alc.northwestern.edu), and see Honors in the Major (p. 201).

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 serous 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, up to two courses taken abroad may be counted towards the minor 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.

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, language courses taken abroad may be counted towards the minor with the approval of the director of undergraduate studies and pending departmental review. It is essential that students returning from abroad take the language placement exam as soon as possible. For more information about the review process, please contact the director of undergraduate studies. Study abroad credits cannot be counted towards the humanities portion of the minor.

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	

Astronomy

See Physics and Astronomy (p. 351).

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 undergraduate major in biological sciences provides a broad, modern curriculum in the life sciences and offers focused concentrations and the potential for laboratory research.

The goal of a major 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 major includes the following:

- A foundation in mathematics, statistics, 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, students complete the courses listed as related courses (see biological sciences major (p. 234)). First-year students usually complete the general chemistry, calculus, and statistics requirements; in spring quarter, they take BIOL_SCI 201-0 Molecular Biology.

During the sophomore year, students usually complete the organic chemistry requirement, BIOL_SCI 202-0 Cell Biology and its co-requisite BIOL_SCI 232-0 Molecular and Cellular Processes Laboratory, BIOL_SCI 203-0 Genetics and Evolution and its co-requisite BIOL_SCI 233-0 Genetics and Molecular Processes Laboratory, BIOL_SCI 234-0 Investigative Laboratory, and BIOL_SCI 301-0 Principles of Biochemistry. These core biology courses address the central topics in contemporary biology with a goal of preparing students for further study in either the biological sciences or professional school. The physics requirement may be completed in this or later years.

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 eight areas of concentration from which to choose. 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 Neurobiology is not available to students also pursuing a Neuroscience major.)

Once the biological sciences major is declared, students are assigned faculty academic advisers.

Students have the opportunity to conduct a research project in the laboratory of a faculty research supervisor with whom they design a plan of study. The supervisor may be a Northwestern faculty member in any department who is engaging in biological research. Research areas of faculty can be accessed via the biological sciences website.

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. 120) 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. 234)
- Biological Sciences Second Major for ISP Students (p. 235)

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) *WCAS First-Year Seminar*

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 Basic Genetics and Evolution (1 Unit) Principles of inheritance as they apply to evolution. May not receive credit after taking BIOL_SCI 203-0 or BIOL_SCI 215-0. *Natural Sciences Distro Area*

BIOL_SCI 201-0 Molecular Biology (1 Unit) This course focuses on how information is stored and propagated in DNA, and used and regulated to generate proteins at the proper time and location. It also applies this information to understanding fundamentals of biotechnology. Credit not allowed for both BIOL_SCI 201-0 and BIOL_SCI 215-0. *Natural Sciences Distro Area*

BIOL_SCI 201-SG Peer-Guided SG: Molecular Biology (0 Unit) Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U. Co-requisite: BIOL_SCI 201-0.

BIOL_SCI 202-0 Cell Biology (1 Unit) This course covers how biomolecules function together to generate the complexity of cells, and how cells behave collectively to communicate with each other and to enact key decisions, such as proliferation and cell death. Prerequisite: Students must have completed, with a C- or better, BIOL_SCI 201-0 or 215-0 to register for this course. Must be taken concurrently with BIOL_SCI 232-0. Credit not allowed for both BIOL_SCI 219-0 and BIOL_SCI 202-0. *Natural Sciences Distro Area*

BIOL_SCI 202-SG Peer-Guided SG: Cell Biology (0 Unit) Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U. Co-requisite: BIOL_SCI 202-0.

BIOL_SCI 203-0 Genetics and Evolution (1 Unit) This course provides an analytic framework for studying the flow of biological information across generations, and understanding how phenotypes reveal biological mechanisms. This framework is applied to development, cancer, the history of life, and mechanisms governing the evolution and distribution of organisms over time. Prerequisite: Students must have completed, with a C- or better, BIOL_SCI 202-0 or 219-0 to register for this course. Must be taken concurrently with BIOL_SCI 233-0. *Natural Sciences Distro Area*

BIOL_SCI 203-SG Peer-Guided Study Group: Genetics and Evolution (0 Unit) Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U. Co-requisite: BIOL_SCI 203-0.

BIOL_SCI 213-0 Undergraduate Teaching Assistant (0 Unit) Prerequisite: consent of instructor.

BIOL_SCI 232-0 Molecular and Cellular Processes Laboratory (0.34 Unit) Laboratory techniques and experiments in fundamental aspects of cell and molecular biology. Must be taken concurrently with BIOL_SCI 202-0. Credit not allowed for both BIOL_SCI 221-0 and BIOL_SCI 232-0.

BIOL_SCI 233-0 Genetics and Molecular Processes Laboratory (0.34 Unit) Laboratory techniques and experiments in fundamental aspects of transmission genetics and molecular biology. Prerequisite: Students must have completed BIOL_SCI 232-0. Must be taken concurrently with BIOL_SCI 203-0. Credit not allowed for both BIOL_SCI 220-0 and BIOL_SCI 233-0.

BIOL_SCI 234-0 Investigative Laboratory (0.34 Unit) A culminating life-science laboratory experience. Prerequisite: Students must have completed BIOL_SCI 233-0. Credit not allowed for both BIOL_SCI 222-0 and BIOL_SCI 234-0.

BIOL_SCI 240-0 Biochemistry, Molecular and Cell Biology - 1 for ISP (1 Unit) This course aims to provide a framework for understanding the chemistry, structure and function of life's smallest functional units known as cells. Starting out with a basic description of inherent properties of biological macromolecules, the course deals with information storage, the flow of genetic information, cytoskeleton, cell organelles, and cell division. Prerequisite: Students must be enrolled in the Integrated Science Program to register for this course.

BIOL_SCI 241-0 Biochemistry, Molecular and Cell Biology - 2 for ISP (1 Unit) The course takes an in depth look at how the chemical and physical properties of organic molecules drive all aspects of life. Focus on principles of chemical evolution/diversification, biological membranes, membrane transport processes, enzyme structure and function, molecular signaling and design principles of the metabolic engine that enables the breakdown and synthesis of biological macromolecules. Prerequisite: Students must have completed CHEM 171-0, CHEM 172-0, CHEM 212-1, BIOL_SCI 240-0, and ISP standing.

BIOL_SCI 301-0 Principles of Biochemistry (1 Unit) Biochemical processes. Prerequisites: Students must have completed, or be currently enrolled in, CHEM 210-1 or CHEM 212-1 or CHEM 215-1. Students must also have completed BIOL_SCI 201-0. *Natural Sciences Distro Area*

BIOL_SCI 301-SG Peer-Guided Study Group: Principles of Biochemistry (0 Unit) Peer-guided study group for students enrolled in BIOL_SCI 301-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

BIOL_SCI 302-0 Fundamentals of Neurobiology (1 Unit)
Cellular and biochemical approaches to the nervous system, focusing on neuron structure and function.
Prerequisite: Students must have completed BIOL_SCI 201-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 217-0 or BIOL_SCI 310-0, and BIOL_SCI 301-0 to register for this course. May not receive credit for both BIOL_SCI 302-0 and NEUROSCI 202-0.

BIOL_SCI 303-0 Molecular Neurobiology (1 Unit) Exploration of the overlap between neurobiology and molecular biology. Prerequisite: Students must have completed BIOL_SCI 302-0 or NEUROSCI 311-0 or NEURO 206-0 to register for this course.

BIOL_SCI 305-0 Neurobiology Laboratory (1 Unit)
Hands-on experience in the performance of experiments in cellular neurophysiology.
Prerequisite: Students must have completed BIOL_SCI 302-0 or NEUROSCI 311-0 and BIOL_SCI 222-0 or BIOL_SCI 234-0 to register for this course.

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. Prerequisite: Students must have completed BIOL_SCI 302-0, BIOL_SCI 325-0 or BIOL_SCI 344-0 or NEURO 206-0 in order to register for this course. *Natural Sciences Distro Area*

BIOL_SCI 310-0 Human Physiology (1 Unit) An exploration of the functions of the human body at the tissue, organ, and organ system level. Emphasis on homeostatic mechanisms and interdependence within organs and organ systems and the influence of modulatory systems. Topics will include, but are not limited to: nervous, cardiovascular, respiratory, and renal systems. Prerequisites: Students must have completed BIOL_SCI 201-0 or BIOL_SCI 215-0, BIOL_SCI 202-0 or BIOL_SCI 219-0, and CHEM 132-0, CHEM 152-0, or CHEM 172-0. Credit not allowed for both BIOL_SCI 310-0 and BIOL_SCI 217-0. *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.
Prerequisite: Students must have completed BIOL_SCI 201-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 301-0 to register for this course.

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. Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 301-0 to register for this course.

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.
Prerequisite: Students must have taken BIOL_SCI 241-0 or BIOL_SCI 301-0 in order to register for this class.

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: Students must have completed BIOL_SCI 217-0 or BIOL_SCI 310-0 to register for this course.

BIOL_SCI 327-0 Biology of Aging (1 Unit)
Biological aspects of aging, from molecular to evolutionary.
Prerequisite: Students must have completed BIOL_SCI 201-0 or BIOL_SCI 215-0, and BIOL_SCI 202-0 or BIOL_SCI 219-0 to register for this course.

BIOL_SCI 328-0 Microbiology (1 Unit) How microbes interact with their environments, including with humans. Prerequisite: Students must have completed BIOL_SCI 201-0 or BIOL_SCI 215-0, and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 203-0 to register for this course.

BIOL_SCI 332-0 Conservation Genetics (1 Unit) Critical issues in the management and understanding of endangered populations. Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 or ENVR_SCI 202-0 to register for this course.

BIOL_SCI 333-0 Plant-Animal Interactions (1 Unit) Plant-animal interactions, and their consequences for individuals, populations, ecological communities, and ecosystems. Examination of how these interactions are responding to ongoing global factors such as anthropogenic habitat destruction and climate change. Prerequisite: Students must have completed BIOL_SCI 203-0, or BIOL_SCI 215-0, or BIOL_SCI 339-0, or BIOL_SCI 341, or BIOL_SCI 342-0, or ENVR_SCI 202-0 to register for this course. *Natural Sciences Distro Area*

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: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 or ENVR_SCI 202-0 to register for this course.

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: Students must have completed BIOL_SCI 203-0, or BIOL_SCI 215-0, or BIOL_SCI 339-0, or BIOL_SCI 341, or BIOL_SCI 342-0, or ENVR_SCI 202-0 to register for this course.

BIOL_SCI 337-0 Biostatistics (1 Unit) Approaches, methods, and techniques for analyzing datasets in ecology and conservation biology. Prerequisite: BIOL_SCI 203-0 or BIOL_SCI 215-0 or ENVR_SCI 202-0, and MATH 218-3 or MATH 220-2.

BIOL_SCI 338-0 Modeling Biological Dynamics (1 Unit)
Mathematical and computational techniques for analyzing and predicting biological dynamics. Techniques include statistical models, discrete- and continuous- time dynamical models, and stochastic models. Applications cover a range of scales, with an emphasis on common mathematical concepts and computational techniques, the interpretation of existing data, and making predictions for new experiments.
Prerequisites: at least one of MATH 218-1, MATH 220-1, MATH 240-0, STAT 202-0, BIOL_SCI 337-0, OR equivalent.
Formal Studies Distro Area

BIOL_SCI 339-0 Critical Topics in Ecology and Conservation (1 Unit)
Seminar discussing historical and modern publications in the field.
Prerequisite: Students must have completed BIOL_SCI 203-0, or BIOL_SCI 215-0, or BIOL_SCI 341, or BIOL_SCI 342-0, or ENVR_SCI 202-0 to register for this course. Prerequisite: Students must have completed BIOL_SCI 203-0, or BIOL_SCI 215-0, or BIOL_SCI 341, or BIOL_SCI 342-0, or ENVR_SCI 202-0 to register for this course.

BIOL_SCI 341-0 Population Genetics (1 Unit)
Processes that affect allele frequency change and thus cause evolution.
Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, and a course in statistics to register for this course.

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). Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, and a course in statistics to register for this course.

BIOL_SCI 344-0 Anatomy of Vertebrates (1 Unit) Vertebrate phylogeny illustrated via comparative morphology; anatomical/ functional and ontogenetic considerations; dissections. Prerequisite: Students must have completed BIOL_SCI 103-0, BIOL_SCI 203-0, BIOL_SCI 341-0, or BIOL_SCI 342-0.

BIOL_SCI 345-0 Topics in Biology (1 Unit)
Topics vary but always deal with an area of advanced study in the life sciences. May include laboratory, depending on topic. May be repeated for credit with different topic.
Prerequisites: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 , BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 234-0 to register for this course.

BIOL_SCI 346-0 Field Ecology (1 Unit)
An intensive experience in field ecological research.
Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and a course in statistics to register for this course.

BIOL_SCI 347-0 Conservation Biology (1 Unit)
Evolution, ecology, and conservation of patterns of biological diversity.
Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 or ENVR_SCI 202-0 and a course in statistics to register for this course.

BIOL_SCI 349-0 Community Ecology (1 Unit) Abundance, distribution, diversity, and scaling in plant communities in space-time. Prerequisite: Students must have completed BIOL_SCI 203-0, or BIOL_SCI 215-0, or BIOL_SCI 339-0, or BIOL_SCI 341, or BIOL_SCI 342-0, or ENVR_SCI 202-0 to register for this course.

BIOL_SCI 350-0 Plant Evolution and Diversity Lab (1 Unit) Introduction to the diversity and evolutionary history of land plants. Prerequisite: Students must have completed BIOL_SCI 203-0, or BIOL_SCI 215-0, or BIOL_SCI 339-0, or BIOL_SCI 341, or BIOL_SCI 342-0, or ENVR_SCI 202-0 to register for this course.

BIOL_SCI 353-0 Molecular Biology Laboratory (1 Unit) Project-based approach to learning lab skills in eukaryotic molecular biology. Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 222-0 or BIOL_SCI 234-0 and BIOL_SCI 301-0 to register for this course.

BIOL_SCI 354-0 Quantitative Analysis of Biology (1 Unit)
Random genetic processes, gene expression, cell adaptation, cell cycle, developmental morphogens, phylgenomics.
Prerequisite: Students must have completed BIOL_SCI 201-0 or BIOL_SCI 215-0, and BIOL_SCI 202-0 or BIOL_SCI 219-0 to register for this course.
Natural Sciences Distro Area

BIOL_SCI 355-0 Immunobiology (1 Unit)

Nature of host resistance; characteristics of antigens, antibodies; basis of immune response; hypersensitivity.
Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 301-0 to register for this course.

BIOL_SCI 356-0 Endocrinology (1 Unit)
Physiology and biochemistry of hormones and glands of internal secretion in vertebrates; endocrine glands.
Prerequisite: Students must have completed BIOL_SCI 325-0 to register for this course.

BIOL_SCI 358-0 Advanced Physiology Laboratory (1 Unit)
Experiments in several physiological systems. Design, techniques, data analysis, and report writing emphasized.
Prerequisite: Students must have completed BIOL_SCI 310-0 or BIOL_SCI 217-0, and BIOL_SCI 234-0 or BIOL_SCI 222-0 to register for this course.

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. Prerequisite: Students must have completed BIOL_SCI 201-0 or BIOL_SCI 215-0, and BIOL_SCI 202-0 or BIOL_SCI 219-0, or BIOL_SCI 354-0 to register for this course. *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. Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, to register for this course.

BIOL_SCI 361-0 Protein Structure and Function (1 Unit)
Structure and function of proteins; x-ray crystallography and NMR.
Prerequisites: Students must have completed BIOL_SCI 301-0 to register for this course.

BIOL_SCI 363-0 Biophysics (1 Unit) Protein interaction with small molecules; protein tertiary structure determination. Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 301-0 to register for this course.

BIOL_SCI 377-0 The Human Microbiome (1 Unit) Course explores different communities of microorganisms in the human body – the gut, urogenital, oral, and skin microbiota, and how these communities contribute to or are altered in health and disease. Topics will include but are not limited to: the contribution of these communities to digestion and gut health, mood, obesity, the immune system, fertility and pregnancy, and neurological disorders. Prerequisites: BIOL_SCI 202-0 or BIOL_SCI 219-0, BIOL_SCI 203-0 or BIOL_SCI 215-0, and BIOL_SCI 301-0. *Natural Sciences Distro Area*

BIOL_SCI 378-0 Functional Genomics (1 Unit)
Patterns of gene expression and their causes.
Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, to register for this course.

BIOL_SCI 380-0 Biology of Cancer (1 Unit) The disease of cancer: causation at the cellular and molecular levels; treatment. Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 301-0 to register for this course.

BIOL_SCI 381-0 Stem Cells and Regeneration (1 Unit) Developmental and molecular biology of tissue regeneration, with regard to regeneration from embryonic or adult stem cells. Discussion of conserved developmental pathways necessary for regeneration. Applications in regenerative medicine. Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, to register for this course. *Natural Sciences Distro Area*

BIOL_SCI 390-0 Advanced Molecular Biology (1 Unit)
Nucleic acid structure; DNA mutation, repair, recombination, replication, restriction, and modification; translation.
Prerequisite: Students must have completed BIOL_SCI 201-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 301-0 to register for this course.

BIOL_SCI 391-0 Developmental Biology (1 Unit)
Molecular mechanisms underlying early embryonic development, including establishment of the body and organogenesis. Discussion of original literature.
Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0 and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 301-0 to register for this course.

BIOL_SCI 392-0 Developmental Genetics Laboratory (1 Unit)
Development of independent projects alongside classic readings and experiments exploring key concepts in developmental biology.
Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0, and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 222-0 or BIOL_SCI 234-0, and BIOL_SCI 301-0 to register for this course.

BIOL_SCI 393-0 Human Genomics (1 Unit) This course will examine how the analysis of the human genome and its variation provides insight into diversity, human health and our evolutionary history. Prerequisite: BIOL_SCI 203-0 or BIOL_SCI 215-0. *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: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0, and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 301-0 to register for this course.

BIOL_SCI 396-0 Evolution and Diversity: Mushroom Genetics and Genomics (1 Unit) The occurrence of natural genetic variation is the raw material with which evolution has sculpted every species that has ever existed. In this laboratory-based course, students are immersed in the world of a widespread and biologically famous mushroom-forming fungus. Prerequisite: Students must have completed BIOL_SCI 203-0 or BIOL_SCI 215-0, and BIOL_SCI 202-0 or BIOL_SCI 219-0, and BIOL_SCI 301-0 to register for this course.

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. Prerequisites: BIOL_SCI 398-0 or BIOL_SCI 399-0, plus permission of instructor.

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. 27) and the degree requirements of their home school.

Course	Title
Program Courses (10.02 units)	
7 core courses (5.02 units):	
BIOL_SCI 201-0	Molecular Biology
BIOL_SCI 202-0	Cell Biology
BIOL_SCI 203-0	Genetics and Evolution
BIOL_SCI 232-0	Molecular and Cellular Processes Laboratory
BIOL_SCI 233-0	Genetics and Molecular Processes Laboratory
BIOL_SCI 234-0	Investigative Laboratory
BIOL_SCI 301-0	Principles of Biochemistry
2 300-level BIOL SCI Electives [1]	
3 courses from one of the concentration areas:	
Molecular Genetics and Genomics (p. 234)	
Cell and Developmental Biology (p. 234)	
Human Health and Disease (p. 234)	
Ecology, Evolution, and Conservation Biology (p. 235)	
Biochemistry and Biophysics (p. 235)	
Computational and Systems Biology (p. 235) [2]	
Molecular Neurobiology (p. 235)	
Interdisciplinary Biology (p. 235)	
Related Courses [3]	
CHEM 110-0 & CHEM 131-0 & CHEM 132-0	Quantitative Problem Solving in Chemistry and 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
CHEM 215-1 & CHEM 215-2	Organic Chemistry I and Organic Chemistry II
or CHEM 212-1 & CHEM 212-2	Organic Chemistry and Organic Chemistry
MATH 218-3	Single-Variable Calculus with Precalculus
or MATH 220-2	Single-Variable Integral Calculus
1 statistics course - STAT 202-0 or other approved course [4]	
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 BIOL_SCI 398-0 Tutorial in Biology and BIOL_SCI 399-0 Independent Research do not count as 300-level BIOL SCI Electives. Students doing the Computational and Systems Biology concentration and taking a 1.0 unit course to satisfy the coding requirement may use this in place of one of the required 300-level electives.

2 This concentration also has a programming competency requirement.

3 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. 237) and physics (p. 351) pages of this Catalog for more information.

4 The statistics related course requirement is waived for students who complete BIOL_SCI 337-0 Biostatistics.

Concentration Courses

Molecular Genetics and Genomics

Course	Title
Any three of the following courses:	
BIOL_SCI 332-0	Conservation Genetics
BIOL_SCI 341-0	Population Genetics
BIOL_SCI 353-0	Molecular Biology Laboratory
BIOL_SCI 354-0	Quantitative Analysis of Biology
BIOL_SCI 359-0	Quantitative Experimentation in Biology
BIOL_SCI 378-0	Functional Genomics
BIOL_SCI 390-0	Advanced Molecular Biology
BIOL_SCI 391-0	Developmental Biology
BIOL_SCI 392-0	Developmental Genetics Laboratory
BIOL_SCI 393-0	Human Genomics
BIOL_SCI 395-0	Molecular Genetics
BIOL_SCI 396-0	Evolution and Diversity: Mushroom Genetics and Genomics

Cell and Developmental Biology

Course	Title
Any three of the following courses:	
BIOL_SCI 310-0	Human Physiology
BIOL_SCI 315-0	Advanced Cell Biology
BIOL_SCI 319-0	Biology of Animal Viruses
BIOL_SCI 327-0	Biology of Aging
BIOL_SCI 328-0	Microbiology
BIOL_SCI 353-0	Molecular Biology Laboratory
BIOL_SCI 355-0	Immunobiology
BIOL_SCI 360-0	Principles of Cell Signaling
BIOL_SCI 377-0	The Human Microbiome
BIOL_SCI 380-0	Biology of Cancer
BIOL_SCI 381-0	Stem Cells and Regeneration
BIOL_SCI 390-0	Advanced Molecular Biology
BIOL_SCI 391-0	Developmental Biology
BIOL_SCI 392-0	Developmental Genetics Laboratory

Human Health and Disease

Course	Title
Any three of the following courses:	
BIOL_SCI 302-0	Fundamentals of Neurobiology
BIOL_SCI 310-0	Human Physiology
BIOL_SCI 319-0	Biology of Animal Viruses
BIOL_SCI 325-0	Animal Physiology
BIOL_SCI 327-0	Biology of Aging
BIOL_SCI 328-0	Microbiology
BIOL_SCI 344-0	Anatomy of Vertebrates
BIOL_SCI 353-0	Molecular Biology Laboratory
BIOL_SCI 355-0	Immunobiology
BIOL_SCI 358-0	Advanced Physiology Laboratory
BIOL_SCI 360-0	Principles of Cell Signaling
BIOL_SCI 377-0	The Human Microbiome
BIOL_SCI 380-0	Biology of Cancer
BIOL_SCI 381-0	Stem Cells and Regeneration

BIOL_SCI 391-0	Developmental Biology
BIOL_SCI 392-0	Developmental Genetics Laboratory

Ecology, Evolution, and Conservation Biology

Course	Title
Any three of the following courses:	
BIOL_SCI 332-0	Conservation Genetics
BIOL_SCI 333-0	Plant-Animal Interactions
BIOL_SCI 334-0	Soils and the Environment: The Earth's Critical Zone
BIOL_SCI 336-0	Spring Flora
BIOL_SCI 337-0	Biostatistics
BIOL_SCI 339-0	Critical Topics in Ecology and Conservation
BIOL_SCI 341-0	Population Genetics
BIOL_SCI 342-0	Evolutionary Processes
BIOL_SCI 344-0	Anatomy of Vertebrates
BIOL_SCI 346-0	Field Ecology
BIOL_SCI 347-0	Conservation Biology
BIOL_SCI 349-0	Community Ecology
BIOL_SCI 350-0	Plant Evolution and Diversity Lab

Biochemistry and Biophysics

Course	Title
Any three of the following courses:	
BIOL_SCI 323-0	Bioinformatics: Sequence and Structure Analysis
BIOL_SCI 338-0	Modeling Biological Dynamics
BIOL_SCI 353-0	Molecular Biology Laboratory
BIOL_SCI 360-0	Principles of Cell Signaling
BIOL_SCI 361-0	Protein Structure and Function
BIOL_SCI 363-0	Biophysics

Computational and Systems Biology

Course	Title
Coding requirement for this concentration may be satisfied by COMP_SCI 110-0, COMP_SCI 111-0, or NICO 101-0 plus NICO 102-0. One unit of programming coursework may substitute for one of the two required 300-level Biol Sci electives.	
Any three of the following courses:	
BIOL_SCI 323-0	Bioinformatics: Sequence and Structure Analysis
BIOL_SCI 337-0	Biostatistics
BIOL_SCI 338-0	Modeling Biological Dynamics
BIOL_SCI 354-0	Quantitative Analysis of Biology
BIOL_SCI 359-0	Quantitative Experimentation in Biology
BIOL_SCI 378-0	Functional Genomics
CHEM_ENG 379-0	Computational Biology: Analysis and Design of Living Systems
Selected sections of BIOL_SCI 345-0 and ES_APPM 495-0 are also eligible to be applied to this concentration. [5]	

[5] For example BIOL_SCI 345-0 may be applied towards the Computational and Systems Biology concentration when the topic is, "Principles & Methods in Systems Biology;" ES_APPM 495-0 may be applied when the topic is, "Introduction to the Analysis of RNA Sequencing Data."

Molecular Neurobiology

Course	Title
Any three of the following courses:	
BIOL_SCI 302-0	Fundamentals of Neurobiology
BIOL_SCI 303-0	Molecular Neurobiology
BIOL_SCI 305-0	Neurobiology Laboratory
BIOL_SCI 307-0	Brain Structure, Function, and Evolution
BIOL_SCI 325-0	Animal Physiology
BIOL_SCI 360-0	Principles of Cell Signaling
BIOL_SCI 391-0	Developmental Biology
BIOL_SCI 392-0	Developmental Genetics Laboratory

Interdisciplinary Biology

Customized concentration consisting of a thematic set of three, 300-level Biol Sci courses approved by the biology program. Interdisciplinary themes should be unique and distinct from already established concentrations.

Honors in Biological Sciences

Seniors may be recommended to the college for graduation with honors if they have completed BIOL_SCI 397-0 Senior Thesis Colloquium and at least one quarter of 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.

Majors with strong academic records and an interest in pursuing honors must complete BIOL_SCI 397-0 Senior Thesis Colloquium in Winter Quarter of Senior Year.

For more information consult the biological sciences website and see the Honors in the Major (p. 201).

Biological Sciences Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 27) 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. 309)). 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. 234) page. Note that if an ISP student is pursuing both a Biological Sciences and a Chemistry second major, it is allowable to co-count CHEM 212-2 Organic Chemistry toward both.

Course	Title
Required courses:	
CHEM 212-2	Organic Chemistry
Three courses for the chosen concentration in biological sciences	

Honors in Biological Sciences

Seniors may be recommended to the college for graduation with honors if they have completed BIOL_SCI 397-0 Senior Thesis Colloquium and at least one quarter of 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.

Majors with strong academic records and an interest in pursuing honors must complete BIOL_SCI 397-0 Senior Thesis Colloquium in Winter Quarter of Senior Year.

For more information consult the biological sciences website and see the Honors in the Major (p. 201).

Business Institutions

businessinstitutions.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. 236)

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 218-1 or MATH 220-1; 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 218-1 or MATH 220-1. *Historical Studies Distro Area*

BUS_INST 331-0 Real Estate Finance & Investment (1 Unit) An introduction to the fundamental concepts, principles, analytical methods and tools used for making investing and financing decisions regarding income producing properties. Topics covered include leases, cash flow-based real estate evaluation, property financing (debt), real estate private equity, and property taxation. Prerequisites: ECON 201-0, ECON 202-0, STAT 210-0 or equivalent, BUS_INST 304-0 or equivalent.

BUS_INST 394-LK Professional Linkage Seminar (1 Unit) Content varies. Possible topics include entrepreneurship, investment banking, business ethics, global marketing, sports marketing, and nonprofit management. Prerequisites vary.

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

Before declaring the minor students must complete the 4 prerequisite courses with a grade of C- or higher, or have equivalent AP course credit posted to their academic record.

See more details about the minor (p. 236). Interested students should consult a program adviser or visit the program office for additional information.

Requirements for the minor in Business Institutions

Course	Title
Prerequisites (4 units)	
ECON 201-0	Introduction to Macroeconomics
ECON 202-0	Introduction to Microeconomics
STAT 210-0	Introduction to Probability and Statistics (or equivalent) [1]
MATH 218-1	Single-Variable Calculus with Precalculus
or MATH 220-1	Single-Variable Differential Calculus
Minor Requirements (7 units) [2]	
4 business tools courses: [3]	
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) [4]
1 writing and speaking in business course: [5]	
ENGLISH 282-0	Writing and Speaking in Business
2 social sciences and humanities electives that have business institutions and practices as a central focus of inquiry, chosen from the list below. See the program website for newly approved courses and other updates.	

[1] 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, MATH 385-0 Probability and Statistics for MMSS, 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 and Data Science.

2 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.

3 With advance approval of the program director a total of only **one** non-Northwestern course, course credit from study abroad, or a course offered by Northwestern's School of Professional Studies (SPS) may count as a business tools course for the minor. Special accommodations may be made for transfer students.

4 Equivalents include ECON 360-1 Foundations of Corporate Finance Theory and KELLG_FE 310-0 Principles of Finance.

5 Students completing majors in 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.

Approved Social Science & Humanities courses for the minor

Course	Title
ANTHRO 240-0	Anthropology of Money
BUS_INST 321-0	Business and Economic Institutions in Historical Perspective
BUS_INST 331-0	Real Estate Finance & Investment
CHINESE 212-0	Chinese in Business Practice 1
CHINESE 312-1	Chinese in Business Practice 2
CHINESE 312-2	Multinational Corporations in China
COMM_ST 274-0	Power in Entertainment
ENGLISH 387-0	Studies in Literature and Commerce
FRENCH 309-0	French For Professions
GERMAN 209-0	German in the Business World
GERMAN 309-1	Advanced Business German: the German Economy
GERMAN 309-2	Advanced Business German: Marketing and Management
HISTORY 325-0	History of American Technology
ITALIAN 206-0	Business Italian
LEGAL_ST 206-0	Law and Society
LEGAL_ST 315-0	Corporation in US Law and Culture
PHIL 270-0	Climate Change and Sustainability: Economic and Ethical Dimensions
PHIL 364-0	Business and Professional Ethics
POLI_SCI 341-0	International Political Economy
POLI_SCI 348-0	Globalization
POLI_SCI 374-0	Politics of Capitalism
PSYCH 387-0	Consumer Psychology and Marketing Research
RTVF 310-0	Television History
RTVF 314-0	History of the Recording Industry
SOCIOL 206-0	Law and Society
SOCIOL 215-0	Economy and Society
SOCIOL 288-0	Institutions and Society
SOCIOL 302-0	Sociology of Organizations
SOCIOL 316-0	Economic Sociology
SOCIOL 324-0	Global Capitalism
SOCIOL 330-0	Law, Markets, and Globalization
SOCIOL 331-0	Markets, Hierarchies & Democracies
SOCIOL 335-0	Sociology of Rational Decision Making
SOC_POL 312-0	Social Policymaking and Implementation
SOC_POL 331-0	Economics of Inequality and Discrimination
SPANISH 206-0	Spanish for Professions: Business
STAT 301-1	Data Science 1 with R
STAT 301-2	Data Science 2 with R
STAT 301-3	Data Science 3 with R
Some variable-topic classes offered under ENGLISH, HISTORY, or HUM may also be applied; visit website or see adviser for details.	
One credit only may be from BUS_INST 394-LK, or internship-related credit, or ENTREP 3XX credit, or IMC 300-0.	
Excluding ECON 201-0 and ECON 202-0, economics courses may be applied to the Social Science & Humanities Electives by students who are NOT doing the major or the minor in economics. [1]	

1 Students earning a **minor** in economics may use ECON 300-level courses towards their Social Science & Humanities Elective requirement. Students earning a **major** in economics may **not** use any economics courses to fulfill their Social Science & Humanities Elective requirement.

Catholic Studies

A Minor in Catholic Studies (p. 373) is offered by the department of Religious Studies (p. 370).

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 non-science students.

The broad applicability of phenomena and rigorous methodology of chemistry provide a wide range of career options for students who pursue a major, minor, or advanced coursework in chemistry.

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 pre-health 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. 120) 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.

Chemistry for Pre-Health Students

Students who have completed any of the general chemistry course sequences, that is 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, are considered to have completed a full year of general chemistry.

Students who complete CHEM 215-1/CHEM 235-1 and CHEM 215-2/CHEM 235-2 will have covered all the fundamental organic chemistry topics required for preparation for the health professions. Students who take the chemistry major organic chemistry sequence must complete CHEM 212-1/CHEM 232-1, CHEM 212-2/CHEM 232-2 and CHEM 212-3/CHEM 235-3 to cover all these topics.

General Chemistry, Advanced Placement, and Course Credit

Entering students may receive credit in chemistry by means of the College Board's AP Chemistry examination or the International Baccalaureate HL Chemistry examination, but this does not dictate course placement. Course placement in Chemistry is determined by the department's placement assessment(s) taken on entry to Northwestern. Depending on their result on the department's placement assessment(s), students will be advised to register for 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
- Organic Chemistry, either CHEM 215-1 or CHEM 212-1

Students may not start any general chemistry sequence with CHEM 131-0, CHEM 152-0, or CHEM 172-0 regardless of their AP or IB credit. Questions should be directed to the Director of Undergraduate Studies in Chemistry.

Students may not retain AP/IB credit if they replace the credit by taking a course at an equal or lower level than the course credit earned from the AP/IB test 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, IB, 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, but co-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. 241)
- Chemistry Minor (p. 243)
- Chemistry Second Major for ISP Students (p. 243)
- Chemistry BA/MS (p. 244)

The laboratory components of general and organic chemistry courses require separate registration, but co-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 (0.5 Unit) For participants in Bridge I summer program. Developing facility with quantitative tools to solve problems in chemistry. Prerequisites: MATH 100-BR and HUM 100-1-BR.

CHEM 105-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

CHEM 110-0 Quantitative Problem Solving in Chemistry (1.34 Units) 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 110-SG Peer-Guided Study Group: Quantitative Problem Solving in Chemistry (0 Unit) Peer-guided study group for students enrolled in CHEM 110-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

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 131-SG Peer-Guided Study Group: General Chemistry 1 (0 Unit) Peer-guided study group for students enrolled in CHEM 131-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively

review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

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. Prerequisites: CHEM 131-0, CHEM 141-0 (C- or better). *Natural Sciences Distro Area*

CHEM 132-MG Midquarter Study Group: General Chemistry 2 (0 Unit) Peer-guided study group for students enrolled in CHEM 132-0. Meets weekly, starting at midquarter, in small groups with a peer facilitator to collaboratively review material, solve practice problems, and clarify concepts. Enrollment optional. Graded S/U.

CHEM 132-SG Peer-Guided Study Group: General Chemistry 2 (0 Unit) Peer-guided study group for students enrolled in CHEM 132-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

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 151-SG Peer-Guided Study Group: Accelerated General Chemistry 1 (0 Unit) Peer-guided study group for students enrolled in CHEM 151-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

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. Prerequisites: CHEM 151-0, CHEM 161-0 (C- or better). *Natural Sciences Distro Area*

CHEM 152-SG Peer-Guided Study Group: Accelerated General Chemistry 2 (0 Unit) Peer-guided study group for students enrolled in CHEM 152-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

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. *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 220-1. *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: department placement exam.

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, CHEM 181-0 (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. *Natural Sciences Distro Area*

CHEM 212-1 Organic Chemistry (1 Unit) Primarily for chemistry majors and students in ISP. Basic concepts of structure, stereochemistry, and reactivity of organic compounds. The chemistry of hydrocarbons and alcohols. Must be taken concurrently with 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. Must be taken concurrently with CHEM 232-1. *Natural Sciences Distro Area*

CHEM 212-2 Organic Chemistry (1 Unit) Primarily for chemistry majors and students in ISP. The chemistry of aromatic, carbonyl, and nitrogen compounds; characterization of organic substances by chemical and spectral methods; reaction mechanisms. No P/N registration. Must be taken concurrently with CHEM 232-2. Prerequisites: CHEM 212-1 and CHEM 232-1 (C- or better). Must be taken concurrently with CHEM 232-2. *Natural Sciences Distro Area*

CHEM 212-3 Organic Chemistry (1 Unit) Primarily for chemistry majors and students in ISP. The chemistry of poly-functional compounds of biological and medicinal interest. Modern organic syn-thesis, bioorganic chemistry, and recent developments in organic chemistry. No P/N registration. Must be taken concurrently with CHEM 235-3. Prerequisites: CHEM 212-2 and CHEM 232-2 (C- or better). Must be taken concurrently with CHEM 235-3. *Natural Sciences Distro Area*

CHEM 215-1 Organic Chemistry I (1 Unit) Foundational concepts in organic chemistry will be introduced. Topics include structure and properties of common functional groups, acidity/basicity, conformational analysis, stereochemistry, and reactivity of organic compounds. 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); or qualifying score on the Chemistry Placement Exam. Must be taken concurrently with CHEM 235-1. *Natural Sciences Distro Area*

CHEM 215-2 Organic Chemistry II (1 Unit) Fundamental concepts in organic chemistry will be covered. The topics will include important functional groups and will include: nomenclature, structure, properties, and multistep synthesis. Reaction mechanisms for organic transformations will be presented, and synthesis strategies will be covered. Prerequisite: Grade of C- or better in CHEM 215-1 and CHEM 235-1. Must be taken concurrently with CHEM 235-2. *Natural Sciences Distro Area*

CHEM 215-3 Advanced Organic Chemistry (1 Unit) Advanced concepts in modern organic chemistry will be introduced. The material will focus on recent developments in synthetic organic chemistry, including: concerted/pericyclic reactions, catalysis, green/environmental chemistry, automated synthesis, and combinatorial/screening methods. Prerequisite: Grade of C- or better in CHEM 215-2 and in CHEM 235-2. Must be taken concurrently with CHEM 235-3. *Natural Sciences Distro Area*

CHEM 215-SG-1 Peer-Guided Study Group: Organic Chemistry I (0 Unit) Peer-guided study group for students enrolled in CHEM 215-1. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

CHEM 215-SG-2 Peer-Guided Study Group: Organic Chemistry II (0 Unit) Peer-guided study group for students enrolled in CHEM 215-2. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

CHEM 215-SG-3 Peer-Guided Study Group: Organic Chemistry III (0 Unit) Peer-guided study group for students enrolled in CHEM 215-3. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

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. 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), or equivalent.

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. 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), or equivalent. Must be taken concurrently with CHEM 212-1.

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). Prerequisites: CHEM 212-1 and CHEM 232-1 (C- or better). Must be taken concurrently with CHEM 212-2.

CHEM 235-1 Organic Chemistry Lab I (0.34 Unit) Standard laboratory techniques in organic chemistry will be covered. Techniques will focus on the isolation and purification of organic compounds as well as the use of spectroscopic methods to determine identity and purity. 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 qualifying score on the Chemistry Placement Exam. Must be taken concurrently with CHEM 215-1.

CHEM 235-2 Organic Chemistry Lab II (0.34 Unit) Complete laboratory experiments focusing on standard synthetic organic chemistry will be conducted each week. Students will complete a prelab worksheet including stoichiometric calculations, prediction of reaction outcome, and identification of safety protocols. Prerequisite: Grade of C- or better in CHEM 215-1 and CHEM 235-1. Must be taken concurrently with CHEM 215-2.

CHEM 235-3 Advanced Organic Chemistry Lab (0.34 Unit) Current laboratory practices for organic synthesis will be introduced. Reactions will include mechanistically complex multi-step process for the preparation of compounds related to topical themes from academic research and industrial chemistry. Synthetic targets will include complex small molecules, polymers, and molecules of biological relevance. Prerequisite: Grade of C- or better in CHEM 215-2 and in CHEM 235-2. Must be taken concurrently with CHEM 215-3 or CHEM 212-3.

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 305-0 Chemistry of Life Processes (1 Unit) Topics in the chemistry and biochemistry of life processes. Taught with CHEM 405-0. Prerequisites: CHEM 215-2 or CHEM 212-3 (C- or better); 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 215-2 or CHEM 212-3 (C- or better); MATH 230-2; 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. Prerequisites: CHEM 215-3 or CHEM 212-3 (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. Prerequisite: 1 quarter of physical chemistry or consent of instructor.

CHEM 309-0 Polymer Chemistry (1 Unit) This course will cover the design and synthesis of polymers, including reaction mechanisms, characterization, and structure-property relationships. CHEM 309-0 is taught with CHEM 409-0. Prerequisites (for undergraduates only): CHEM 215-3 or CHEM 212-3 (C- or better); and one of the following courses: CHEM 307-0, CHEM 313-0, CHEM 319-0, CHEM 412-0, or CHEM 415-0.

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. Prerequisites: CHEM 215-3 or CHEM 212-3 (C- or better).

CHEM 314-0 Principles of Chemical Biology (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 215-3 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. Prerequisites: CHEM 215-3 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. Prerequisites: CHEM 215-3 or CHEM 212-3 (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 230-1; and PHYSICS 135-1 and PHYSICS 136-1. 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 230-1 (MATH 230-2 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 215-3 or CHEM 212-3, and CHEM 235-3 (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 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. Prerequisites: CHEM 215-3 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. 27) and the degree requirements of their home school.

Course	Title
Department Courses (16.7–18.04 units)	
14.7–16.04 core units providing a solid basis in chemistry	
CHEM 110-0	Quantitative Problem Solving in Chemistry
& CHEM 131-0	and General Chemistry 1
& CHEM 141-0	and General Chemistry Laboratory 1
& CHEM 132-0	and General Chemistry 2
& CHEM 142-0	and General Chemistry Laboratory 2
or CHEM 151-0	Accelerated General Chemistry 1
& CHEM 161-0	and Accelerated General Chemistry Laboratory 1
& CHEM 152-0	and Accelerated General Chemistry 2
& CHEM 162-0	and Accelerated General Chemistry Laboratory 2
or CHEM 171-0	Advanced General Inorganic Chemistry
& CHEM 181-0	and Advanced General Inorganic Chemistry
& CHEM 172-0	Laboratory
& CHEM 182-0	and Advanced General Physical Chemistry and Advanced General Physical Chemistry Laboratory
CHEM 220-0	Introductory Instrumental Analysis
CHEM 212-1	Organic Chemistry
& CHEM 232-1	and Organic Chemistry Laboratory I
& CHEM 212-2	and Organic Chemistry
& CHEM 232-2	and Organic Chemistry Laboratory II
& CHEM 212-3	and Organic Chemistry
& CHEM 235-3	and Advanced Organic Chemistry Lab
Students who complete the non-majors organic sequence CHEM 215-1, CHEM 215-2, and CHEM 215-3 with associated labs, and decide later to major in chemistry, are permitted to use these courses in place of the 212 sequence.	
CHEM 333-0	Inorganic Chemistry
CHEM 342-1	Thermodynamics
& CHEM 342-2	and Quantum Mechanics and Spectroscopy
& CHEM 342-3	and Kinetics and Statistical Thermodynamics

CHEM 350-1	Advanced Laboratory 1
& CHEM 350-2	and Advanced Laboratory 2
& CHEM 350-3	and Advanced Laboratory 3
2 courses from one of these concentration areas:	
Biochemistry (p. 242)	
Environmental Chemistry (p. 242)	
Inorganic Chemistry (p. 242)	
Organic Chemistry (p. 242)	
Physical Chemistry (p. 242)	
Materials/Nanotechnology (p. 242)	
Self-designed Concentration (p. 243)	
Related Courses (Units depend on mathematics courses taken.)	
BIOL_SCI 301-0	Principles of Biochemistry
or BIOL_SCI 241-0	Biochemistry, Molecular and Cell Biology - 2 for ISP
MATH 220-1	Single-Variable Differential Calculus
& MATH 220-2	and Single-Variable Integral Calculus
or MATH 218-1	Single-Variable Calculus with Precalculus
& MATH 218-2	and Single-Variable Calculus with Precalculus
& MATH 218-3	and Single-Variable Calculus with Precalculus
MATH 230-1	Multivariable Differential Calculus
& MATH 230-2	and Multivariable Integral Calculus
or MATH 281-1	Accelerated Mathematics for ISP. First Year
& MATH 281-2	and Accelerated Mathematics for ISP. First Year
or MATH 285-2	Accelerated Mathematics for MMSS: First Year
& MATH 285-3	and Accelerated Mathematics for MMSS: First Year
or MATH 290-2	MENU: Linear Algebra and Multivariable Calculus
& MATH 290-3	and MENU: Linear Algebra and Multivariable Calculus
or MATH 291-2	MENU: Intensive Linear Algebra and Multivariable
& MATH 291-3	Calculus
	and MENU: Intensive Linear Algebra and Multivariable Calculus
PHYSICS 125-1	General Physics ISP
& PHYSICS 125-2	and General Physics for ISP
& PHYSICS 125-3	and General Physics for ISP
& PHYSICS 126-1	and Physics for ISP Laboratory
& PHYSICS 126-2	and Physics for ISP Laboratory
& PHYSICS 126-3	and Physics for ISP Laboratory
or 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
or PHYSICS 140-1	Fundamentals of Physics
& PHYSICS 140-2	and Fundamentals of Physics
& PHYSICS 140-3	and Fundamentals of Physics
& PHYSICS 136-1	and General Physics Laboratory
& PHYSICS 136-2	and General Physics Laboratory
& PHYSICS 136-3	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	Principles of Chemical Biology
CHEM 316-0	Medicinal Chemistry: the Organic Chemistry of Drug Design and Action
CHEM 432-0	X-Ray Crystallography
BIOL_SCI 361-0	Protein Structure and Function

Environmental Chemistry

Course	Title
CHEM 306-0	Environmental Chemistry
CHEM 393-0	Green Chemistry
CHEM 445-0	Advanced Physical & Analytical Chemistry [1]
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

[1] Only applicable when class topic is "Chemistry of Alternate Energy"

Inorganic Chemistry

Course	Title
CHEM 302-0	Principles of Inorganic 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 309-0	Polymer Chemistry
CHEM 313-0	Advanced Organic Chemistry 1. Advanced concepts of organic reactivity and selectivity in synthesis.
CHEM 314-0	Principles of Chemical Biology
CHEM 316-0	Medicinal Chemistry: the Organic Chemistry of Drug Design and Action
CHEM 319-0	Advanced Organic Synthesis - Concepts and Applications
CHEM 410-0	Physical Organic Chemistry
CHEM 411-0	Organic Spectroscopy
CHEM 412-0	Organometallic Reaction Mechanisms
CHEM 415-0	Advanced Organic Chemistry

Physical Chemistry

Course	Title
CHEM 442-1	Quantum Chemistry
CHEM 442-2	Quantum Chemistry
CHEM 443-0	Kinetics and Spectroscopy
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 309-0	Polymer Chemistry
MAT_SCI 201-0	Introduction to Materials
MAT_SCI 301-0	Materials Science Principles

MAT_SCI 331-0	Soft 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 in Chemistry and see Honors in the Major (p. 201).

Honors Program in Medical Education Students

Chemistry majors who are also participating in the HPME program (p. 37) 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 full-credit courses [1]	

[1] Exclusive of CHEM 201-0 Chemistry of Nature and Culture, CHEM 398-0 Undergraduate Seminar, CHEM 399-0 Independent Study, or all 0.34-credit lab courses.

- Life science majors and premedical students are advised to take:

Course	Title
CHEM 215-1 & CHEM 235-1 & CHEM 215-2 & CHEM 235-2 & CHEM 215-3 & CHEM 235-3	Organic Chemistry I and Organic Chemistry Lab I and Organic Chemistry II and Organic Chemistry Lab II and Advanced Organic Chemistry and Advanced Organic Chemistry Lab
or CHEM 212-1 & CHEM 232-1 & CHEM 212-2 & CHEM 232-2 & CHEM 212-3 & CHEM 235-3	Organic Chemistry and Organic Chemistry Laboratory I and Organic Chemistry and Organic Chemistry Laboratory II and Organic Chemistry and Advanced Organic Chemistry Lab
3 additional Chemistry 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 Chemistry courses	

- Students with interests in materials science, earth and planetary science, or environmental science should take:

Course	Title
CHEM 215-1 & CHEM 235-1	Organic Chemistry I and Organic Chemistry Lab I
CHEM 215-2 & CHEM 235-2	Organic Chemistry II and Organic Chemistry Lab II
CHEM 333-0	Inorganic Chemistry
3 additional Chemistry 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. (https://www.chemistry.northwestern.edu/undergraduate/programs/advising-research.html)

Chemistry Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

The Integrated Science Program is a highly selective BA program in the Weinberg College of Arts and Sciences (see Integrated Science Program (p. 309)). 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 232-2 & CHEM 212-3 & CHEM 235-3	Organic Chemistry and Organic Chemistry Laboratory II and Organic Chemistry and Advanced Organic Chemistry Lab
CHEM 220-0	Introductory Instrumental Analysis

CHEM 333-0	Inorganic Chemistry
CHEM 350-1	Advanced Laboratory 1
& CHEM 350-2	and Advanced Laboratory 2
& CHEM 350-3	and Advanced Laboratory 3
Concentration	
Two courses from a selected concentration area in the Chemistry major [1]	

[1] See concentration areas and course lists on the Chemistry Major page (p. 241).

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 (p. 198), and at least 1 term of independent study.

Information about degree requirements can be found in the Graduate Catalog section describing the combined BA/MS program in Chemistry (https://catalogs.northwestern.edu/tgs/chemistry/chemistry-bach-mast/).

Undergraduate students interested in pursuing this program should contact the Director of Undergraduate Studies in Chemistry (https://www.chemistry.northwestern.edu/undergraduate/programs/advising-research.html).

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. 201) 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. 198).

CFS 291-0 Analysis of Field Experience (0.25-1 Unit) Online course for students who intern 10 to 40 hours a week in firms and organizations throughout the world. Requires students to read, reflect upon and discuss the structure and purpose of organizations as well as workplace inclusion, teamwork, productivity, and leadership styles. May be subject to internship course-credit limits; students should consult their academic adviser before applying.

CFS 387-0 Field Studies in Environment, Science, and Sustainability (1-4 Units) Explores theoretical, geographic, and historical stakes of environmental thought and practice with emphasis on Chicago-based environmental work. Students intern 10 to 40 hours a week. May be subject to internship course-credit limits; students should consult their academic adviser before applying. Maximum 1 unit may apply to Weinberg College distribution credit. *Social Behavioral Sciences Distro Area*

CFS 388-0 Field Studies in Business Culture (1-4 Units) Online course for students who intern 10 to 40 hours a week in firms and organizations throughout the world. Course focus on critical issues shaping business culture, especially pertaining to interns and internships. May be subject to internship course-credit limits; students should consult their academic adviser before applying. *Course Meets Online*

CFS 391-0 Field Studies in Social Justice (1-4 Units) Approaches to social change with focus on particular justice issues and current events. Students intern 10 to 40 hours a week in advocacy, policy, and social justice organizations. May be subject to internship course-credit limits; students should consult their academic adviser before applying. Maximum 1 unit may apply to Weinberg College distribution credit. *Social Behavioral Sciences Distro Area*

CFS 392-0 Field Studies in Public Health (1-4 Units) Explores foundational concepts and current issues in global and local Public Health, with emphasis on promoting health equity. Students earn 10 to 40 hours a week in health- and medicine-related organizations. May be subject to internship course-credit limits; students should consult their academic adviser before applying. Maximum 1 unit may apply to Weinberg College distribution credit. *Social Behavioral Sciences Distro Area*

CFS 393-0 Field Studies in the Modern Workplace (2-4 Units) Workplace culture and political theory of labor. Students intern 25 to 40 hours a week in a variety of professional fields. 2- or 3-credit enrollment option available only during summer session. May be subject to internship course-credit limits; students should consult their academic adviser before applying. Maximum 1 unit may apply to Weinberg College distribution credit. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *Social Behavioral Sciences Distro Area*

CFS 394-0 Legal Field Studies (2-4 Units) Contemporary issues and workplace culture in the legal field. Students intern 25 to 40 hours a week in legal organizations. 2- or 3-credit enrollment option available

only during summer session. May be subject to internship course-credit limits; students should consult their academic adviser before applying. Maximum 1 unit may apply to Weinberg College distribution credit. *Social Behavioral Sciences Distro Area*

CFS 395-0 Business Field Studies (2-4 Units) Contemporary issues and workplace culture in business. Students intern 25 to 40 hours a week in business organizations (primarily finance, consulting, and marketing). 2- or 3-credit enrollment option available only during summer session. May be subject to internship course-credit limits; students should consult their academic adviser before applying. Maximum 1 unit may apply to Weinberg College distribution credit. *Social Behavioral Sciences Distro Area*

CFS 397-0 Field Studies in Civic Engagement (1-4 Units) Forms of civic engagement with emphasis on local issues and approaches. Students intern 10 to 40 hours a week in civic, educational, legal, governmental, nonprofit, or community-based organizations. May be subject to internship course-credit limits; students should consult their academic adviser before applying. Maximum 1 unit may apply to Weinberg College distribution credit. *Social Behavioral Sciences Distro Area*

CFS 398-0 Field Studies in Humanities (1-4 Units) Labor issues through arts and cultural history, with emphasis on humanities, arts, and media in the public sphere. Students intern 10 to 40 hours a week in fields including but not limited to arts and cultural organizations. May be subject to internship course-credit limits; students should consult their academic adviser before applying. Maximum 1 unit may apply to Weinberg College distribution credit. *Literature Fine Arts Distro Area*

Chinese

See Asian Languages and Cultures (p. 223).

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 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

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, the summer program at the American School of Classical Studies in Athens, or Northwestern's own program Athens: Ancient Culture and Modern City (https://classics.northwestern.edu/undergraduate/study-abroad.html). 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: Rome
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. 247)
- Classics Minor Concentrations (p. 248)

See below for Courses with Readings in Greek (p. 246), and Courses with Readings in English (p. 246).

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. Prerequisite: 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. Prerequisite: 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. Prerequisite: 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.
Prerequisite: LATIN 201-3 or consent of instructor. May be repeated for credit with different topics.
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 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 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 301-0 Readings in Greek Literature (1 Unit)
Selected topics and authors including Homer, Plato, Euripides, and Greek lyric poetry.
Prerequisite: GREEK 201-3 or consent of instructor. May be repeated for credit with different topics.
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.

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. 198) *Literature Fine Arts Distro Area*

CLASSICS 211-0 Greek History and Culture: From Homer to Alexander the Great (1 Unit) An introduction to the history, culture, and peoples of the ancient Greek world from the age of Homer (c. 7th century BCE) to Alexander the Great (323 BCE). Daily life; political, social, artistic, and intellectual developments. Special attention paid to Athenian democracy as well as the politics of other city-states, including Sparta. Primary sources include texts, art, and archaeology. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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. 198) *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. 198) *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: The Amazons - Warrior Women of Greek Myth and History; The Archaeology of Pompeii, Herculaneum, and Stabiae. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *Literature Fine Arts Distro Area*

CLASSICS 310-SA Archaeology of the Ancient Mediterranean (1 Unit)
Study abroad version of Classics 310-0. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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: Sophokles and

Athens, The Foundation of Rome through Legends and Objects. *Historical Studies Distro Area*

CLASSICS 320-SA Greek and Roman History (1 Unit) Content varies; may be repeated for credit with different topic. Recent topics: Sophokles and Athens, The Foundation of Rome through Legends and Objects. *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. 198) *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 380-0 Classical Reception Studies: the Ancient Greco-Roman world in posterity (1 Unit) Content varies; may be repeated for credit with different topic. This course focuses on how Greek and Roman sources (texts, images, material objects, figures, practices) have been utilized by post-antiquity actors in a variety of media, such as art, architecture, literature, music, cinema, theater, popular culture, etc. to make meaning in and for their own times (later-antiquity to contemporary times). *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *Literature Fine Arts Distro Area*

CLASSICS 390-0 Topics in Greco-Roman Civilization (1 Unit) Content varies; may be repeated for credit with different topic. Recent topics: Materiality of Art and Archaeology of Roman Metals, Comparative Approaches to Ancient Empires.

CLASSICS 395-0 Research Seminar (1 Unit) Fundamental research skills through hands-on learning, and in-class work on an individual project. Students will learn how to use reference tools, allowing them to search, analyze and interpret literary texts, inscriptions, papyri and visual material. Course reflects current developments in Classics, and emphasizes digital approaches. 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. 198) *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. 27) 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 115-2	Introduction to Latin Literature and Accelerated Elementary Ancient and Biblical 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	Greek History and Culture: From Homer to Alexander the Great
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. 245)

[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	Greek History and Culture: From Homer to Alexander the Great
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. 245))
[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	Greek History and Culture: From Homer to Alexander the Great
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. 245))
[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 Director of Undergraduate Studies and submit an application form in junior year no later than the College reading period in Spring Quarter. Students should list a preliminary bibliography for the project approved by a faculty member who has agreed to serve as the thesis adviser. A one-page research proposal approved by the adviser is due at the end of the first week of the Fall Quarter of the senior year. The Honors Committee, consisting of the Director of Undergraduate Studies, the Honors Coordinator and a third Classics faculty member, will evaluate the proposal and vote on approval. During the fall and winter quarters of their senior year, students enroll in **CLASSICS 399-0**, Independent Study and complete a senior thesis. Students must be in residence during these terms. All honors theses are evaluated as passing or not-passing by the Honors Committee. Students whose theses and grades meet departmental criteria are recommended to the College for graduation with honors. For more information consult the **department website** or the director of undergraduate studies.

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. 245))

- 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 115-2 Accelerated Elementary Ancient and Biblical Greek, or equivalent placement (see Language Placement (p. 245))

- 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	Greek History and Culture: From Homer to Alexander the Great
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; theme 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 contact the Program Assistant (https://cogsci.northwestern.edu/people/staff.html).

Programs of Study

- Cognitive Science Major (p. 249)
- Cognitive Science Minor (p. 251)

COG_SCI 110-0 Introduction to Cognitive Science (1 Unit) Become familiar with and invested in cognitive science research, focusing on big themes in the study of the mind and mental representation, exemplified by interdisciplinary work conducted at Northwestern University. *Social Behavioral Sciences Distro Area*

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. POLI_SCI 212-0 and COG_SCI 202-0 are taught together; may not receive credit for both courses. *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 345-0 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 345-0 and COG_SCI 345-0 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. 27) and the degree requirements of their home school.

Course	Title
Major Requirements (14 units)	
4 required introductory courses:	
COG_SCI 110-0	Introduction to Cognitive Science
COMP_SCI 110-0	Introduction to Computer Programming
or COMP_SCI 111-0	Fundamentals of Computer Programming
STAT 202-0	Introduction to Statistics and Data Science
or PSYCH 201-0	Statistical Methods in Psychology
COG_SCI 202-0	Evaluating Evidence
1 required proseminar	
COG_SCI 366-0	Cognitive Science Proseminar
5 Theme courses, one from each of the five themes listed below.	
Theme: Brains & Bodies	
COG_SCI 210-0	Language and the Brain
LING 250-0	Sound Patterns in Human Language
MUS_THRY 251-0	Intro to Music Cognition
NEUROSCI 326-0	Neurobiology of Learning and Memory
PSYCH 221-0	Introduction to Neuroscience
Theme: Learning over Lifetimes	
COG_SCI 211-0	Learning, Representation & Reasoning
PSYCH 228-0	Cognitive Psychology
PSYCH 244-0	Developmental Psychology
Theme: Models & Machines	
COG_SCI 207-0	Introduction to Cognitive Modeling
COMP_SCI 348-0	Introduction to Artificial Intelligence
LING 260-0	Formal Analysis of Words & Sentences
LING 334-0	Introduction to Computational Linguistics
PHIL 225-0	Minds and Machines
PHIL 325-0	Philosophy of Mind
Theme: Reasoning & Rhetoric	
LING 270-0	Meaning
PHIL 255-0	Theory of Knowledge
POLI_SCI 335-0	Political Psychology
PSYCH 333-0	Psychology of Thinking
PSYCH 373-0	Decision Making
Theme: Collective Cognition	
ANTHRO 377-0	Psychological Anthropology
COG_SCI 345-0	Presenting Ideas & Data
LOC 214-0	Culture and Cognition

LOC 308-0	Redesigning Everyday Organizations
LOC 313-0	Learning and Thinking in Organizations
PSYCH 344-0	Cultural Psychology
4 Electives chosen from the Theme lists above or from the Electives listed below	

- Of the 9 Theme and Elective courses (5 Theme courses plus 4 Electives) at least five must be at the 300-level or above. Other 300- and 400-level courses beyond those listed here may be counted as Electives with consent of the cognitive science adviser.
- Independent study is strongly recommended. COG_SCI 399-0 or another independent study approved by the cognitive science adviser may count as an Elective course.
- For students pursuing honors, the second quarter Senior Thesis Seminar (COG_SCI 398-2) may count as an Elective course.
- At most 3 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.

Electives

Students following the major requirements in this catalog year may chose any of the elective courses listed below regardless of academic area. Students following requirements in a prior catalog year should refer to that catalog for the required allocation of courses among designated advanced elective areas.

Elective Courses

Course	Title
ANTHRO 360-0	Language and Culture
ANTHRO 361-0	Talk as Social Action
ANTHRO 389-0	Ethnographic Methods and Analysis
BIOL_SCI 302-0	Fundamentals of Neurobiology
CSD 301-0	Anatomy and Physiology of the Vocal Mechanism
CSD 302-0	Anatomy and Physiology of the Peripheral Hearing Mechanism
CSD 303-0	Brain and Cognition
CSD 306-0	Psychoacoustics
CSD 309-0	Culture, Language and Learning
CSD 310-0	Biological Foundations of Speech and Music
CSD 342-0	Language and Cognition in Atypical Development
CSD 373-0	Introduction to Learning Disabilities
CSD 376-0	Diagnostic & Remedial Approaches for Children With Learning Problems
CSD 382-0	Autism Spectrum Disorder
CSD 388-0	Attention Deficit Disorder and Related Disorders
CSD 392-0	Language Development and Usage
CSD 406-0	Medical Aspects of Audiology
CSD 444-0	Development and Disorders of Mathematics
CSD 457-0	Language Science
COMP_SCI 325-1	Artificial Intelligence Programming
COMP_SCI 337-0	Natural Language Processing
COMP_SCI 338-0	Practicum in Intelligent Information Systems
COMP_SCI 344-0	Design of Computer Problem Solvers
COMP_SCI 349-0	Machine Learning
COMP_SCI 371-0	Knowledge Representation and Reasoning
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages
ECON 330-0	Behavioral Economics
LING 300-0	Topics in Linguistics
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 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 370-0	Fundamentals of Meaning
LING 371-0	Reference
LING 372-0	Pragmatics
LING 373-0	Implicature
LING 450-1	Laboratory Phonology I
LING 460-2	Syntactic Analysis II
LRN_SCI 301-0	Design of Learning Environments
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
MUSIC_ED 437-0	Psychology of Music Teaching & Learning
NEUROSCI 320-0	Animal Behavior
NEUROSCI 360-0	Neuroscience of Brain Disorders
NEUROSCI 377-0	Neurobiology of Sensation and Perception
PHIL 250-0	Elementary Logic II
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
PSYCH 324-0	Perception
PSYCH 327-0	Brain and Cognition
PSYCH 328-0	Brain Damage and the Mind
PSYCH 336-0	Consciousness
PSYCH 370-0	Cognitive Development
PSYCH 372-0	Language and Cognition
PSYCH 374-0	Human Memory
PSYCH 461-0	Reasoning and Representation
PSYCH 466-0	Analogy and Similarity
Also relevant sections of:	
ANTHRO 390-0	Topics In Anthropology
CSD 369-0	Special Topics in Communication Sciences and Disorders
COMP_SCI 396-0	Special Topics in Computer Science
LRN_SCI 451-0	Topics in Learning Sciences
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
PHIL 410-0	Seminar: Special Topics in Philosophy
PHIL 426-0	Seminar in Philosophy of Mind
PSYCH 391-0	Advanced Seminar in Cognition or Neuroscience

PSYCH 460-0	Special Topics in Cognition
PSYCH 470-0	Topics in Brain, Behavior, and Cognition

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. 201) 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 required introductory courses:	
COG_SCI 110-0	Introduction to Cognitive Science
COG_SCI 202-0	Evaluating Evidence
1 methodology course chosen from:	
COMP_SCI 110-0	Introduction to Computer Programming
COMP_SCI 111-0	Fundamentals of Computer Programming
PSYCH 201-0	Statistical Methods in Psychology
STAT 202-0	Introduction to Statistics and Data Science
3 Theme courses, each selected from a different one of the five themes listed below	
Theme: Brains & Bodies	
COG_SCI 210-0	Language and the Brain
LING 250-0	Sound Patterns in Human Language
MUS_THRY 251-0	Intro to Music Cognition
NEUROSCI 326-0	Neurobiology of Learning and Memory
PSYCH 221-0	Introduction to Neuroscience
Theme: Learning over Lifetimes	
COG_SCI 211-0	Learning, Representation & Reasoning
PSYCH 228-0	Cognitive Psychology
PSYCH 244-0	Developmental Psychology
Theme: Models & Machines	
COG_SCI 207-0	Introduction to Cognitive Modeling
COMP_SCI 348-0	Introduction to Artificial Intelligence
LING 260-0	Formal Analysis of Words & Sentences
LING 334-0	Introduction to Computational Linguistics
PHIL 225-0	Minds and Machines
PHIL 325-0	Philosophy of Mind
Theme: Reasoning & Rhetoric	
LING 270-0	Meaning
PHIL 255-0	Theory of Knowledge
POLI_SCI 335-0	Political Psychology
PSYCH 333-0	Psychology of Thinking
PSYCH 373-0	Decision Making
Theme: Collective Cognition	
ANTHRO 377-0	Psychological Anthropology
COG_SCI 345-0	Presenting Ideas & Data
LOC 214-0	Culture and Cognition
LOC 308-0	Redesigning Everyday Organizations
LOC 313-0	Learning and Thinking in Organizations
PSYCH 344-0	Cultural Psychology
2 Elective courses [1]	

[1] Elective courses can be chosen from the Theme lists above or from the Elective Courses list shown under the Cognitive Science major (p. 249).

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. 253)
- World Literature Minor (p. 253)
- Comparative Literary Studies BA/MA (p. 254)

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. 27) 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
    a. 2 courses in first language, at least one 300-level
    b. 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:
    a. Poetry
    b. Drama & Performance
    c. Narrative
    d. Film & Visual Studies
- **Period**: Two courses in each of two broad periods:
    a. Pre-1830
    b. 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. 201).

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.

Information about degree requirements can be found in the Graduate Catalog section describing the combined BA/MA program in Comparative Literary Studies (https://catalogs.northwestern.edu/tgs/comparative-literary-studies/comparative-literary-studies-bach-mast/).

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 Computer Science. The computer science requirements are identical in the two programs. Faculty and courses for the program are drawn from the McCormick CS 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 CS department and its course offerings, see the McCormick School chapter of this catalog (p. 153), or the CS web site (https://www.mccormick.northwestern.edu/computer-science/). Students are urged to speak regularly with advisers and to consult the CS website for a detailed curriculum document.

Programs of Study

- Computer Science Major (p. 254)
- Computer Science Minor (Weinberg College) (p. 256)
- Computer Science Second Major for ISP Students (p. 257)
- Computer Science BA/MS (p. 258)

These courses are offered by the Robert R. McCormick School of Engineering and Applied Sciences. See Computer Science (p. 153).

Computer Science Major

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Course	Title
Program Courses (19 units)	
6 core courses:	
COMP_SCI 111-0	Fundamentals of Computer Programming [1]
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
COMP_SCI 211-0	Fundamentals of Computer Programming II
COMP_SCI 212-0	Mathematical Foundations of Comp Science
COMP_SCI 213-0	Introduction to Computer Systems
COMP_SCI 214-0	Data Structures & Algorithms
5 breadth courses (see below)	
2 project courses (see below)	
6 technical electives (see below)	
Related Courses (Units depend on mathematics sequence taken.)	
Mathematics (p. 256)	
Probability and Statistics (p. 256)	
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 COMP_SCI 110-0 Introduction to Computer Programming, ideally in the Python programming language.

Breadth Courses

Majors must take one course from each area. Minors must take one course from each of any three areas.

Theory

Course	Title
COMP_SCI 335-0	Introduction to the Theory of Computation
COMP_SCI 336-0	Design & Analysis of Algorithms

Systems

Course	Title
COMP_SCI 322-0	Compiler Construction
COMP_SCI 339-0	Introduction to Database Systems
COMP_SCI 340-0	Introduction to Networking
COMP_SCI 343-0	Operating Systems
COMP_SCI 345-0	Distributed Systems
COMP_SCI 350-0	Introduction to Computer Security
COMP_SCI 354-0	Computer System Security
COMP_SCI 440-0	Advanced Networking
COMP_SCI 441-0	Resource Virtualization
COMP_SCI 443-0	Advanced Operating Systems
COMP_SCI 446-0	Kernel and Other Low-level Software Development
COMP_SCI 450-0	Internet Security
COMP_ENG 303-0	Advanced Digital Design
COMP_ENG 346-0	Microprocessor System Design
COMP_ENG 358-0	Introduction to Parallel Computing
COMP_ENG 361-0	Computer Architecture I

Artificial Intelligence

Course	Title
COMP_SCI 325-1	Artificial Intelligence Programming
COMP_SCI 337-0	Natural Language Processing
COMP_SCI 344-0	Design of Computer Problem Solvers
COMP_SCI 348-0	Introduction to Artificial Intelligence
COMP_SCI 349-0	Machine Learning
COMP_SCI 371-0	Knowledge Representation and Reasoning
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages

Interfaces

Course	Title
COMP_SCI 329-0	HCI Studio
COMP_SCI 313-0	Tangible Interaction Design and Learning
COMP_SCI 315-0	Design, Technology, and Research
COMP_SCI 330-0	Human Computer Interaction
COMP_SCI 331-0	Introduction to Computational Photography
COMP_SCI 333-0	Interactive Information Visualization
COMP_SCI 351-1	Introduction to Computer Graphics
COMP_SCI 352-0	Machine Perception of Music & Audio
COMP_SCI 370-0	Computer Game Design
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages
COMP_SCI 376-0	Computer Game Design and Development
COMP_SCI 377-0	Game Design Studio
ELEC_ENG 332-0	Introduction to Computer Vision

Software Development and Programming Languages

Course	Title
COMP_SCI 310-0	Scalable Software Architectures
COMP_SCI 321-0	Programming Languages
COMP_SCI 338-0	Practicum in Intelligent Information Systems
COMP_SCI 377-0	Game Design Studio
COMP_SCI 393-0	Software Construction
COMP_SCI 394-0	Agile Software Development
COMP_SCI 473-1	NUvention: Web - Part 1
COMP_SCI 473-2	NUvention: Web - Part 2

Project Courses

Majors must take two courses from this list.

Project course list

Course	Title
COMP_SCI 311-0	Inclusive Making
COMP_SCI 315-0	Design, Technology, and Research
COMP_SCI 322-0	Compiler Construction
COMP_SCI 329-0	HCI Studio
COMP_SCI 330-0	Human Computer Interaction
COMP_SCI 331-0	Introduction to Computational Photography
COMP_SCI 337-0	Natural Language Processing
COMP_SCI 338-0	Practicum in Intelligent Information Systems
COMP_SCI 339-0	Introduction to Database Systems
COMP_SCI 340-0	Introduction to Networking
COMP_SCI 343-0	Operating Systems
COMP_SCI 344-0	Design of Computer Problem Solvers
COMP_SCI 345-0	Distributed Systems
COMP_SCI 351-1	Introduction to Computer Graphics
COMP_SCI 351-2	Intermediate Computer Graphics
COMP_SCI 354-0	Computer System Security
COMP_SCI 355-0	Digital Forensics and Incident Response
COMP_SCI 367-0	Wireless and Mobile Health: Passive Sensing Data Analytics
COMP_SCI 370-0	Computer Game Design
COMP_SCI 371-0	Knowledge Representation and Reasoning
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages
COMP_SCI 377-0	Game Design Studio
COMP_SCI 393-0	Software Construction
COMP_SCI 394-0	Agile Software Development
COMP_SCI 397-0	Special Projects in Computer Science
COMP_SCI 441-0	Resource Virtualization
COMP_SCI 446-0	Kernel and Other Low-level Software Development
COMP_SCI 450-0	Internet Security
COMP_SCI 473-2	NUvention: Web - Part 2
COMP_SCI 497-0	Special Projects in Computer Science
COMP_ENG 366-0	Embedded Systems
COMP_ENG 466-0	Embedded Systems
ELEC_ENG 332-0	Introduction to Computer Vision

Technical electives

Majors must take six technical electives. **Any 300- or 400-level COMP_SCI course** may be taken as a technical elective. In addition the following courses may also be taken as technical electives:

Additional technical electives

Course	Title
COMP_ENG 303-0	Advanced Digital Design
COMP_ENG 329-0	The Art of Multicore Concurrent Programming
COMP_ENG 334-0	Fundamentals of Blockchains and Decentralization
COMP_ENG 346-0	Microprocessor System Design
COMP_ENG 355-0	ASIC and FPGA Design
COMP_ENG 356-0	Introduction to Formal Specification & Verification
COMP_ENG 357-0	Design Automation in VLSI
COMP_ENG 358-0	Introduction to Parallel Computing
COMP_ENG 361-0	Computer Architecture I
COMP_ENG 362-0	Computer Architecture Projects
COMP_ENG 365-0	Internet-of-things Sensors, Systems, And Applications
COMP_ENG 366-0	Embedded Systems
COMP_ENG 368-0	Programming Massively Parallel Processors with CUDA
COMP_ENG 452-0	Adv Computer Architecture
COMP_ENG 453-0	Parallel Architectures
COMP_ENG 456-0	Modern Topics in Computer Architecture
COMP_ENG 459-0	VLSI Algorithmics
COMP_ENG 465-0	Internet-of-things Sensors, Systems, And Applications
COMP_ENG 466-0	Embedded Systems
COMP_ENG 468-0	Programming Massively Parallel Processors with CUDA
ELEC_ENG 332-0	Introduction to Computer Vision
ELEC_ENG 375-0	Machine Learning: Foundations, Applications, and Algorithms
ELEC_ENG 433-0	Statistical Pattern Recognition

ELEC_ENG 435-0	Deep Learning: Foundations, Applications, and Algorithms

Related Courses

Mathematics

Course	Title
MATH 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus
or MATH 218-1 & MATH 218-2 & MATH 218-3	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
MATH 230-1	Multivariable Differential Calculus
or MATH 228-1	Multivariable Differential Calculus for Engineering
MATH 240-0	Linear Algebra

Probability and Statistics[1]

Course	Title
IEMS 201-0	Introduction to Statistics
or STAT 210-0	Introduction to Probability and Statistics
or MATH 310-1	Probability and Stochastic Processes

[1] STAT 202-0 Introduction to Statistics and Data Science is not accepted.

Note

Many courses are eligible to count toward more than one requirement for the major; for example, all breadth courses are also technical elective courses. A student who completes such a course must choose which requirement 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. 201).

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 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus
or MATH 218-1 & MATH 218-2 & MATH 218-3	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
MATH 230-1	Multivariable Differential Calculus
or MATH 228-1	Multivariable Differential Calculus for Engineering
MATH 240-0	Linear Algebra
Minor Requirements (9 units)	
6 core courses	
COMP_SCI 111-0	Fundamentals of Computer Programming [1]
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
COMP_SCI 211-0	Fundamentals of Computer Programming II
COMP_SCI 212-0	Mathematical Foundations of Comp Science
COMP_SCI 213-0	Introduction to Computer Systems
COMP_SCI 214-0	Data Structures & Algorithms
3 breadth courses in 3 separate breadth areas (see below)	

[1] Students without programming experience may want to first take COMP_SCI 110-0 Introduction to Computer Programming, ideally in the Python programming language.

Breadth Courses

Majors must take one course from each area. Minors must take one course from each of any three areas.

Theory

Course	Title
COMP_SCI 335-0	Introduction to the Theory of Computation
COMP_SCI 336-0	Design & Analysis of Algorithms

Systems

Course	Title
COMP_SCI 322-0	Compiler Construction
COMP_SCI 339-0	Introduction to Database Systems
COMP_SCI 340-0	Introduction to Networking
COMP_SCI 343-0	Operating Systems
COMP_SCI 345-0	Distributed Systems
COMP_SCI 350-0	Introduction to Computer Security
COMP_SCI 354-0	Computer System Security
COMP_SCI 440-0	Advanced Networking
COMP_SCI 441-0	Resource Virtualization
COMP_SCI 443-0	Advanced Operating Systems
COMP_SCI 446-0	Kernel and Other Low-level Software Development
COMP_SCI 450-0	Internet Security
COMP_ENG 303-0	Advanced Digital Design
COMP_ENG 346-0	Microprocessor System Design
COMP_ENG 358-0	Introduction to Parallel Computing
COMP_ENG 361-0	Computer Architecture I

Artificial Intelligence

Course	Title
COMP_SCI 325-1	Artificial Intelligence Programming
COMP_SCI 337-0	Natural Language Processing
COMP_SCI 344-0	Design of Computer Problem Solvers
COMP_SCI 348-0	Introduction to Artificial Intelligence
COMP_SCI 349-0	Machine Learning
COMP_SCI 371-0	Knowledge Representation and Reasoning
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages

Interfaces

Course	Title
COMP_SCI 329-0	HCI Studio
COMP_SCI 313-0	Tangible Interaction Design and Learning
COMP_SCI 315-0	Design, Technology, and Research
COMP_SCI 330-0	Human Computer Interaction
COMP_SCI 331-0	Introduction to Computational Photography
COMP_SCI 333-0	Interactive Information Visualization

COMP_SCI 351-1	Introduction to Computer Graphics
COMP_SCI 352-0	Machine Perception of Music & Audio
COMP_SCI 370-0	Computer Game Design
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages
COMP_SCI 376-0	Computer Game Design and Development
COMP_SCI 377-0	Game Design Studio
ELEC_ENG 332-0	Introduction to Computer Vision

Software Development and Programming Languages

Course	Title
COMP_SCI 310-0	Scalable Software Architectures
COMP_SCI 321-0	Programming Languages
COMP_SCI 338-0	Practicum in Intelligent Information Systems
COMP_SCI 377-0	Game Design Studio
COMP_SCI 393-0	Software Construction
COMP_SCI 394-0	Agile Software Development
COMP_SCI 473-1	NUvention: Web - Part 1
COMP_SCI 473-2	NUvention: Web - Part 2

Students should begin the minor before the end of the first quarter of their junior year.

Computer Science Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

The Integrated Science Program is a highly selective program in Weinberg College. Weinberg College students, but not McCormick students, majoring in Integrated Science may complete an abbreviated, adjunct major in computer science through a curriculum tailored specifically to their needs:

Course	Title
Core courses	
COMP_SCI 111-0	Fundamentals of Computer Programming
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
COMP_SCI 211-0	Fundamentals of Computer Programming II
COMP_SCI 212-0	Mathematical Foundations of Comp Science
COMP_SCI 213-0	Introduction to Computer Systems
COMP_SCI 214-0	Data Structures & Algorithms
Breadth courses (same as for stand-alone major: 5 courses, one from each area, see below)	
Project courses (2 units; projects must be approved by both ISP and CS advisers)	
COMP_SCI 399-0	Projects
or INTG_SCI 398-0	Undergraduate Research

Breadth Courses

Majors must take one course from each area. Minors must take one course from each of any three areas.

Theory

Course	Title
COMP_SCI 335-0	Introduction to the Theory of Computation
COMP_SCI 336-0	Design & Analysis of Algorithms

Systems

Course	Title
COMP_SCI 322-0	Compiler Construction
COMP_SCI 339-0	Introduction to Database Systems
COMP_SCI 340-0	Introduction to Networking
COMP_SCI 343-0	Operating Systems
COMP_SCI 345-0	Distributed Systems
COMP_SCI 350-0	Introduction to Computer Security
COMP_SCI 354-0	Computer System Security
COMP_SCI 440-0	Advanced Networking
COMP_SCI 441-0	Resource Virtualization
COMP_SCI 443-0	Advanced Operating Systems
COMP_SCI 446-0	Kernel and Other Low-level Software Development
COMP_SCI 450-0	Internet Security
COMP_ENG 303-0	Advanced Digital Design
COMP_ENG 346-0	Microprocessor System Design
COMP_ENG 358-0	Introduction to Parallel Computing
COMP_ENG 361-0	Computer Architecture I

Artificial Intelligence

Course	Title
COMP_SCI 325-1	Artificial Intelligence Programming
COMP_SCI 337-0	Natural Language Processing
COMP_SCI 344-0	Design of Computer Problem Solvers
COMP_SCI 348-0	Introduction to Artificial Intelligence
COMP_SCI 349-0	Machine Learning
COMP_SCI 371-0	Knowledge Representation and Reasoning
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages

Interfaces

Course	Title
COMP_SCI 329-0	HCI Studio
COMP_SCI 313-0	Tangible Interaction Design and Learning
COMP_SCI 315-0	Design, Technology, and Research
COMP_SCI 330-0	Human Computer Interaction
COMP_SCI 331-0	Introduction to Computational Photography
COMP_SCI 333-0	Interactive Information Visualization
COMP_SCI 351-1	Introduction to Computer Graphics
COMP_SCI 352-0	Machine Perception of Music & Audio
COMP_SCI 370-0	Computer Game Design
COMP_SCI 372-0	Designing and Constructing Models with Multi-Agent Languages
COMP_SCI 376-0	Computer Game Design and Development
COMP_SCI 377-0	Game Design Studio
ELEC_ENG 332-0	Introduction to Computer Vision

Software Development and Programming Languages

Course	Title
COMP_SCI 310-0	Scalable Software Architectures
COMP_SCI 321-0	Programming Languages
COMP_SCI 338-0	Practicum in Intelligent Information Systems
COMP_SCI 377-0	Game Design Studio
COMP_SCI 393-0	Software Construction
COMP_SCI 394-0	Agile Software Development

COMP_SCI 473-1	NUvention: Web - Part 1
COMP_SCI 473-2	NUvention: Web - Part 2

Computer Science BA/MS

Information about degree requirements can be found in the Graduate Catalog section describing the combined Bachelor's/MS in Computer Science (https://catalogs.northwestern.edu/tgs/computer-science/computer-science-bach-mast/).

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 Reading Group (https://criticaltheory.northwestern.edu/undergraduate/research-workshop.html), students pursuing the minor benefit from an active undergraduate research culture. The minor is associated with Northwestern's Critical Theory Cluster (https://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 (https://gloapp.northwestern.edu/?FuseAction=Programs.ViewProgramAngular&id=10037).

Program of Study

- Critical Theory Minor (p. 258)

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 prior to registration. 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.

Data Science

See Statistics and Data Science (p. 392).

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. 260)
- Earth and Planetary Sciences Minor (p. 262)
- Earth and Planetary Sciences Second Major for ISP Students (p. 262)

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 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 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 180-0 Fantasy Worlds – How to Build Your Own Planet (1 Unit) The formation and evolution of rocky planets. Introduction of physical concepts common in the lives of planets as they are in our everyday lives: gravity, heat transport, magnetism, and others. Students will apply these concepts to build their own unique planet, and will present their creation at a culminating poster presentation. *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.
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 Physics of Weather & Climate (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 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. Recommended Background: EARTH 201-0 (concurrent enrollment acceptable) and first-year chemistry.
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 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).

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Major Requirements: Department Courses (12 Units)

4 200-level Core EARTH 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 EARTH Courses (8 units)

Advanced studies courses are divided into seven sub-disciplines and three skill areas, as listed below. Students must take at least one course from four of the seven Sub-Discipline Requirement lists below, and at least one course from each of the three Skills Requirement lists below. Additional advanced studies courses to the required total of eight may be any EARTH 300- or 400-level course, but only one EARTH 399-0 Independent Study may be counted toward the major. Consult with the Director of Undergraduate Studies (DUS) regarding EARTH 390-0 Special Topics in Earth and Planetary Science courses that may meet Sub-Discipline or Skills requirements. In certain cases, the DUS may approve

additional eligible courses for the Sub-Discipline and Skills Requirement course lists.

Sub-Discipline Requirement (4 courses)

Students must take at least one course from four of the following seven sub-disciplines.

Earth Materials

Course	Title
EARTH 300-0	Earth and Planetary Materials
EARTH 301-0	Petrology: Evolution of Crustal and Mantle Rocks

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	Physics of Weather & Climate
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

Skills Requirement (3 courses)

Students must take at least one course from each of the following three skill areas. No course may be counted in more than one skills category.

Quantitative

Course	Title
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	Scientific Programming in Python
EARTH 390-0	Special Topics in Earth and Planetary Science (when Level 2 geographic information systems is the topic)

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	Scientific Programming in Python

Major Requirements: Related Courses (9.34-12.04 Units)

Math Courses (3-4 courses)

Students must take the following math requirements, for a total of three units if the MATH 220 sequence is selected, or a total of four units if the MATH 218 sequence is selected.

Course	Title
MATH 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus
or MATH 218-1 & MATH 218-2 & MATH 218-3	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
MATH 226-0	Sequences and Series
or MATH 230-1	Multivariable Differential Calculus
or MATH 240-0	Linear Algebra

or equivalent

6 Additional Related Math and Science Courses

Students must take six courses (and their associated lab, if applicable) from the following options, with maximum three in any one subject.[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
CHEM 215-1 & CHEM 235-1	Organic Chemistry I and Organic Chemistry Lab I

CHEM 215-2 & CHEM 235-2	Organic Chemistry II and Organic Chemistry Lab II
CHEM 215-3 & CHEM 235-3	Advanced Organic Chemistry and Advanced Organic Chemistry Lab
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 201-0	Molecular Biology
BIOL_SCI 202-0 & BIOL_SCI 232-0	Cell Biology and Molecular and Cellular Processes Laboratory
BIOL_SCI 203-0 & BIOL_SCI 233-0	Genetics and Evolution and Genetics and Molecular Processes Laboratory
MATH 226-0	Sequences and Series
MATH 230-2	Multivariable Integral Calculus
or MATH 228-2	Multivariable Integral Calculus for Engineering
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.

Honors in Earth and Planetary Sciences

Majors with strong academic records and an interest in pursuing honors should discuss possible research projects with a faculty member and/or the director of undergraduate studies (DUS) early in their undergraduate career, but no later than spring quarter of their junior year. After the chosen faculty mentor approves a proposed project, research is conducted and students must complete at least two quarters of EARTH 399-0 Independent Study; only one quarter may count towards major requirements. To earn the honors distinction, students must complete a thesis following the guidance provided in guidelines published on the department webpage.

Students whose grades, research, and written thesis meet departmental criteria are recommended to the college for graduation with honors. For more information, students should consult the director of undergraduate studies and see Honors in the Major (p. 201).

Earth and Planetary Sciences Minor

The minor offers students in any major outside the department a flexible path to improved knowledge of earth and planetary sciences.

Minor Requirements (6 units)

- Two courses from EARTH 201-0, EARTH 202-0, or EARTH 203-0.
- Four 300-level EARTH courses, of which only one EARTH 399-0 or 400-level course may be substituted with permission from the Director of Undergraduate Studies.

Earth and Planetary Sciences Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Second Major for ISP Student Requirements (5 units beyond ISP requirements):

The Integrated Science Program (ISP) is a highly selective program within Weinberg College. Students majoring in ISP who wish also to complete a major in Earth and Planetary Sciences must fulfill the following requirements (which replace the usual major requirements of the Earth and Planetary Sciences Major (p. 260)):

- 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
- Three 300-level EARTH courses (excluding EARTH 399-0), including at least one from the Analytical/Instrumentation/Field or Spatial Reasoning Skills Requirement lists on the Earth and Planetary Sciences Major page (p. 260)
- One 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. 120) 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. 265)
- Economics Minor (p. 266)
- Economics BA/MA (p. 267)

ECON 100-BR Introduction to Problem-Solving in Economics (0.5 Unit) For participants in Bridge I summer program. Developing facility with quantitative tools to solve problems in Economics. Prerequisites: MATH 100-BR and HUM 100-1-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 201-MG Midquarter Study Group: ECON 201 Introduction to Macroeconomics (0 Unit) Peer-guided study group for students enrolled in ECON 201-0. Meets weekly, starting at midquarter, in small groups with a peer facilitator to collaboratively review material, solve practice problems, and clarify concepts. Enrollment optional. Graded S/U.

ECON 201-SG Peer-Guided Study Group: Introduction to Macroeconomics (0 Unit) Peer-guided study group for students enrolled in ECON 201-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

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 202-SG Peer-Guided Study Group: Introduction to Microeconomics (0 Unit) Peer-guided study group for students enrolled in ECON 202-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

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 220-1.

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 220-1, STAT 210-0 or higher level statistics class.

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 220-1.
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 310-SG-1 Peer-Guided Study Group: Microeconomics I (0 Unit)
Peer-guided study group for students enrolled in ECON 310-1. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

ECON 310-SG-2 Peer-Guided Study Group: Microeconomics II (0 Unit)
Peer-guided study group for students enrolled in ECON 310-2. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

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 220-1.
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 220-2, MATH 230-1.

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.
Prerequisites: ECON 281-0, ECON 310-1, ECON 311-0. ECON 323-1 is not a prerequisite.

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 333-0 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 281-0, Econ 310-1, Econ 310-2. SOC_POL 330-0 and ECON 333-0 are taught together; may not receive credit for both. SESP students must register for SOC_POL 330-0.

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.
Prerequisites: ECON 281-0, ECON 310-1, ECON 311-0. (May not receive credit for both this course and BUS_INST 304-0. Not for students who have previously taken KELLG_FE 310-0.).

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 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 220-2, MATH 230-1.

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 226-0, MATH 230-1, MATH 230-2, 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 220-2, MATH 230-1; 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. 27) 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 Introduction to Probability and Statistics and MATH 220-1 Single-Variable Differential Calculus 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 220-1 is required, majors are strongly urged to take MATH 220-2 Single-Variable Integral Calculus, MATH 230-1 Multivariable Differential Calculus, 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	
MATH 220-1	Single-Variable Differential Calculus [1]
or MATH 218-2	Single-Variable Calculus with Precalculus
STAT 210-0	Introduction to Probability and Statistics [2]
or MATH 314-0	Probability and Statistics for Econometrics

1 A math course at a higher level than MATH 220-1 may be applied instead. MATH 220-1 (or higher) credit granted based on AP or IB testing may be applied. The requirement may be waived for students exempted from MATH 220-1 by Northwestern Mathematics Placement Examination.

2 STAT 210-0 credit based on AP or IB test may be applied. MATH 385-0 *or* equivalent course may be applied.

Joint Major in Economics for MMSS Students

In addition to taking all of the required Mathematical Methods in the Social Sciences (p. 326) courses, students must take the following in order to complete a joint major in economics (for triple major limitations see MMSS Adjunct Major (p. 326)).

Course	Title
Department Courses (7 units)	
1 introductory course:	
ECON 201-0	Introduction to Macroeconomics
1 intermediate theory course:	
ECON 311-0	Macroeconomics
5 additional field courses at the 300 level. [1]	

1 These courses can include ECON 310-2 Microeconomics, but cannot include ECON 380-1 Game Theory, ECON 380-2 Game Theory, ECON 381-1 Econometrics, or ECON 381-2 Econometrics.

Economics Major for Industrial Engineering

Students completing the Industrial Engineering Degree (p. 177) may complete a major in economics with some industrial engineering courses double-counted towards both programs of study as described below.

Course	Title
Substitute for introductory course ECON 281-0:	
IEMS 304-0	Statistical Learning for Data Analysis
Count as one of the six 300-level field courses:	
IEMS 373-0	Intro to Financial Engineering
Substitute for related course STAT 210-0:	
IEMS 303-0	Statistics

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: Senior Seminars ECON 398-1 and ECON 398-2, 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. 201).

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 220-1 Single-Variable Differential Calculus and STAT 210-0 Introduction to Probability and Statistics 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	Microeconomics
or ECON 311-0	Macroeconomics
3 additional field courses at the 300 level	

Economics Minor for Industrial Engineering

Students completing the Industrial Engineering Degree (p. 177) may double-count one industrial engineering course with the minor in economics as described below.

Course	Title
Substitute for introductory course ECON 281-0:	
IEMS 304-0	Statistical Learning for Data Analysis

OR

Count as one of the three 300-level field courses:	
IEMS 373-0	Intro to Financial Engineering

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.

Information about degree requirements can be found in the Graduate Catalog section describing the combined BA/MA in Economics (https://catalogs.northwestern.edu/tgs/economics/economics-bach-mast/).

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. 120) 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. 400) for a list of composition (expository writing) courses.

Programs of Study

- English and American Literature Major (p. 271)
- Creative Writing Major (p. 271)
- English and American Literature Minor (p. 272)
- Creative Writing Sequence-Based Minor (p. 272)
- Creative Writing Cross-Genre Minor (p. 272)

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 200-0 Literary Histories (1 Unit) Content varies, but all versions of this course engage with at least 200 years of literature from a particular tradition, genre, or theme, with an emphasis on literary history and narratives of continuity and change over time. Suitable for majors and non-majors. No prior knowledge of the field is expected. *Literature Fine Arts Distro Area*

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.

ENGLISH 208-0 Reading & Writing Creative Non-Fiction (1 Unit) Forms and techniques of creative nonfiction.

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 18th 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 the former COMP_LIT 210-0. *Ethics Values Distro Area Interdisciplinary Distro* - See Rules (p. 198) *Literature Fine Arts Distro Area*

ENGLISH 234-0 Introduction to Shakespeare (1 Unit) Representative Shakespearean plays. *Literature Fine Arts Distro Area*

ENGLISH 266-0 Introduction to African American Literature (1 Unit) Literature of Black people in the United States from slavery to freedom. Works of major writers and significant but unsung bards of the past. ENGLISH 266-0 and AF_AM_ST 210-0 are taught together. *Literature Fine Arts Distro Area*

ENGLISH 267-0 Topics in African American Literature (1 Unit) Content varies. In contrast to ENGLISH 266-0, which offers a broad survey of the field, this course explores particular topics in greater depth. Suitable for majors and non-majors. No prior knowledge of the field is expected. *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 276-0 Topics in Asian American Literature (1 Unit) Content varies. In contrast to ENGLISH 275-0, which offers a broad survey of the field, this course explores particular topics in greater depth. Suitable for majors and non-majors. No prior knowledge of the field is expected. ENGLISH 276-0 and ASIAN_AM 276-0 are taught together. *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 280-0 Introduction to Postcolonial Literature (1 Unit) Introduces the field of postcolonial literary studies, including a critical overview of key terms and major debates. Students will read selected postcolonial literary works, paying particular attention to their formal properties, alongside theoretical and historical texts on colonialism and its aftermath. Suitable for majors and nonmajors. No prior knowledge of the field is expected. *Literature Fine Arts Distro Area*

ENGLISH 281-0 Topics in Postcolonial & Comparative Literatures (1 Unit) Content varies. In contrast to ENGLISH 280-0, which offers a broad survey of the field, this course explores particular topics in greater depth. Suitable for majors and non-majors. No prior knowledge of the field is expected. *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 283-0 Introduction to Literature and the Environment (1 Unit) Studies in literature and other media oriented by ecological thinking. An introduction to the ways language, literature, and aesthetic production shape ideas about nature, varying widely by historical and cross-cultural context. Suitable for majors and nonmajors. No prior knowledge of the field is expected. *Literature Fine Arts Distro Area*

ENGLISH 284-0 Topics in Literature and the Environment (1 Unit) Content varies. In contrast to ENGLISH 283-0, which offers a broad survey of the field, this course explores particular topics in greater depth. Suitable for majors and non-majors. No prior knowledge of the field is expected. *Literature Fine Arts Distro Area*

ENGLISH 285-0 Topics in Literature and Culture (1 Unit) Content varies. Suitable for majors and non-majors. No prior knowledge of the field is expected.

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. 198) *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) This course is for undergraduate students in their second year or above who want to develop their abilities to write in different styles and for different audiences.

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)
20thcentury 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 381-0 Literature & Medicine (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. 198) *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. 27) and the degree requirements of their home school.

Course	Title
Department Courses (13 units)	
2 200-level Historical Breadth courses	
1 emphasizing works written before 1830	
1 emphasizing works written after 1830	
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 courses must be at the 300-level; 2 courses may be taken at the 200-level	
At least 3 courses emphasizing works written before 1830	
At least 3 courses emphasizing works written after 1830	
At least 1 course focusing on Gender, Sexuality & Embodiment	
At least 1 course focusing on Postcolonial & Comparative Literatures	
At least 1 course focusing on Race & Ethnicity	
1 300-level literature course may be taken in another department or program, subject to approval by the DUS	

Students who matriculated Spring 2022 or earlier can follow requirements as outlined in a Catalog edition corresponding to their prior quarters of enrollment. The Office of the Registrar maintains an archive of Catalog editions (https://www.registrar.northwestern.edu/registration-graduation/undergraduate-catalog.html).

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. 201)

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. 27) 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	Theory and Practice of Poetry and Theory and Practice of Poetry and Theory and Practice of Poetry
or ENGLISH 394-1 & ENGLISH 394-2 & ENGLISH 394-3	Theory & Practice of Fiction and Theory & Practice of Fiction and Theory & Practice of Fiction
or ENGLISH 395-1 & ENGLISH 395-2 & ENGLISH 395-3	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. 201).

English and American Literature Minor

Course	Title
Department Courses (7 units)	
2 200-level Historical Breadth courses	
1 emphasizing works written before 1830	
1 emphasizing works written after 1830	
1 required seminar	
ENGLISH 300-0	Seminar in Reading and Interpretation
4 additional literature courses	
1 course may be taken at the 200 level; all others must be taken at the 300 level	
2 emphasizing works written before 1830	
2 emphasizing works written after 1830	
1 300-level literature course may be taken in another department or program, subject to approval by the DUS	

Students who matriculated Spring 2022 or earlier can follow requirements as outlined in a Catalog edition corresponding to their prior quarters of enrollment. The Office of the Registrar maintains an archive of Catalog editions (https://www.registrar.northwestern.edu/registration-graduation/undergraduate-catalog.html).

Creative Writing Sequence-Based Minor

Students may apply to sequence-based minor in creative writing. Admission to the sequence-based minor in creative writing 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 minor offers an apprenticeship in the writing of poetry, fiction, and creative nonfiction, with a literature component.

The department accepts applications to the sequence-based minor in creative writing early each spring. First-year students may not apply.

Course	Title
Requirements: Sequence-based Minor in Creative Writing (8 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
1 yearlong theory and practice sequence:	
ENGLISH 393-1 & ENGLISH 393-2 & ENGLISH 393-3	Theory and Practice of Poetry and Theory and Practice of Poetry and Theory and Practice of Poetry
or ENGLISH 394-1 & ENGLISH 394-2 & ENGLISH 394-3	Theory & Practice of Fiction and Theory & Practice of Fiction and Theory & Practice of Fiction
or ENGLISH 395-1 & ENGLISH 395-2 & ENGLISH 395-3	Theory and Practice of Creative Nonfiction and Theory and Practice of Creative Nonfiction 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 (8 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
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
ENGLISH 309-0	Advanced Creative Cross-Genre 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. 273)

ENVR_POL 101-6 First-Year Seminar (1 Unit) Open to first-year students in Weinberg College. Does not satisfy major/minor requirements in EPC. *WCAS First-Year Seminar*

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 336-0 The Climate Crisis, Policies, 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 356-0 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 356-0 and PSYCH 356-0 are taught together; may not receive credit for both courses. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

ENVR_POL 360-0 Animal Law (1 Unit) Survey of laws, regulations, and cultural norms regarding nonhuman animals and animal ownership in the United States. History of animal protection movement, wildlife regulation, hunting and fishing rights, livestock care and slaughter, animal experimentation, anti-cruelty legislation, and companion animal law. Prerequisite: Legal_St 206-0 or Poli_Sci 230-0, or instructor approval. Taught with ENVR_POL 360-0; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

ENVR_POL 384-0 Political Ecology (1 Unit)
Introduction to a multidisciplinary body of theory and research that analyzes the environmental articulations of political, economic, and social difference and inequality. Topics include environmental scarcity and degradation, sustainability, resilience and conservation. ANTHRO 382-0 and ENVR_POL 384-0 taught together, may not receive credit for both.
Social Behavioral Sciences Distro Area

ENVR_POL 385-0 Archaeologies of Sustainability and Collapse (1 Unit)
Archaeological survey of case studies from the past to interrogate human-environment relationships across time and space, including the present and the future. ANTHRO 326-0 and ENVR_POL 385-0 taught together, may not receive credit for both.
Social Behavioral Sciences 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.

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 quarterly list of courses counting toward the minor is available from the program office and the website. Exceptions must be approved by the program director.

Course	Title
Minor Requirements (7 units) [1]	
2 humanities or social science courses chosen from the following core courses: [2]	
ANTHRO 383-0	Environmental Anthropology
ANTHRO 390-0	Topics In Anthropology (relevant sections; see EPC website for details)
CIV_ENV 303-0	Environmental Law and Policy
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 EPC website for details)

ENVR_POL 399-0	Independent Study [3]
GEOG 211-0	World Biogeography
HISTORY 251-0	The Politics of Disaster: A Global Environmental History
HISTORY 300-0	New Lectures in History (relevant sections; see EPC website for details)
ISEN 230-0	Climate Change and Sustainability: Ethical Dimensions
PHIL 268-0	Ethics and the Environment
POLI_SCI 329-0	U.S. Environmental Politics
POLI_SCI 349-0	International Environmental Politics
RELIGION 369-0	Topics in American Religion (relevant sections; see EPC website for details)

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)

[1] At least 4 of the 7 courses must be at the 300 level.

[2] When a course on the list that is not under the ENVR POL subject code is taught in combined section as ENVR_POL 390-0, students can enroll during pre-registration under ENVR_POL 390-0 and it will count toward minor requirements.

[3] Only 1 quarter of ENVR_POL 399-0 may count toward the requirements.

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 climate change, energy, air and water pollution, biodiversity, 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 pre-professional development for careers in civil service, law, business, and medicine.

Programs of Study

- Environmental Sciences Major (p. 274)
- Environmental Sciences Second Major for ISP Students (p. 277)

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 (Science Track) and one in economic policy (Policy Track). The tracks share foundation courses in science and math, and the core curriculum. Advanced coursework differs by track.

Students plan their academic paths with an environmental sciences adviser. Many foundation courses are prerequisites for advanced courses and should be completed as soon as possible. Students envisioning graduate training are specifically encouraged to take additional math and/or the General Physics sequence. Students interested in medical professions and environmental biology are advised to take the full 200-level sequence in biological sciences and two additional quarters of organic chemistry.

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Major Requirements: Program Courses (11 units)

3 Core Environmental Science Courses at the 200-Level

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

8 Advanced Studies Courses

Advanced studies courses differ by the chosen track. **In both the science track and the policy track at least 6 of the required 8 advanced studies courses must be at the 300-level.** See the Advanced Studies Course Lists (p. 275) below for lists of approved courses. See the Environmental Sciences webpage (https://www.envsci.northwestern.edu/undergraduate-program/major-requirements.html) for updates to these lists. Students who double-major in economics and environmental sciences are encouraged to do the science track in environmental sciences, and must take extra 300-level economics classes to fulfill the requirements for both majors.

Science Track Advanced Studies Course Requirements

- 6 courses from the Science List (p. 275). Up to 2 of these may be replaced with ENVR_SCI 399-0 research courses.
- 2 courses from the Environment and Society List (p. 276).

Policy Track Advanced Studies Course Requirements

- 4 courses from the Science List (p. 275).
- 2 required economics courses: ECON 281-0 and ECON 310-1.
- 1 additional economics course chosen from: ECON 371-0, ECON 372-0, or ECON 373-0.
- 1 course selected from either the Science List (p. 275) or the Environment and Society List (p. 276).

Major Requirements: Foundations in Science and Math (9.68-12.38 units)

Required Math and Chemistry Courses

Students should complete all of the following math and chemistry courses in their first two years. Total units depend on math sequence taken. Courses may double-count with another major or minor.

Course	Title
MATH 220-1	Single-Variable Differential Calculus
or MATH 218-1 & MATH 218-2	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
MATH 220-2	Single-Variable Integral Calculus
or MATH 218-3	Single-Variable Calculus with Precalculus
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 (Pre-requisite: CHEM 110-0)
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

5 Additional Related Math and Science Courses

Students must take 5 courses (and their associated lab, if applicable) from the following options, with at least 2 from the same group. Required labs do not count toward the 5-course total; however, if all three biological sciences labs are taken, they can collectively count toward one of the 5 required courses.

Course	Title
BIOL_SCI 201-0	Molecular Biology
BIOL_SCI 202-0	Cell Biology (with required lab BIOL_SCI 232-0)
BIOL_SCI 203-0	Genetics and Evolution (with required lab BIOL_SCI 233-0)
BIOL_SCI 232-0 & BIOL_SCI 233-0 & BIOL_SCI 234-0	Molecular and Cellular Processes Laboratory and Genetics and Molecular Processes Laboratory and Investigative Laboratory
CHEM 215-1 & CHEM 235-1	Organic Chemistry I and Organic Chemistry Lab I
CHEM 215-2 & CHEM 235-2	Organic Chemistry II and Organic Chemistry Lab II
ECON 201-0	Introduction to Macroeconomics
ECON 202-0	Introduction to Microeconomics
GEN_ENG 205-1	Engineering Analysis I
MATH 230-1	Multivariable Differential Calculus
MATH 240-0	Linear Algebra (Pre-requisite: MATH 230-1)
MATH 250-0	Elementary Differential Equations (Pre-requisites: MATH 226-0, MATH 230-2 and MATH 240-0)
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 202-0	Introduction to Statistics and Data Science
or STAT 210-0	Introduction to Probability and Statistics

Advanced Studies Course Lists

Approved courses for the advanced studies course requirements (p. 274) may be selected from the below Science List (p. 275) and Environment and Society List (p. 276), dependent on track requirements outlined above.

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 328-0	Microbiology
BIOL_SCI 332-0	Conservation Genetics
BIOL_SCI 333-0	Plant-Animal Interactions [2]
BIOL_SCI 334-0	Soils and the Environment: The Earth's Critical Zone
BIOL_SCI 336-0	Spring Flora
BIOL_SCI 337-0	Biostatistics
BIOL_SCI 339-0	Critical Topics in Ecology and Conservation
BIOL_SCI 341-0	Population Genetics
BIOL_SCI 342-0	Evolutionary Processes
BIOL_SCI 346-0	Field Ecology
BIOL_SCI 347-0	Conservation Biology
BIOL_SCI 349-0	Community Ecology
BIOL_SCI 350-0	Plant Evolution and Diversity Lab
CHEM 306-0	Environmental Chemistry
CHEM 342-1	Thermodynamics
CHEM 342-2	Quantum Mechanics and Spectroscopy
CHEM 393-0	Green Chemistry
CHEM_ENG 345-0	Process Optimization for Energy and Sustainability
CHEM_ENG 365-0	Sustainability, Technology, and Society
CHEM_ENG 367-0	Quantitative Methods in Life Cycle Analysis
CIV_ENV 260-0	Environmental Systems and Processes
CIV_ENV 295-0	Introductory topics in Civil and Environmental Engineering [1]
CIV_ENV 340-0	Hydraulics and Hydrology
CIV_ENV 346-0	Ecohydrology
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 370-0	Emerging Organic Contaminants
CIV_ENV 371-0	Introduction to Transportation Planning and Analysis
CIV_ENV 376-0	Transportation System Operations
CIV_ENV 387-0	Design of Sustainable Urban Developments
CIV_ENV 395-0	Special Topics in Civil and Environmental Engrg [1]
EARTH 201-0	Earth Systems Revealed
EARTH 202-0	Earth's Interior
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 340-0	Physics of Weather & Climate
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
EARTH 360-0	Instrumentation and Field Methods
EARTH 361-0	Scientific Programming in Python
EARTH 362-0	Data Analysis for Earth and Planetary Sciences
EARTH 370-0	Geobiology
EARTH 371-0	Biogeochemistry
EARTH 373-0	Microbial Ecology
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 313-0	North America
GEOG 341-0	Principles of Cartography
ISEN 210-0	Introduction to Sustainability: Challenges and Solutions
ISEN 220-0	Introduction to Energy Systems for the 21st Century
ISEN 390-0	Special Topics in Energy & Sustainability [1]
MECH_ENG 241-0	Fluid Mechanics I
MECH_ENG 367-0	Quantitative Methods in Life Cycle Analysis
MECH_ENG 380-0	Thermal Energy Systems Design
MECH_ENG 395-0	Special Topics in Mechanical Engineering [1]

[1] Approved sections only.
[2] Take as ENVR_SCI 390-0

Environment and Society List

Course	Title
ANTHRO 383-0	Environmental Anthropology
ANTHRO 390-0	Topics In Anthropology [1]
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]
EARTH 390-0	Special Topics in Earth and Planetary Science [1]
ECON 281-0	Introduction to Applied Econometrics
ECON 310-1	Microeconomics
ECON 371-0	Economics of Energy
ECON 372-0	Environmental Economics
ECON 373-0	Natural Resource Economics
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 336-0	The Climate Crisis, Policies, and Society
ENVR_POL 340-0	Global Environments and World History
ENVR_POL 356-0	Native Americans and Environmental Decision Making
ENVR_POL 390-0	Special Topics in Environmental Policy and Culture
ENVR_POL 395-0	Special Topics Seminar [1]
GEOG 312-0	Geography of Chicago & Its Region
GEOG 313-0	North America
GEOG 240-0	Economic Geography
GEOG 328-0	The Human Use of the Earth
GBL_HLTH 201-0	Introduction to Global Health
GBL_HLTH 302-0	Global Bioethics
GBL_HLTH 325-0	History of Reproductive Health
GBL_HLTH 390-0	Special Topics in Global Health [1]
HISTORY 200-0	New Introductory Courses in History [1]
HISTORY 251-0	The Politics of Disaster: A Global Environmental History
HISTORY 300-0	New Lectures in History [1]
HISTORY 309-0	American Environmental History
HISTORY 376-0	Global Environments and World History
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 262-0	Ethical Problems and Public Issues
PHIL 268-0	Ethics and the Environment
PHIL 269-0	Bioethics
PHIL 270-0	Climate Change and Sustainability: Economic and Ethical Dimensions
PHIL 390-0	Special Topics In Philosophy [1]
POLI_SCI 329-0	U.S. Environmental Politics
POLI_SCI 349-0	International Environmental Politics
RELIGION 261-0	American Religion, Ecology and Culture
SOCIOL 212-0	Environment and Society
SOCIOL 276-0	Introductory Topics in Sociology [1]
SOCIOL 301-0	The City: Urbanization and Urbanism
SOCIOL 305-0	Population Dynamics
SOCIOL 311-0	Food, Politics and Society
SOCIOL 312-0	Social Change and the Environment
SOCIOL 336-0	The Climate Crisis, Policies, and Society

[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 a minimum 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. 201).

Environmental Sciences Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 27) 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. 309)). 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. 274).

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. 277)

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. 198).

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.

Programs of Study

- French Major (p. 282)
- French Minor (p. 283)
- Italian Literature and Culture Major (p. 284)
- Italian Minor (p. 285)
- French BA/MA (p. 285)

See below for Italian Courses (p. 280).

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: Grade of at least C- in FRENCH 111-1 or Department placement.

FRENCH 111-3 Elementary French (1 Unit) Conversation, grammar, reading, and writing for beginners. Four class meetings a week. Prerequisite: Grade of at least C- in FRENCH 111-2 or Department placement.

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: Grade of at least C- in 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: Grade of at least C- in 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: Grade of at least C- in 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: Grade of at least C- in 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: Grade of at least C- in 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: Grade of at least C- in 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: Grade of at least C- in 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: Grade of at least C- in 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 204-0 Acting French (1 Unit) Use of dramatic scenes, dialogues, songs and performance to help students improve their language skills and develop their interpretive, interpersonal and intercultural competence at the Intermediate Mid/High level. Prerequisite: FRENCH 121-3 or FRENCH 125-3 or FRENCH 201-0 or consent of instructor.

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 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. Prerequisite: FRENCH 210-0 or FRENCH 211-0, AP score of 5 in literature, or consent of instructor. Credit not allowed for both FRENCH 272-0 and FRENCH 279-0. *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. Prerequisite: 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. 198) *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: Finding Your Voice in French (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: Debating Contemporary France (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. Prerequisite: 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. Prerequisite: 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. *Literature Fine Arts Distro Area*

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. Prerequisite: FRENCH 271-0, FRENCH 272-0, or FRENCH 273-0, or consent of instructor. May be repeated for credit when content changes. *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: Grade of at least C- in ITALIAN 101-1 or Department placement.

ITALIAN 101-3 Elementary Italian (1 Unit) Emphasis on oral communication, supported by grammar, writing, reading, and listening. Four class meetings a week. Prerequisite: Grade of at least C- in ITALIAN 101-2 or Department placement.

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: Grade of at least a C- in ITALIAN 102-1 or Department placement.

ITALIAN 102-3 Intermediate Italian (1 Unit) Grammar review, conversation, composition, and readings in modern prose and drama. Four class meetings a week. Prerequisite: Grade of at least C- in ITALIAN 102-2 or Department placement.

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: Grade of at least C- in ITALIAN 101-2 or Department placement.

ITALIAN 105-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

ITALIAN 106-0 Italian for Research (0 Unit)

ITALIAN 110-0 Italian in the Business World (1 Unit) Italian language course with an emphasis on communication and a cultural focus on business and its practices.

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: Grade of at least C- in ITALIAN 133-1 and ITALIAN 134-1 or Department placement.

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: Grade of at least C- in ITALIAN 133-2 and ITALIAN 134-2 or Department placement.

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: Grade of at least C- in ITALIAN 133-1 and ITALIAN 134-1 or Department placement.

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: Grade of at least C- in ITALIAN 133-2 and ITALIAN 134-2 or Department placement.

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. May be repeated for credit with change in topic. 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. 198*) 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. 198*) 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 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. 27) 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	Reading Literatures in French
or FRENCH 211-0	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: Finding Your Voice in French
FRENCH 303-0	Advanced Conversation: Debating Contemporary France
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: 1800–1848 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 departmental advanced placement, depending upon results of the French Language Placement Test, may either waive FRENCH 202-0 Writing Workshop: Cultural Encounters in Contemporary France or waive 1 elective course at the 200-level. 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. 201).

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: Finding Your Voice in French
FRENCH 303-0	Advanced Conversation: Debating Contemporary France
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: Finding Your Voice in French
FRENCH 303-0	Advanced Conversation: Debating Contemporary France
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 310-367 or 380-390.	
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.
- Minors with an AP score of 5 or with departmental advanced placement, depending upon results of the French Language Placement Test, may either waive FRENCH 202-0 Writing Workshop: Cultural Encounters in Contemporary France or waive 1 elective course at the 200-level. 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. 27) 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. 201).

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 110-0	Italian in the Business World
ITALIAN 133-1 & ITALIAN 133-2 & ITALIAN 133-3	Intensive Italian and Intensive Italian and Intensive Italian
or ITALIAN 134-1 & ITALIAN 134-2 & ITALIAN 134-3	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 Minor

Minor Requirements (6 units)

- No more than 3 Italian courses taught in English.
- At least 3 Italian courses at the 300 level.
- At least 1 course at the 300 level must be taught in Italian.

French BA/MA

The department offers a BA/MA program in French for outstanding undergraduate majors. Information about degree requirements can be found in the Graduate Catalog section describing the combined BA/MA in French (https://catalogs.northwestern.edu/tgs/french-francophone-studies/french-bach-mast/). Interested undergraduate students should 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. 286)
- Gender and Sexuality Studies Minor (p. 287)

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. 198) *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 221-0 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. 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 & Sexuality (1 Unit) The use of language to construct sexual identity, focusing on the language of and about gay men and lesbians. Topics include heteronormativity, identity labels and categories, gender versus sexuality, and cross-cultural sexual diversity. Taught with GNDR_ST 327-0; may not receive credit for both courses. Prerequisite: any 200-level 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. 198*) 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. 27) and the degree requirements of their home school.

Course	Title
Program Courses (11 units)	
2 Core Courses:	
GNDR_ST 220-0	Sexual Subjects: Introduction to Sexuality Studies
GNDR_ST 230-0	Traditions in Feminist Thought
2 Theory Courses:	
GNDR_ST 381-0	Queer Theory

GNDR_ST 397-0	Feminist Theory
or GNDR_ST 380-0	Black Feminist Theory
2 Research Courses:	
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
5 Additional Courses, including:	
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. 201).

Gender and Sexuality Studies Minor

Course	Title
Minor Requirements (7 units)	
2 Core Courses:	
GNDR_ST 220-0	Sexual Subjects: Introduction to Sexuality Studies
GNDR_ST 230-0	Traditions in Feminist Thought
5 Additional Courses:	
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.

General Liberal Arts (GEN_LA) courses are listed below.

- See Weinberg College Policies (p. 200) for more details governing the Student Organized Seminar course.
- See Academic Options and Support (p. 201) for more about Study Abroad.

GEN_LA 100-BR Exploring the Liberal Arts (0.5 Unit) For participants in Bridge I summer program. This course will preview the curriculum offered by Weinberg College, highlighted by lectures from faculty in different departments, and explain the distribution requirements in the College as well as the value of a broad liberal arts curriculum.

GEN_LA 111-1 Introductory Topics in Language Study I (1 Unit) Registration for students studying a foreign language through CourseShare at the introductory level. Permission required in advance.

GEN_LA 111-2 Introductory Topics in Language Study II (1 Unit) Registration for students studying a foreign language through CourseShare at the introductory level. Permission required in advance.

GEN_LA 111-3 Introductory Topics in Language Study III (1 Unit) Registration for students studying a foreign language through CourseShare at the introductory level. Permission required in advance.

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 121-1 Intermediate Topics in Language Study I (1 Unit) Registration for students studying a foreign language through CourseShare at the intermediate level. Permission required in advance.

GEN_LA 121-2 Intermediate Topics in Language Study II (1 Unit) Registration for students studying a foreign language through CourseShare at the intermediate level. Permission required in advance.

GEN_LA 121-3 Intermediate Topics in Language Study III (1 Unit) Registration for students studying a foreign language through CourseShare at the intermediate level. Permission required in advance. Does not automatically satisfy the Weinberg College foreign language proficiency requirement.

GEN_LA 131-1 Advanced Topics in Language Study I (1 Unit) Registration for students studying a foreign language through CourseShare at the intermediate level. Permission required in advance.

GEN_LA 150-0 Arch Scholar Mentoring Program (0 Unit) A weekly 1-hour workshop for first-year students in the Arch Scholar programs. Workshops will focus on academic skills, professional development, and college success strategies. Only two excused absences are allowed. Instructor permission to register is required.

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. 289)
- Geography Minor (p. 289)

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.
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. 27) 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	World Biogeography
or GEOG 235-0	Atmosphere and Climate
GEOG 240-0	Economic Geography
GEOG 341-0	Principles of Cartography
or GEOG 343-0	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 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus
or MATH 218-1 & MATH 218-2 & MATH 218-3	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
STAT 210-0	Introduction to Probability and Statistics
or STAT 202-0	Introduction to Statistics and Data Science

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. 201).

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 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus
or MATH 218-1 & MATH 218-2 & MATH 218-3	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
STAT 210-0	Introduction to Probability and Statistics
or STAT 202-0	Introduction to Statistics and Data Science
Minor Requirements (6 units)	
GEOG 211-0	World Biogeography
or GEOG 235-0	Atmosphere and Climate
GEOG 240-0	Economic Geography
GEOG 341-0	Principles of Cartography
or GEOG 343-0	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. A variety of cultural and literary readings as well as cultural experiences 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, that may include business German, history and culture, literature and media, German-Jewish studies, 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).

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. 293)
- German Minor (p. 294)
- German Studies Minor (p. 294)
- Business German Minor (p. 295)

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)

Introduction to the translation of scholarly and scientific German texts. No prerequisites in the language.

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. Prerequisite: None. May be repeated for credit with different topic. *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. Prerequisite: None. May be repeated for credit with different topic. *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. 198) *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. 198) *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. 198) *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. Prerequisite: None. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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. 198*) 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. Prerequisite: None. GERMAN 242-0 and JWSH_ST 242-0 are taught together; may not receive credit for both courses. *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. Prerequisite: None. *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. Prerequisite: None. *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. Prerequisite: None. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro* - See Rules *(*p. 198*)*

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: Two 200-level courses in 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. Prerequisite: Two 200-level courses in German.

GERMAN 309-2 Advanced Business German: Marketing and Management (1 Unit) 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: Two 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. 198*) 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. 198*) 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. 198*) 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. Prerequisite: None. May be repeated for credit with different topic. *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: Three 200-level courses in German (at least one in literature). *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. 198*)*

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. Prerequisite: None. *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. Prerequisite: None. *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. Prerequisite: Three 200-level courses in German (at least one in literature). May be repeated for credit with different topic.

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. Prerequisite: None. May be repeated for credit with different topic.

GERMAN 349-0 History of the Holocaust (1 Unit) Origins and development of the genocide of European Jewry during World War II. HISTORY 349-0 and GERMAN 349-0 are taught together; may not receive credit for both courses. *Historical Studies Distro Area*

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. Prerequisite: None. GERMAN 366-0, JWSH_ST 366-0 and YIDDISH 366-0 taught together; may receive credit for only one course.. *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 the German major 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-1800) 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. 27) 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. 201).

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.

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

globalhealthstudies.northwestern.edu

Global health is of concern to individuals working in public and international policy, public health and medical professions, industry, commerce, engineering, disaster management, environmental sustainability and international agencies. Addressing challenging global health issues requires not only financial resources but, more importantly, a deep understanding of context: how cultural, social, economic, historical political, domestic and global realities affect the design and implementation of interventions meant to expand access to health and wellbeing.

The Program in Global Health Studies offers an adjunct major and a minor designed to provide the critical thinking and analytical skills necessary for addressing complex health issues at home and abroad. The curriculum focuses not only on the status of public and clinical health systems, but also on health disparities and inequities that lead to differential health outcomes.

As an inherently interdisciplinary program, Global Health Studies combines insights from history, anthropology, sociology, public health, political science, public policy, demography, epidemiology, engineering, environmental studies, international relations, and psychology to offer students multiple lenses through which to critically reflect upon and learn meaningful means to address some of the world's greatest challenges.

Programs of Study

- Global Health Studies Adjunct Major (p. 296)
- Global Health Studies Minor (p. 298)

GBL_HLTH 201-0 Introduction to Global 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 222-0 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 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 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. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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. 198) *Social Behavioral Sciences Distro Area*

GBL_HLTH 323-0 Global Health from Policy to Practice (1 Unit) Examines global health and development policy, from the politics of policy-making to the impacts of policy on global health practice and local realities. This course highlights the histories and material, political, and social realities of policy and its application. The course draws on case studies of policy makers, economists, public officials, health care workers, and aid recipients. *Social Behavioral Sciences Distro Area*

GBL_HLTH 324-0 Volunteerism and the Ethics of Help (1 Unit) Explores the ethics of altruism through the discourses and practices that make up volunteering, from the perspectives of volunteers, hosts, and a range of others both promoting and critiquing volunteerism. What motivates people to volunteer among strangers or in unfamiliar contexts? What are the implications for volunteers, and communities and institutions where foreign volunteering takes place? *Ethics Values Distro Area*

GBL_HLTH 325-0 History of Reproductive Health (1 Unit) This course concerns the history of human reproduction from multiple vantage points. Since reproduction is often about power, the course is framed around the distribution of power in matters of reproduction; as such we will pay particular attention during this class to struggles over matters of reproduction as we explore historical changes and continuities in reproduction globally since 1900. *Historical Studies 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. 27) and the degree requirements of their home school.

Course	Title
Adjunct Major Requirements (11 units)	
4 core courses:	
GBL_HLTH 201-0	Introduction to Global Health [1]
GBL_HLTH 302-0	Global Bioethics
GBL_HLTH 309-0	Biomedicine and World History [2]
or GBL_HLTH 222-0	The Social Determinants of Health
or GBL_HLTH 325-0	History of Reproductive Health
GBL_HLTH 320-0	Qualitative Research Methods in Global Health [3]
3 additional GBL_HLTH courses [4]	
4 elective courses. Courses taken abroad can be counted as electives; students may study abroad more than once and receive up to 2 elective credits per program. Remaining elective credits can be fulfilled by health-related courses from various departments as listed below and on the GHS website.	

1. GBL_HLTH 301-0 (Introduction to International Public Health) from Spring 2022 or earlier may be applied in lieu of GBL_HLTH 201-0.
2. GBL_HLTH 322-0 (The Social Determinants of Health) from Spring 2022 or earlier may be applied in lieu of GBL_HLTH 222-0, GBL_HLTH 309-0, or GBL_HLTH 325-0.
3. The methods requirement (GBL_HLTH 320-0) can also be fulfilled by GBL_HLTH 390-0 Special Topics in Global Health when offered

as the following topics: Community Based Participatory Research, Quantitative Methods: Turning Numbers into a Story, or (Re)Mixing Qualitative Methods.

[4] GBL_HLTH 399-0 Independent Study and courses taken abroad may not be counted toward this requirement.

Note:

- Students may elect to study abroad (https://globalhealthstudies.northwestern.edu/academic-programs/study-abroad/) as part of their Global Health Studies curriculum.
- All adjunct majors require completion of a stand-alone major as well.

Approved elective courses (students may take courses from more than one subject area)

Anthropology

Course	Title
ANTHRO 306-0	Evolution of Life Histories
ANTHRO 309-0	Human Osteology
ANTHRO 312-0	Human Population Biology
ANTHRO 314-0	Human Growth & Development
ANTHRO 315-0	Medical Anthropology
ANTHRO 332-0	The Anthropology of Reproduction
ANTHRO 359-0	The Human Microbiome and Health
ANTHRO 386-0	Methods in Human Biology Research

Biological Sciences

Course	Title
BIOL_SCI 327-0	Biology of Aging
BIOL_SCI 337-0	Biostatistics
BIOL_SCI 341-0	Population Genetics
BIOL_SCI 355-0	Immunobiology
BIOL_SCI 380-0	Biology of Cancer

Chemistry

Course	Title
CHEM 316-0	Medicinal Chemistry: the Organic Chemistry of Drug Design and Action

Communications

Course	Title
COMM_ST 246-0	Intro to Health Communication
COMM_ST 367-0	Nonprofit Communication Management

Economics

Course	Title
ECON 307-0	Economics of Medical Care
ECON 359-0	Economics of Nonprofit Organizations

Engineering

Course	Title
BMD_ENG 325-0	Introduction to Medical Imaging
BMD_ENG 343-0	Biomaterials and Medical Devices
or MAT_SCI 370-0	Biomaterials
BMD_ENG 380-0	Medical Devices, Disease & Global Health
BMD_ENG 390-1	Biomedical Engineering Design
BMD_ENG 390-2	Biomedical Engineering Design
BMD_ENG 390-3	Biomedical Engineering Design
CHEM_ENG 373-0	Biotechnology and Global Health
CIV_ENV 361-2	Public & Environmental Health
ENTREP 340-0	Innovate for Impact
IEMS 365-0	Analytics for Social Good
IEMS 385-0	Introduction to Health Systems Management

English

Course	Title
ENGLISH 381-0	Literature & Medicine

Field Studies

Course	Title
CFS 391-0	Field Studies in Social Justice
CFS 392-0	Field Studies in Public Health
CFS 397-0	Field Studies in Civic Engagement

Gender Studies

Course	Title
GNDR_ST 332-0	Gender, Sexuality, and Health
GNDR_ST 340-0	Gender, Sexuality, and the Law
GNDR_ST 341-0	Transnational Perspectives on Gender and Sexuality
GNDR_ST 361-0	Gender, Sexuality, and Literature

History

Course	Title
HISTORY 275-1	History of Early Modern Science and Medicine
HISTORY 275-2	History of Modern Science and Medicine
HISTORY 352-0	Global History of Death and Dying

International Studies

Course	Title
INTL_ST 393-0	Development in the Global Context: Participation, Power, and Social Change

Philosophy

Course	Title
PHIL 268-0	Ethics and the Environment
PHIL 269-0	Bioethics
PHIL 326-0	Topics in Philosophy of Medicine

Political Science

Course	Title
POLI_SCI 326-0	Race and Public Policy
POLI_SCI 352-0	Global Development
or SOCIOL 317-0	Global Development
POLI_SCI 377-0	Drugs and Politics
POLI_SCI 380-0	Refugee Crises and Human Rights
POLI_SCI 384-0	International Responses to Mass Atrocities

Psychology

Course	Title
PSYCH 341-0	Positive Psychology: The Science of Well-Being
PSYCH 383-0	Psychology and Food

Public Health

Course	Title
PUB_HLTH 302-0	Introduction to Biostatistics
PUB_HLTH 304-0	Introduction to Epidemiology
PUB_HLTH 391-0	Global Health Care Service Delivery

SESP

Course	Title
SOC_POL 311-0	Social Policy and the United States Health Care System
SOC_POL 333-0	Economics of Health, Human Capital, and Happiness

Sociology

Course	Title
SOCIOL 220-0	Health, Biomedicine, Culture, and Society
or HUM 220-0	Health, Biomedicine, Culture, and Society
SOCIOL 336-0	The Climate Crisis, Policies, and Society
or ENVR_POL 336-0	The Climate Crisis, Policies, and Society
SOCIOL 355-0	Medical Sociology

Spanish

Course	Title
SPANISH 205-0	Spanish for Professions: Health Care

Statistics

Course	Title
STAT 370-0	Human Rights Statistics

Additional info

Depending on the topic, other occasional courses may also be used as electives including, *AF_AM_ST 380-0, AMER_ST 310-0, ANTHRO 390-0, ASIAN_AM 303-0, ASIAN_AM 380-0, BUS_INST 394-LK, COMM_ST 395-0, ENVR_SCI 390-0, GNDR_ST 390-0, HISTORY 300-0 , HUM 370-5,* INTL_ST 390-0, *INTL_ST 395-0, JWSH_ST 390-0, LATINO 392-0, NEUROSCI 390-0, PHIL 361-0* and *SOC_POL 351-0.* For more details and an up-to-date listing of courses, consult the Global Health Studies website (https://globalhealthstudies.northwestern.edu/courses/) or email the program.

Global Health Studies Minor

Course	Title
Minor Requirements (7 units)	
2 core courses	
All students complete:	
GBL_HLTH 201-0	Introduction to Global Health [1]
Plus one of the following: [2]	
GBL_HLTH 302-0	Global Bioethics
or GBL_HLTH 320-0	Qualitative Research Methods in Global Health
or GBL_HLTH 325-0	History of Reproductive Health
2 additional GBL_HLTH courses [3]	
3 elective courses. Courses taken abroad can be counted as electives; students may study abroad more than once and receive up to 2 elective credits per program. Remaining elective credits can be fulfilled by health-related courses from various departments, as listed on the GHS major page and program website.	

1. GBL_HLTH 301-0 (Introduction to International Public Health) from Spring 2022 or earlier may be applied in lieu of GBL_HLTH 201-0.
2. GBL_HLTH 390-0 Special Topics in Global Health may be used in substitution when offered as the following topics: Community Based Participatory Research, Quantitative Methods: Turning Numbers into a Story, or (Re)Mixing Qualitative Methods.
3. GBL_HLTH 399-0 Independent Study and courses taken abroad may not be counted toward this requirement.

Note:

- Students may elect to study abroad (https://globalhealthstudies.northwestern.edu/academic-programs/study-abroad/) as part of their Global Health Studies curriculum.
- A list of eligible elective courses can be found on the Global Health Adjunct Major (p. 296) page of this Catalog. Refer also to the Global Health Studies website for updates and occasional offerings.

Greek

See Classics (p. 245).

Hebrew

Hebrew language classes are offered by the Middle East and North African Languages Program (https://mena-languages.northwestern.edu). For course listings in this catalog, see either Jewish Studies (p. 311) or Middle East and North African Studies (p. 336).

Hindi

See Asian Languages and Cultures (p. 223).

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 expertise enables 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. 120) 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. 304)
- History Minor (p. 306)

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 Europe in the Medieval and Early Modern World (1 Unit) Culture and structure of preindustrial society, high medieval through mid-18th century. *Historical Studies Distro Area*

HISTORY 201-2 Europe in the Modern World (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 252-0 Global History of Refugees (1 Unit) Global History of Refugees Development of the international refugee regime in the nineteenth and twentieth centuries, including humanitarianism, international law, and activism by and on behalf of refugees. *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 262-0 Pirates, Guns, and Empires (1 Unit) Piracy in the Atlantic Ocean, the Mediterranean Sea, the Indian Ocean, and the China Seas from the late sixteenth to the early nineteenth century. *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 Modern Middle East, 1789 - Present (1 Unit) Jewish and Arab nationalism, oil diplomacy, Islam in the modern context, 1789-present. *Historical Studies Distro Area*

HISTORY 272-0 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 275-1 History of Early Modern Science and Medicine (1 Unit) The transformations of science and medicine in Europe and beyond during the period known as the 'Scientific Revolution' (c. 1500-1800). Focus on the social dimensions of scientific and medical knowledge, including the relations of science and medicine to religion, politics, commercial markets, and the expansion of Europe's overseas empires during the first age of globalization. *Historical Studies Distro Area*

HISTORY 275-2 History of Modern Science and Medicine (1 Unit) The transformation of modern science and medicine in Europe, America and around the world over the past two hundred years; topics include the relations of science and technology from telecom to the A-bomb to biotech; and the relations of science to society, from Darwin to genetics/eugenics to climate change. *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 292-0 Introduction to Topics in History (1 Unit) Introductory seminar for non-majors and majors interested in a variety of topics related to a historical event, period, or broader historical problem. *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 Mediterannean 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 US 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 time after 1900. *Historical Studies Distro Area*

HISTORY 320-0 The Fourteenth Amendment (1 Unit) The Fourteenth Amendment's role in defining and protecting citizenship, privileges and immunities, due process, and equal protection from its nineteenth-century origins to the present. HISTORY 320-0 and LEGAL_ST 320-0 are taught together; may not receive credit for both courses. *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. 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 Sex (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, 1917-2014.
Historical Studies Distro Area

HISTORY 349-0 History of the Holocaust (1 Unit) Origins and development of the genocide of European Jewry during World War II. HISTORY 349-0 and GERMAN 349-0 are taught together; may not receive credit for both courses. *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. 198)

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 Brexit, 1900-present.
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 365-0 Revolutions in Medicine (1 Unit)
Introduction to the history of medicine in the Americas from precontact to the present, with special focus on Latin America and the Caribbean in imperial, transnational, and global frameworks.
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 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 Modern China: The Transition to Modern Times, 1600-1912 (1 Unit)
Survey of Chinese history from the rise of the last dynasty (the Qing) to the Revolution of 1911 and the inauguration of the Republic of China. Explores the transition from the "traditional" to the "modern" era and considers the transformation of social, economic, cultural, and international relations.
Historical Studies Distro Area

HISTORY 381-2 Modern China: The Twentieth Century (1 Unit)
Survey of Chinese history from the Revolution of 1911 to the era of post-Mao reform. Course explores the political, social, cultural, and international challenges confronting China under the Republic of China (1912-1949) and the early People's Republic of China after 1949.
Historical Studies Distro Area

HISTORY 381-3 Modern China: Post-Mao Reforms, 1978-2016 (1 Unit)
This course examines the complexities of China's reformist period from the late 1970s until the early 21st century. Topics include the transformation of rural-urban relations, domestic arguments about the unevenness and morality of socio-economic change, the 1989 Spring Democracy Movement, China's "Peaceful Rise," the AIDS crisis and SARS, and its growing participation in global affairs. *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 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. *Historical Studies Distro Area*

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. 27) 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 in times and places other than their own. 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 their concentration:

- 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)	
2 undergraduate seminars:	
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)
10 additional 200- or 300-level courses:	
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. 201).

History Courses

Introductory Seminars

The following 3 courses are first-year seminars, 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 Mediterannean 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	Modern China: The Transition to Modern Times, 1600-1912 and Modern China: The Twentieth Century
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	Europe in the Medieval and Early Modern World and Europe in the Modern World
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 Sex
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 Modern Middle East, 1789 - Present
HISTORY 272-0	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 Early Modern Science and Medicine and History of Modern Science and Medicine
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

Intermediate and Advanced Seminars

Course	Title
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	Greek History and Culture: From Homer to Alexander the Great
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
LATINO 218-0	Latina & Latino 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 history[1]
  - Environmental history[1]
  - Law and crime[1]
  - Science and technology[1]
- 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 (https://www.humanities.northwestern.edu) (“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 explore 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 (the only exception is that Weinberg College First-Year Seminars are only open to Weinberg students). 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 most years, 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 most 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.

Humanities courses are labeled "HUM" in CAESAR. Specific class offerings in a quarter are fitted under the broad umbrella course categories listed in the humanities course list (for example, HUM 370-X or HUM 325-X). Class descriptions are available on CAESAR; information is also available on the Kaplan website (https://www.humanities.northwestern.edu/courses/). Many HUM courses are one-of-a-kind, so they are only offered once in a student's career at Northwestern. And HUM lecture courses may not always be offered in the same quarter from year to year, so make sure to check CAESAR each quarter for specific class descriptions.

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. 308)
- Kaplan Humanities Scholars Program (p. 309)

HUM 100-1-BR Introduction to Critical Thinking in the Humanities and Social Sciences (0.5 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 MATH 100-BR.

HUM 100-2-BR Asking - and Answering - Questions in the Humanities and Social Sciences (0.5 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. Prerequisites: MATH 100-BR and HUM 100-1-BR.

HUM 101-6 First-Year Seminar (1 Unit) Part of a two-course exploration of the humanities for first-year students selected into the Kaplan Humanities Scholars Program. This team-taught program—lecture + small coordinated seminar—is designed to challenge students to integrate a variety of intellectual methods to probe the qualitative aspects of human experience. Course topics and instructors change each year. HUM 101-6 is the lecture section (2 days/week) and HUM 210-0 is the paired seminar section (2 days/week). Prerequisite: This course is reserved for first-year students of the Kaplan Humanities Scholar Program. *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. Enrollment in the Plunge is by application.

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. 198) *Literature Fine Arts Distro Area*

HUM 210-0 Humanities in the World I (1 Unit) Part of a two-course exploration of the humanities for first-year students selected into the Kaplan Humanities Scholars Program. This team-taught program—lecture + small coordinated seminar—is designed to challenge students to integrate a variety of intellectual methods to probe the qualitative aspects of human experience. Course topics and instructors change each year. HUM 101-6 is the lecture section (2 days/week) and HUM 210-0 is the paired seminar section (2 days/week). Prerequisite: This course is reserved for first-year students of the Kaplan Humanities Scholar Program. *Literature Fine Arts Distro Area*

HUM 211-0 Humanities in the World II (1 Unit) Part of a two-course exploration of the humanities for first-year students selected into the Kaplan Humanities Scholars Program. This team-taught program—lecture + small coordinated seminar—is designed to challenge students to integrate a variety of intellectual methods to probe the qualitative aspects of human experience. Course topics and instructors change each year. HUM 101-6 is the lecture section (2 days/week) and HUM 211-0 is the paired seminar section (2 days/week). Prerequisite: This course is reserved for first-year students of the Kaplan Humanities Scholar Program. *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. 198) *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. 198) *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; the afterlife of Marxism; the politics of reputation; being animal, being human; writing ancestry.

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. 198) *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. 244) 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 fall of the first year. Designed especially for program participants, the **Humanities in the World** lecture course (HUM 210-0 or HUM 211-0) and the small coordinated **First-Year Seminar** (HUM 101-6) are team-taught by award-winning professors drawn from different departments. Through these linked courses, students take up a broad humanistic theme that traverses the boundaries of academic disciplines—as well as those of geography, culture, and historical periods—and integrate a variety of intellectual methods to 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/).

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. 11). 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. 309)

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. 27) and the degree requirements of their home school.

Course	Title
Major Requirements (25.7 units)	
First Year	
COMP_SCI 111-0	Fundamentals of Computer Programming
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
Second Year	
BIOL_SCI 240-0 & BIOL_SCI 241-0	Biochemistry, Molecular and Cell Biology - 1 for ISP and Biochemistry, Molecular and Cell Biology - 2 for ISP
BIOL_SCI 232-0	Molecular and Cellular Processes Laboratory
BIOL_SCI 233-0	Genetics and Molecular 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 for ISP
PHYSICS 339-1 & PHYSICS 339-2	Quantum Mechanics and Quantum Mechanics
Third Year	
ASTRON 331-0	Astrophysics ISP
BIOL_SCI 323-0	Bioinformatics: Sequence and Structure Analysis
or BIOL_SCI 341-0	Population Genetics
or BIOL_SCI 361-0	Protein Structure and Function
or BIOL_SCI 390-0	Advanced Molecular Biology
NEUROSCI 311-0	Biophysical Analysis of Neurons for ISP
PHYSICS 337-0	Physics of Condensed Matter

or PHYSICS 339-3	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	Bioinformatics: Sequence and Structure Analysis
or BIOL_SCI 341-0	Population Genetics
or BIOL_SCI 361-0	Protein Structure and Function
or BIOL_SCI 390-0	Advanced Molecular Biology
MATH 382-0	Complex Analysis for ISP
NEUROSCI 311-0	Biophysical Analysis of Neurons for ISP
PHYSICS 337-0	Physics of Condensed Matter
or PHYSICS 339-3	Particle and Nuclear Physics

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. 201).

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. 310)
- International Studies Minor (p. 311)

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 393-0 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 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. 27) 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 demonstrate proficiency in a language other than English at a level equivalent to two full years of instruction at Northwestern. Students must also take at least three foreign-language courses at Northwestern even if they have documented proficiency in one language through testing. These three units of credit may be at any language-learning level and may count towards the Weinberg College language proficiency requirement. They 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. 201).

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 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.

Italian

See French and Italian (p. 277).

Japanese

See Asian Languages and Cultures (p. 223).

Jewish Studies

jewish-israel-studies-center.northwestern.edu

Jewish Studies at Northwestern is an interdisciplinary enterprise examining Jewish life from ancient to modern times with a focus on the interaction between the Jewish people and the world. It explores Jewishness as a cultural, ethnic and/or religious identity and phenomenon. More specifically, Jewish Studies courses offer instruction

in Jewish texts and languages, philosophy and literature, religion and history. Our faculty seek to develop students' skills in critical reading, writing, and thinking, using comparative approaches, and building bridges between the universal and the particular.

You can take Jewish Studies courses to fulfill distribution requirements, as a way to explore your identity, as a step toward bettering your critical thinking, or simply out of curiosity. The students who take Jewish Studies courses are a diverse group and many have no background in Judaism before they begin.

Jewish Studies also partners with the Middle East and North African Languages Program (https://mena-languages.northwestern.edu) to provide Hebrew language classes, which are offered at three levels.

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-israel-studies-center.northwestern.edu/undergraduate/courses/):

• 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

• GERMAN 366-0 Yiddish Culture and the Holocaust

• 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 393-0 Approaches to 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)

• SESP 351-0 Special Topics (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. 314)
- Hebrew Studies Minor (p. 314)
- Jewish Studies Minor (p. 314)

Below see also Hebrew Courses (p. 313) and Yiddish Courses (p. 313). In addition, please see relevant courses listed by other academic units here (p. 311).

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) This sequence offers students a systematic introduction to mainly conversational Hebrew language and culture. Emphasizes the four modalities-speaking, listening comprehension, reading, and writing. Prerequisite: None or one year of high-school Hebrew or placement exam results.

HEBREW 111-2 Hebrew I (1 Unit) This sequence offers students a systematic introduction to mainly conversational Hebrew language and culture. Emphasizes the four modalities-speaking, listening comprehension, reading, and writing. Prerequisite: HEBREW 111-1 or equivalent.

HEBREW 111-3 Hebrew I (1 Unit) This sequence offers students a systematic introduction to mainly conversational Hebrew language and culture. Emphasizes the four modalities-speaking, listening comprehension, reading, and writing. Prerequisite: HEBREW 111-2 or equivalent.

HEBREW 121-1 Hebrew II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing skills in Hebrew. Offers also insights into Hebrew culture and history. Uses authentic written and audiovisual materials, including newspapers, short stories, poems, television, film. Prerequisite: HEBREW 111-3 or equivalent.

HEBREW 121-2 Hebrew II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing skills in Hebrew. Offers also insights into Hebrew culture and history. Uses authentic written and audiovisual materials, including newspapers, short stories, poems, television, film. Prerequisite: HEBREW 121-1 or equivalent.

HEBREW 121-3 Hebrew II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing skills in Hebrew. Offers also insights into Hebrew culture and history. Uses authentic written and audiovisual materials, including newspapers, short stories, poems, television, film. Prerequisite: HEBREW 111-3 or equivalent.

HEBREW 211-0 Hebrew III: Language and Culture (1 Unit) Introduction to and practice of intermediate and advanced grammatical concepts in Hebrew through authentic cultural texts and current media sources. The course focuses on speaking, listening comprehension, reading, and writing skills. Prerequisite: HEBREW 121-3.

HEBREW 216-1 Hebrew III:Topics in Hebrew Literature (1 Unit) Hebrew language, literature, and culture. Review of more complex grammar including the development of reading, writing, and speaking. Material includes authentic written and audiovisual works and newspaper articles. Prerequisite: HEBREW 121-3 or equivalent. *Literature Fine Arts Distro Area*

HEBREW 216-2 Hebrew III: Topics in Hebrew Literature (1 Unit) Hebrew language, literature, and culture. Review of more complex grammar including the development of reading, writing, and speaking. Material includes authentic written and audiovisual works and newspaper articles. Prerequisite: HEBREW 121-3 or equivalent. *Literature Fine Arts Distro Area*

HEBREW 216-3 Hebrew III: Topics in Hebrew Literature (1 Unit) Hebrew language, literature, and culture. Review of more complex grammar including the developemnt of reading, writing, and speaking. Material includes authentic written and audiovisual works and newspaper articles. Prerequisite: HEBREW 121-3 or equivalent. *Literature Fine Arts Distro Area*

HEBREW 245-0 Current Events in Israel: Israeli Society through Online News Media (1 Unit) This course focuses on current events in Israel through in-depth exploration of online news media sources such as foreign newspaper articles and videos. Students will gain respect for alternative ideas and diversity of views and learn how news and public opinion are chosen, disseminated, shared. The course focuses on reading, listening, discussion and on building a comprehensive Hebrew vocabulary. Prerequisite: HEBREW 121-3 or permission of the instructor. May be repeated for credit with different topic.

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. 27) and the degree requirements of their home school.

Prerequisite

- Complete or place out of :

Course	Title
HEBREW 121-1	Hebrew II
& HEBREW 121-2	and Hebrew II
& HEBREW 121-3	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 other 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 postrabbinic 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. 201).

Relevant Courses in Other Departments

Additional Jewish studies courses are offered by many departments and programs. This list (p. 311) 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.

Hebrew Studies Minor

Prerequisite

- Complete or place out of:

Course	Title
HEBREW 121-1	Hebrew II
& HEBREW 121-2	and Hebrew II
& HEBREW 121-3	and Hebrew II

Minor Requirements (6 units)

- 2 courses conducted in Hebrew—for example, third-year Hebrew:

Course	Title
HEBREW 216-1	Hebrew III:Topics in Hebrew Literature
& HEBREW 216-2	and Hebrew III: Topics in Hebrew Literature
& HEBREW 216-3	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 translation
- 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 III:Topics in Hebrew Literature
& HEBREW 216-2	and Hebrew III: Topics in Hebrew Literature
& HEBREW 216-3	and Hebrew III: Topics in Hebrew Literature
HEBREW 316-1	Hebrew IV: Advanced Topics in Hebrew Literature
& HEBREW 316-2	and Hebrew IV: Advanced Topics In Hebrew
& HEBREW 316-3	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)

The requirements outlined below do not require the study of Hebrew language. Students who complete two years of Hebrew language study at Northwestern have the option of completing the minor in Jewish Studies with five additional courses, as noted below (p. 315).

- 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 History 1492-1789 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 complete two years of Hebrew language study at Northwestern may complete the Jewish Studies minor with 5 additional courses:
  - 3 in Jewish history
  - 1 in religion
  - 1 in Jewish literature or philosophy

Korean

See Asian Languages and Cultures (p. 223).

Latin

See Classics (p. 245).

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 the Global Learning Office (https://www.northwestern.edu/abroad/).

Program of Study

- Latin American and Caribbean Studies Minor (p. 315)

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. 315)	
History (p. 315)	
Latina and Latino Studies (p. 315)	
Political Science (p. 316)	
Spanish and Portuguese (p. 316)	
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

History[1]

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 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

Spanish and Portuguese

Course	Title
PORT 396-0	Topics in Lusophone Cultures [2]
SPANISH 231-0	The "New" Latin American Narrative (Taught in English)
SPANISH 232-0	Discovering Jewish Latin America
SPANISH 260-0	Literature in Latin America before 1888
SPANISH 261-0	Literature in Latin America since 1888
SPANISH 340-0	Colonial Latin American Literature
SPANISH 341-0	Latin American Modernismo
SPANISH 342-0	Race and Representation in Latin America
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 Latina/o America and Spain
SPANISH 361-0	Latin America: Studies in Culture and Society
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]
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. 317)
- Latina and Latino Studies Minor (p. 317)

LATINO 101-6 First-Year Seminar (1 Unit) Open to first-year students in Weinberg College. Subjects vary quarterly. *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. 198) *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 its transnational context, from the 16th century to the present. HISTORY 218-0 and LATINO 218-0 are taught together; students may receive credit for one of these courses, and cannot be enrolled in both. *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. ENGLISH 277-0 and SPANISH 277-0 are taught together; students may receive credit for one of these courses, and cannot be enrolled in both. *Literature Fine Arts Distro Area*

LATINO 312-0 Latinx Chicago (1 Unit) The Chicagoland area has long been a home for Latina/o/x communities. These communities, spanning and spilling beyond city limits, have profoundly shaped life in the Windy City. Drawing on the ever-growing interdisciplinary scholarship on Latinx Chicago, students will explore the local formation of Latinx identities, politics, and cultural production.

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. 198) *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. 198) *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. 27) 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. 244)
- 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 (https://www.latinostudies.northwestern.edu/undergraduate/honors.html) and Honors in the Major (p. 201).

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. 319)
- Legal Studies Minor (p. 320)

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 and the influence of society on law. Courts, the legal profession, law enforcement, inequality, and social change. 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. SOCIOL 227-0 and LEGAL_ST 207-0 are taught together; may not receive credit for both courses. Prerequisite: LEGAL_ST 206-0 or SOCIOL 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 315-0 Corporation in US Law and Culture (1 Unit) Tracing the evolution of the corporate person in the United States from the colonial era to the present: both the evolving legal rights and responsibilities of the corporation and the role that corporations have played in the American cultural imagination. *Social Behavioral Sciences Distro Area*

LEGAL_ST 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 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 320-0 The Fourteenth Amendment (1 Unit) The Fourteenth Amendment's role in defining and protecting citizenship, privileges and immunities, due process, and equal protection from its nineteenth-century origins to the present. HISTORY 320-0 and LEGAL_ST 320-0 are taught together; 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 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. LEGAL_ST 331-0 and POLI_SCI 331-0 are taught together; may not receive credit for both courses.

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: Civil and Political Rights (1 Unit) Consideration of US Supreme Court decisions dealing with civil and political rights, including equality, freedom of speech, and freedom of religion. 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, 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. 198*) 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 360-0 Animal Law (1 Unit) Survey of laws, regulations, and cultural norms regarding nonhuman animals and animal ownership in the United States. History of animal protection movement, wildlife regulation, hunting and fishing rights, livestock care and slaughter, animal experimentation, anti-cruelty legislation, and companion animal law. Prerequisite: Legal_St 206-0 or Poli_Sci 230-0, or instructor approval. Taught with ENVR_POL 360-0; 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 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. POLI_SCI 380-0 and LEGAL_ST 380-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

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 244-0. *Social Behavioral Sciences Distro Area*

LEGAL_ST 394-LK Professional Linkage Seminar (1 Unit) Varied legal topics taught by practitioners. May be repeated for credit with different topics.

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 206, 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 (https://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 and 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. 27) 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 & LEGAL_ST 398-2	Advanced Research Seminar 1 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 (https://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. 244) 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. 201).

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. 244) credits may be counted with permission of the legal studies adviser.

Approved electives are listed on the program website (https://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.

Through their Linguistics courses, students will learn about language as a complex system with formal, cognitive, social and physical aspects. Students will explore the deep commonalities and systematic variation among diverse languages and speakers, as observed at multiple levels of linguistic organization, including sounds, words, sentences and discourses. Linguistics students will learn how the scientific method is used to develop theories based on empirical evidence, and refine their ability to communicate the scientific understanding of language and linguistic theories in written and oral presentations.

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. 321)
- Linguistics Minor (p. 322)
- Linguistics BA/MA (p. 322)

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. LING 222-0 and SLAVIC 222-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198)

LING 223-0 Language & Gender (1 Unit) Exploration of socially and linguistically 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 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 312-0 Experimental Sociolinguistics (1 Unit)
Experimental approaches to the social meaning of language. Discussion of sociolinguistic research questions best suited to the use of experimental methods. Investigation of theoretical and methodological contributions of experimental work to sociolinguistic theory. Social inferences based on language, social expectations' influence on linguistic perception, roles of experiences, stereotypes and attitudes on language, awareness and control in sociolinguistic perception.
Prerequisite: LING 220 or 250; graduate standing or consent of instructor.
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: any 200 level course in linguistics.
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: any 200 level course in linguistics.

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. Taught with PSYCH 460-0.
Prerequisite: any 200-level course in linguistics 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.
Prerequisite: any 200 level course in linguistics; graduate standing or consent of instructor.
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: any 200 level course in linguistics.
Social Behavioral Sciences Distro Area

LING 327-0 Language & Sexuality (1 Unit) The use of language to construct sexual identity, focusing on the language of and about gay men and lesbians. Topics include heteronormativity, identity labels and categories, gender versus sexuality, and cross-cultural sexual diversity. Taught with GNDR_ST 327-0; may not receive credit for both courses.
Prerequisite: any 200-level 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.
Prerequisite: any 200 level course in linguistics, graduate standing or consent of instructor.
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.
Prerequisite: Basic programming experience is required, at the level of at least LING 300-0 (Intro to Text Processing and Programming for Linguists) or COMP_SCI 110-0 (Intro to Computer Programming).
Formal Studies Distro Area

LING 341-0 Language Typology (1 Unit)
A comparison of varying and universal features of the world's languages.
Prerequisite: any 200 level course in linguistics, graduate standing or consent of instructor.
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.
Prerequisite: any 200 level course in linguistics, graduate standing or consent of instructor.
Formal Studies Distro Area

LING 350-0 Fundamentals of Laboratory Phonology (1 Unit)
Sound patterns of diverse languages and their expression in articulatory and acoustic phonetics. Syllable structure, phonotactics, morpho-phonological alternation, stress. Fundamentals of laboratory methods and the quantitative analysis of speech data.
Prerequisite: any 200-level Linguistics course 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.
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: any 200 level course in linguistics, graduate standing 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 the use and interpretation of referring expressions. Topics include definiteness, common ground, genericity, deixis, and anaphora. Prerequisite: any 200-level course in linguistics, a course in 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: any 200-level course in linguistics or consent of instructor.

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, impliciture, and the semantics-pragmatics boundary.
Prerequisite: any 200-level course in linguistics or consent of instructor.
Social Behavioral Sciences Distro Area

LING 380-0 Spoken English for Nonnative 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 Nonnative 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. 27) and the degree requirements of their home school.

Course	Title
Department Courses (12 units)	
Introductory courses (2 units)	
Any two 200-level courses in Linguistics	
Methods courses (3 units)	
1 course from each of the following categories:	
Statistical [1]	
STAT 202-0	Introduction to Statistics and Data Science
STAT 210-0	Introduction to Probability and Statistics
Computational	
COMP_SCI 110-0	Introduction to Computer Programming
COMP_SCI 111-0	Fundamentals of Computer Programming
Experimental	
COG_SCI 210-0	Language and the Brain
LING 312-0	Experimental Sociolinguistics
LING 315-0	Experimental Approaches to Word Form Processing
LING 316-0	Experimental Syntax
LING 317-0	Experimental Pragmatics
LING 321-0	Bilingualism
Advanced courses (7 units)	
7 additional courses beyond the 200 level [2]	

1 PSYCH 201 may substitute for either STAT 202-0 or STAT 210-0 with DUS approval

2 Only 1 of the 7 may be LING 398-0 Undergraduate Seminar in Linguistics or LING 399-0 Independent Study.

Adjunct major in MMSS

Linguistics majors pursuing an adjunct major in Mathematical Methods in the Social Sciences (p. 325) (MMSS) may double-count the following MMSS courses towards linguistics major requirements (for triple major limitations see MMSS Adjunct Major (p. 326)):

- MMSS 311-1 and MMSS 311-2 may be counted as 300-level advanced 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 for participation in the honors program 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 participating in the honors program must meet with the Director of Undergraduate Studies for Linguistics to approve their work plan no later than the first week of Fall Quarter in their senior year. The honors thesis must be submitted to the Director of Undergraduate Studies for Linguistics no later than April 30 of the student's senior year.

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. 201).

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 (6 units)	
Introductory courses (2 units)	
Any two 200-level courses in Linguistics	
Methods course (1 unit). Any one of the following:	
COG_SCI 210-0	Language and the Brain
LING 312-0	Experimental Sociolinguistics
LING 315-0	Experimental Approaches to Word Form Processing
LING 316-0	Experimental Syntax
LING 317-0	Experimental Pragmatics
LING 321-0	Bilingualism
Advanced courses (3 units)	
3 additional linguistics courses beyond the 200 level [1]	

1 Only 1 of the 3 may be LING 398-0 Undergraduate Seminar in Linguistics or LING 399-0 Independent Study Independent Study.

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 must complete all requirements for the BA degree along with the course requirements for the Linguistics major. 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.

Information about degree requirements can be found in the Graduate Catalog section describing the combined BA/MA program in Linguistics (https://catalogs.northwestern.edu/tgs/linguistics/linguistics-bach-mast/).

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. 323)
- Materials Science Minor (p. 324)
- Materials Science Second Major for ISP Students (p. 324)

These courses are offered by the Robert R. McCormick School of Engineering and Applied Sciences. See Materials Science and Engineering (p. 180).

Materials Science Major

Students must also complete the Undergraduate Registration Requirement (p. 27) 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. 178) 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	Introduction to Materials
or MAT_SCI 301-0	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. 324)	
Soft Materials Track (p. 324)	
3 advanced electives:	
At least 1 in materials science chosen from: [1]	
MAT_SCI 318-0	Materials Selection
MAT_SCI 332-0	Mechanical Behavior of Solids
MAT_SCI 336-0	Chemical Synthesis of Materials
MAT_SCI 337-0	Conducting Polymers
MAT_SCI 340-0	Ceramic Processing
MAT_SCI 351-2	Introductory Physics of Materials
MAT_SCI 353-0	Bioelectronics
MAT_SCI 354-0	Bioelectronics Lab
MAT_SCI 355-0	Electronic Materials
MAT_SCI 357-0	Nanomagnetic Materials for Information Storage
MAT_SCI 358-0	Modeling and Simulation in Materials Science and Engineering
MAT_SCI 360-0	Introduction to Electron Microscopy
MAT_SCI 361-0	Crystallography & Diffraction
MAT_SCI 370-0	Biomaterials
MAT_SCI 371-0	Biominerals: 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 387-0	Solar Energy Conversion
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 215-3	Advanced 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
EARTH 300-0	Earth and Planetary Materials
MATH 250-0	Elementary Differential Equations
MATH 351-0	Fourier Analysis and Boundary Value Problems
or MATH 381-0	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
Foundations in Mathematics and Science (Units depend on chemistry and mathematics sequences taken.)	
MATH 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus
or MATH 218-1 & MATH 218-2 & MATH 218-3	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
MATH 230-1 & MATH 230-2 & MATH 240-0	Multivariable Differential Calculus and Multivariable Integral 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
CHEM 110-0 & CHEM 131-0 & CHEM 132-0	Quantitative Problem Solving in Chemistry and 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

PHYSICS 135-1	General Physics
& PHYSICS 135-2	and General Physics
& PHYSICS 135-3	and General Physics
or PHYSICS 125-1	General Physics ISP
& PHYSICS 125-2	and General Physics for ISP
& PHYSICS 125-3	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 215-1	Organic Chemistry I
CHEM 342-1	Thermodynamics
or MAT_SCI 314-0	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 course in another department	

Soft Materials Track

Course	Title
CHEM 215-1	Organic Chemistry I
& CHEM 215-2	and Organic Chemistry II
or CHEM 212-1	Organic Chemistry
& CHEM 212-2	and Organic Chemistry
CHEM 342-1	Thermodynamics
or MAT_SCI 314-0	Thermodynamics of Materials
MAT_SCI 331-0	Soft Materials
MAT_SCI 370-0	Biomaterials
or BMD_ENG 343-0	Biomaterials and Medical Devices

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. 201).

Materials Science Minor

Course	Title
Program Courses (6 units)	
MAT_SCI 201-0	Introduction to Materials
or MAT_SCI 301-0	Materials Science Principles
MAT_SCI 315-0	Phase Equilibria & Diffusion of Materials
MAT_SCI 316-1	Microstructural Dynamics
MAT_SCI 316-2	Microstructural Dynamics
2 other 300-level materials science courses [1]	
Foundations in Mathematics and Science (units depend on chemistry and mathematics sequences taken)	
MATH 220-1	Single-Variable Differential Calculus
& MATH 220-2	and Single-Variable Integral Calculus
or MATH 218-1	Single-Variable Calculus with Precalculus
& MATH 218-2	and Single-Variable Calculus with Precalculus
& MATH 218-3	and Single-Variable Calculus with Precalculus
MATH 230-1	Multivariable Differential Calculus
& MATH 230-2	and Multivariable Integral Calculus (or equivalent) [2]
CHEM 110-0	Quantitative Problem Solving in Chemistry
& CHEM 131-0	and General Chemistry 1
& CHEM 132-0	and General Chemistry 2
or CHEM 151-0	Accelerated General Chemistry 1
& CHEM 152-0	and Accelerated General Chemistry 2
or CHEM 171-0	Advanced General Inorganic Chemistry
& CHEM 172-0	and Advanced General Physical Chemistry
1 course in thermodynamics:	
MAT_SCI 314-0	Thermodynamics of Materials
or CHEM 342-1	Thermodynamics
or PHYSICS 332-0	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. 27) 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	Introduction to Materials
or MAT_SCI 301-0	Materials Science Principles
MAT_SCI 315-0	Phase Equilibria & Diffusion of Materials
MAT_SCI 316-1	Microstructural Dynamics
MAT_SCI 316-2	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. 201).

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. 336) 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/) and relevant sections of this Catalog 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.

Key objectives students should develop from graduating from the MMSS Program

- Understand normative principles of Social Science and identify key tradeoffs in practical policy questions.
- Develop fluency in the use of formal models to capture and quantify essential themes.
- Understand the limitations of Social Science data and learn to recognize the appropriate empirical tools for overcoming these limitations.
- Formulate and execute original research questions.
- Communicate in both formal and informal language the key ideas in practical policy debates.

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 two quarters of calculus (MATH 220-1 Single-Variable Differential Calculus and MATH 220-2 Single-Variable Integral Calculus) 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 226-0	Sequences and Series
MATH 230-1	Multivariable Differential Calculus
MATH 230-2	Multivariable Integral 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. 11). 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. 326)

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) A fast-paced mathematical treatment of intermediate microeconomics designed for mathematically sophisticated students. No previous training in microeconomics is assumed. Topics covered include consumer and producer behavior in market economies, equilibrium in competitive and monopolistic markets, public goods and externalities, and welfare analysis. *Social Behavioral Sciences Distro Area*

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. *Social Behavioral Sciences Distro Area*

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. 27) 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

Joint Majors

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. 336) 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/) and relevant sections of this Catalog for information on adjustments to requirements in other majors or minors for students in MMSS:

- Anthropology Major (p. 214)
- Data Science Major (p. 396)
- Economics Major (p. 265)
- Linguistics Major (p. 321)
- Political Science Major (p. 362)
- Psychology Major (p. 368)
- Sociology Major (p. 383)
- Statistics Major (p. 395)
- Statistics Minor (p. 395)

Triple majors

Students wishing to pursue two joint majors with MMSS (i.e. to pursue a triple major) are NOT allowed to double count MMSS courses towards both of their other majors, i.e., MMSS students may only apply the double counting rules to ONE major. In special cases, permission may be given to count some MMSS courses as fulfilling the requirements of two other majors. However, explicit permission must be obtained from the Director of MMSS and from the Directors of Undergraduate Studies of BOTH of the other departments.

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 or MMSS 398-3. 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. 201).

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, and to develop an understanding of both the foundations and frontiers of the discipline.

The Department of Mathematics (https://www.math.northwestern.edu) offers a major and a minor in mathematics. The mathematics major and minor are 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 strong preparation who seek an early exposure to rigorous mathematics should consider participating in Mathematical Experience for Northwestern Undergraduates (MENU) (https://math.northwestern.edu/undergraduate/menu/). The department also encourages well-prepared undergraduate students to enroll in its graduate courses.

Course Recommendations

First-Year Placement

For information about course placement for first-year students, see the First Year Focus (https://www.math.northwestern.edu/undergraduate/first-year-focus/) webpage.

Mathematical Experience for Northwestern Undergraduates (MENU)

Mathematical Experience for Northwestern Undergraduates (MENU) (https://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 (https://www.math.northwestern.edu/undergraduate/advising/) is available to advise all MENU participants regardless of major.

The First Year

During the first year MENU participants typically enroll in one of two yearlong sequences:

Course	Title
MATH 290-1	MENU: Linear Algebra and Multivariable Calculus
& MATH 290-2	and MENU: Linear Algebra and Multivariable Calculus
& MATH 290-3	and MENU: Linear Algebra and Multivariable Calculus
or MATH 291-1	MENU: Intensive Linear Algebra and Multivariable Calculus
& MATH 291-2	and MENU: Intensive Linear Algebra and Multivariable Calculus
& MATH 291-3	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. 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 (https://www.math.northwestern.edu/undergraduate/advising/).

MENU and MATH 226-0

MENU participants who do not have credit for MATH 226-0 should consider taking MATH 226-0, which is a prerequisite for most further courses in differential equations, probability, and analysis. MENU participants who anticipate taking ECON 381-1 should note that MATH 314-0 is prerequisite for ECON 381-1, and MATH 226-0 is prerequisite for MATH 314-0. MATH 226-0 is also a required course for the mathematics major, the mathematics minor, the statistics major, and the statistics minor.

Beyond the First Year

After the first year MENU participants may choose among four upper-level MENU sequences:

Course	Title
MATH 311-1	MENU: Probability and Stochastic Processes
& MATH 311-2	and MENU: Probability and Stochastic Processes
& MATH 311-3	and MENU: Probability and Stochastic Processes
MATH 321-1	MENU: Real Analysis
& MATH 321-2	and MENU: Real Analysis
& MATH 321-3	and MENU: Real Analysis
MATH 331-1	MENU: Abstract Algebra
& MATH 331-2	and MENU: Abstract Algebra
& MATH 331-3	and MENU: Abstract Algebra
MATH 360-1	MENU: Applied Analysis
& MATH 360-2	and MENU: Applied Analysis

or they may enroll in other advanced mathematics courses.

Participating in MENU

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 (https://www.math.northwestern.edu/undergraduate/advising/) 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 220-1 or MATH 220-2 may consult the Director of MENU (https://www.math.northwestern.edu/undergraduate/advising/) about continuing their studies of mathematics in MENU. Further information is available at Mathematical Experience for Northwestern Undergraduates (MENU) (https://math.northwestern.edu/undergraduate/menu/).

Mathematics and Computer Science

Students interested in mathematics and computer science should consider the following courses and course sequences:

Course	Title
MATH 300-0	Foundations of Higher Mathematics
MATH 306-0	Combinatorics & Discrete Mathematics
MATH 308-0	Graph Theory
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
MATH 334-0	Linear Algebra: Second Course
MATH 336-1	Introduction to the Theory of Numbers
COMP_SCI 336-0	Design & Analysis of Algorithms
COMP_SCI 339-0	Introduction to Database Systems
COMP_SCI 349-0	Machine Learning
IEMS 303-0	Statistics

Mathematics and Economics

Students interested in mathematics and economics should consider the following courses and course sequences:

Course	Title
MATH 314-0 & MATH 310-2 & MATH 310-3	Probability and Statistics for Econometrics and Probability and Stochastic Processes and Probability and Stochastic Processes
or MATH 314-0 & MATH 311-2 & MATH 311-3	Probability and Statistics for Econometrics 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
ECON 331-0	Economics of Risk and Uncertainty
ECON 380-1 & ECON 380-2	Game Theory and Game Theory
ECON 381-1 & ECON 381-2	Econometrics and Econometrics

Enrolling in MATH 311-2 after MATH 314-0 requires permission from the Department of Mathematics (https://www.math.northwestern.edu).

Actuarial Science

The following courses and course sequences are essential for students pursuing a credential in actuarial science:

Course	Title
ECON 381-1 & ECON 381-2	Econometrics and Econometrics
or MATH 386-1 & MATH 386-2	Econometrics for MMSS and Econometrics for MMSS
ECON 360-1	Foundations of Corporate Finance Theory
or KELLG_FE 310-0	Principles of Finance
or CIV_ENV 205-0	Economics and Finance for Engineers
ECON 310-1	Microeconomics
ECON 311-0	Macroeconomics

To prepare for Exam P by the Society of Actuaries or Exam 1 by the Casualty Actuarial Society students should consider the following course sequences:

Course	Title
MATH 314-0 & MATH 310-2 & MATH 310-3	Probability and Statistics for Econometrics and Probability and Stochastic Processes and Probability and Stochastic Processes
or MATH 314-0 & MATH 311-2 & MATH 311-3	Probability and Statistics for Econometrics and MENU: Probability and Stochastic Processes and MENU: Probability and Stochastic Processes

Enrolling in MATH 311-2 after MATH 314-0 requires permission from the Department of Mathematics (https://www.math.northwestern.edu).

Students interested in actuarial science should also consider the following courses and course sequences:

Course	Title
MATH 366-0	Mathematical Models in Finance
BUS_INST 301-0	Accounting
STAT 320-2 & STAT 320-3	Statistical Theory & Methods 2 and Statistical Theory & 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
STAT 359-0	Topics in Statistics

Programs of Study

- Mathematics Major (p. 333)
- Mathematics Minor (p. 335)
- Mathematics Second Major for ISP Students (p. 335)
- Mathematics Second Major or Minor for MMSS Students (p. 336)

The Director of Undergraduate Studies in Mathematics (https://www.math.northwestern.edu/undergraduate/advising/) may waive prerequisites for mathematics courses. No waived prerequisite course is eligible for credit after a student completes another course for which it is prerequisite without permission from the Department of Mathematics (https://www.math.northwestern.edu). MATH 100-0 and MATH 110-0 are not available for credit after completing a course at the 200 level or higher. See the course descriptions for other restrictions. See Weinberg College Policies (p. 200) 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. Solving multistep problems using elementary algebra, probability, and statistics. *Formal Studies Distro Area*

MATH 100-BR Quantitative Reasoning (0.5 Unit) For participants in Bridge I summer program. Analyzing topical, real-life problems from a quantitative perspective. Solving multistep problems using elementary algebra, probability, and statistics. Taken with HUM 100-1-BR.

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. Students may not receive credit for MATH 110-0 after completing a 200-level MATH course or higher. *Formal Studies Distro Area*

MATH 202-0 Finite Mathematics (1 Unit) Selected topics 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 (former), MATH 213-0 (former), MATH 214-0 (former), MATH 218-1, MATH 218-2, MATH 218-3, MATH 220-0 (former), MATH 220-1, MATH 220-2, MATH 224-0 (former), or MATH 226-0. Not suitable for students planning to major in mathematics, the natural sciences, or economics. *Formal Studies Distro Area*

MATH 218-1 Single-Variable Calculus with Precalculus (1 Unit) Functions and graphs. Limits. Continuity. Differentiation. Linearization. Students may not receive credit for both MATH 218-1 and any of MATH 211-0, MATH 212-0 (former), MATH 220-0 (former), or MATH 220-1. Prerequisite: consent of the department. *Formal Studies Distro Area*

MATH 218-2 Single-Variable Calculus with Precalculus (1 Unit) Extreme value theorem, mean value theorem, and curve-sketching. Related rates. Optimization. Transcendental and inverse functions. Students may not receive credit for both MATH 218-2 and any of MATH 211-0, MATH 212-0 (former), MATH 220-0 (former), or MATH 220-1. Prerequisite: MATH 218-1 or consent of the department. *Formal Studies Distro Area*

MATH 218-3 Single-Variable Calculus with Precalculus (1 Unit) Definite integrals, antiderivatives, and the fundamental theorem of calculus. Areas and volumes. Techniques of integration, numerical integration, and improper integrals. First-order linear and separable ordinary differential equations. Students may not receive credit for both MATH 218-3 and any of MATH 213-0 (former), MATH 220-2, or MATH 224-0 (former). Prerequisite: MATH 218-2 or consent of the department. *Formal Studies Distro Area*

MATH 218-SG-1 Peer-Guided Study Group: Single-Variable Calculus with Precalculus (0 Unit) Peer-guided study group for students enrolled in MATH 218-1. Meets weekly in small groups with a peer facilitator, to collaboratively review material, solve practice problems, and clarify concepts. Enrollment optional. Graded S/U.

MATH 218-SG-2 Peer-Guided Study Group: Single-Variable Calculus with Precalculus (0 Unit) Peer-guided study group for students enrolled in MATH 218-2. Meets weekly in small groups with a peer facilitator, to collaboratively review material, solve practice problems, and clarify concepts. Enrollment optional. Graded S/U.

MATH 218-SG-3 Peer-Guided Study Group: Single-Variable Calculus with Precalculus (0 Unit) Peer-guided study group for students enrolled in MATH 218-3. Meets weekly in small groups with a peer facilitator, to collaboratively review material, solve practice problems, and clarify concepts. Enrollment optional. Graded S/U.

MATH 220-1 Single-Variable Differential Calculus (1 Unit) Limits. Differentiation. Linear approximation and related rates. Extreme value theorem, mean value theorem, and curve-sketching. Optimization. Students may not receive credit for both MATH 220-1 and any of MATH 211-0, MATH 212-0 (former), MATH 213-0 (former), MATH 218-1, MATH 218-2, or MATH 220-0 (former). *Formal Studies Distro Area*

MATH 220-2 Single-Variable Integral Calculus (1 Unit) Definite integrals, antiderivatives, and the fundamental theorem of calculus. Transcendental and inverse functions. Areas and volumes. Techniques of integration, numerical integration, and improper integrals. First-order linear and separable ordinary differential equations. Students may not receive credit for both MATH 220-2 and any of MATH 213-0 (former), MATH 214-0 (former), MATH 218-3, or MATH 224-0 (former). Prerequisite: MATH 218-2 or MATH 220-0 (former) or MATH 220-1. *Formal Studies Distro Area*

MATH 220-MG-2 Midquarter Study Group: MATH 220-2 Single-Variable Integral Calculus (0 Unit) Peer-guided study group for students enrolled in MATH 220-2. Meets weekly, starting at midquarter, in small groups with a peer facilitator to collaboratively review material, solve practice problems, and clarify concepts. Enrollment optional. Graded S/U.

MATH 220-SG-1 Peer-Guided Study Group: Single-Variable Differential Calculus (0 Unit) Peer-guided study group for students enrolled in MATH 220-1. Meets weekly in small groups with a peer facilitator to collaboratively review material, solve practice problems, and clarify concepts. Enrollment optional. Graded S/U.

MATH 220-SG-2 Peer-Guided Study Group: Single-Variable Integral Calculus (0 Unit) Peer-guided study group for students enrolled in MATH 220-2. Meets weekly in small groups with a peer facilitator to collaboratively review material, solve practice problems, and clarify concepts. Enrollment optional. Graded S/U.

MATH 226-0 Sequences and Series (1 Unit) Infinite sequences. Infinite series and convergence tests. Power series, Taylor series, Taylor polynomials and error. Complex numbers. Second-order linear ordinary differential equations and power series solutions. Students may not receive credit for both MATH 226-0 and any of MATH 214-0 (former), MATH 224-0 (former), or MATH 281-2. Prerequisite: MATH 218-3 or MATH 220-2. *Formal Studies Distro Area*

MATH 228-1 Multivariable Differential Calculus for Engineering (1 Unit) Vectors, vector functions, partial derivatives, Taylor polynomials, and optimization. Emphasis on engineering applications. For McCormick School of Engineering students only. Students may not receive credit for both MATH 228-1 and any of MATH 230-0 (former), MATH 230-1, MATH 281-1, MATH 285-2, MATH 290-2, MATH 291-2, or ES_APPM 252-1. Prerequisite: MATH 218-3 or MATH 214-0 (former) or MATH 220-2 or MATH 224-0 (former). *Formal Studies Distro Area*

MATH 228-2 Multivariable Integral Calculus for Engineering (1 Unit) Multiple integration: double integrals, triple integrals, and change of variables. Vector calculus: vector fields, line integrals, surface integrals, curl and divergence, Green's theorem, Stokes' theorem, and the divergence theorem. Emphasis on engineering applications. For McCormick School of Engineering students only. Students may not receive credit for both MATH 228-2 and any of MATH 230-2, MATH 234-0 (former), MATH 281-2, MATH 285-3, MATH 290-3, MATH 291-3, or ES_APPM 252-2. Prerequisite: MATH 228-1 or MATH 230-0 (former)

or MATH 230-1 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 228-SG-1 Peer-Guided Study Group: Multivariable Calculus for Engineering (0 Unit) Peer-guided study group for students enrolled in MATH 228-1. Meets weekly in small groups with a peer facilitator to collaboratively review material, solve practice problems, and clarify concepts. Enrollment optional. Graded S/U.

MATH 230-1 Multivariable Differential Calculus (1 Unit) Vectors, vector functions, partial derivatives, and optimization. Not open to students in the McCormick School of Engineering. Students may not receive credit for both MATH 230-1 and any of MATH 228-1, MATH 230-0 (former), MATH 281-1, MATH 285-2, MATH 290-2, MATH 291-2, or ES_APPM 252-1. Prerequisite: MATH 218-3 or MATH 214-0 (former) or MATH 220-2 or MATH 224-0 (former). *Formal Studies Distro Area*

MATH 230-2 Multivariable Integral 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. Not open to students in the McCormick School of Engineering. Students may not receive credit for both MATH 230-2 and any of MATH 228-2, MATH 234-0 (former), MATH 281-2, MATH 285-3, MATH 290-3, MATH 291-3, or ES_APPM 252-2. Prerequisite: MATH 228-1 or MATH 230-0 (former) or MATH 230-1 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 230-SG-1 Peer-Guided Study Group: Multivariable Differential Calculus (0 Unit) Peer-guided study group for students enrolled in MATH 230-1. Meets weekly in small groups with a peer facilitator to collaboratively review material, solve practice problems, and clarify concepts. Enrollment optional. Graded S/U.

MATH 235-0 Series and Multiple Integrals (1 Unit) Sequences and series, and convergence tests. Power series, Taylor polynomials and error. Double integrals, triple integrals, and change of variables. Students may receive credit for only one of MATH 235#0, MATH 226#0, or STAT 228#0. Prerequisite: MATH 218#3 or MATH 220#2, and MATH 228#1 or MATH 230#1 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 230-1 or MATH 230-0 (former) 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 226-0 or MATH 281-2; and MATH 228-2 or MATH 230-2 or MATH 234-0 (former) 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 228-1, MATH 230-0 (former), MATH 230-1, 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 226-0, MATH 228-2, MATH 230-2, MATH 234-0 (former), 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 228-1, MATH 230-0 (former), MATH 230-1, 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 228-2, MATH 230-2, MATH 234-0 (former), 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. *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 228-1, MATH 230-0 (former), MATH 230-1, 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 228-2, MATH 230-2, MATH 234-0 (former), 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, vector spaces, and subspaces. 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: orthogonality, determinants, eigenvectors, and symmetric matrices. 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 228-1, MATH 230-0 (former), MATH 230-1, MATH 281-1, MATH 285-2, MATH 290-2, or ES_APPM 252-1. Prerequisite: MATH 291-1. *Formal Studies Distro Area*

MATH 291-3 MENU: Intensive Linear Algebra and Multivariable Calculus (1 Unit) Multivariable differential calculus: optimzation. 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 228-2, MATH 230-2, MATH 234-0 (former), MATH 281-2, MATH 285-3, MATH 290-3, or ES_APPM 252-2. Prerequisite: MATH 291-2. *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. 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 300-BR Foundations of Higher Mathematics (1 Unit)
For participants in the Causeway Postbaccalaureate Program only. Introduction to fundamental mathematical structures, including sets, functions, equivalence relations, and cardinal numbers. Elementary logic and proof techniques. Additional topics selected by the instructor.

MATH 306-0 Combinatorics & Discrete Mathematics (1 Unit)
Discrete mathematics, inductive reasoning, counting problems, binomial coefficients and Pascal's triangle, Fibonacci numbers, set and integer 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.
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 ELEC_ENG 302-0. Prerequisite or corequisite: MATH 226-0 or MATH 281-2; and MATH 228-2 or MATH 230-2 or MATH 234-0 (former), 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 or MATH 314-0 or MATH 385-0 or STAT 320-1 or STAT 383-0 or IEMS 202-0 or ELEC_ENG 302-0.
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 ELEC_ENG 302-0.
Prerequisite: MATH 226-0 or MATH 281-2; and MATH 291-3, or MATH 300-0 and any one of MATH 290-3, MATH 281-2, MATH 285-3 or ES_APPM 252-2; or consent of the department. Recommended: MATH 320-1 or MATH 321-1.
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 ELEC_ENG 302-0. Prerequisite or corequisite: MATH 226-0 or MATH 281-2; and MATH 228-2 or MATH 230-2 or MATH 234-0 (former) or MATH 281-1 or MATH 285-3 or MATH 290-3 or MATH 291-3 or ES_APPM 252-2.
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 226-0 or MATH 281-2; and 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: 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. Students may not receive credit for both MATH 325-0 and either MATH 382-0 or ES_APPM 312-0.
Prerequisites: MATH 226-0 or MATH 281-2; and MATH 228-2 or MATH 230-2 or MATH 234-0 (former) 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 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, 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 226-0 or MATH 281-3; and MATH 228-2 or MATH 230-2 or MATH 234-0 (former) 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 Interdisciplinary Distro - See Rules *(*p. 198*)*
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.
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.
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: 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.
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.
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.
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 228-1 or MATH 230-1 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.
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 226-0 or MATH 281-2; and MATH 228-2 or MATH 230-2 or MATH 234-0 (former) 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 354-0 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 360-1 MENU: Applied Analysis (1 Unit)
Linear ordinary differential equations, systems of linear ordinary differential equations, and 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 226-0 or MATH 281-2; and MATH 290-3 or MATH 291-3.
Formal Studies Distro Area

MATH 360-2 MENU: Applied Analysis (1 Unit)
Qualitative analysis of systems of ordinary differential equations. Linear partial differential equations. Fourier series and orthogonal functions. Applications. Students may not receive credit for both MATH 360-2 and any of MATH 381-0, MATH 351-0, or ES_APPM 311-2.
Prerequisite: MATH 360-1.
Formal Studies Distro Area

MATH 366-0 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 for 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 ELEC_ENG 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.
Prerequisites: MATH 226-0 or MATH 281-2; and MATH 291-3, or MATH 300-0 and one of MATH 228-2, MATH 230-2, MATH 234-0 (former), 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 only. 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 for ISP (1 Unit) Complex numbers. Analytic functions. Cauchy's theorem and the Cauchy integral formula. Series. Residues. For ISP students only. Students may not receive credit for both MATH 382-0 and either MATH 325-0 or ES_APPM 312-0. 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 ELEC_ENG 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. 27) and the degree requirements of their home school.

Major Requirements

(Units depend on basic courses.)

The mathematics major consists of basic courses and 9 upper-level courses.

Basic Courses

Students may count basic courses toward the requirements of more than one major, minor, or program.

Course	Title
MATH 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus

or MATH 218-1	Single-Variable Calculus with Precalculus
& MATH 218-2	and Single-Variable Calculus with Precalculus
& MATH 218-3	and Single-Variable Calculus with Precalculus
MATH 226-0	Sequences and Series
MATH 230-1	Multivariable Differential Calculus
& MATH 230-2	and Multivariable Integral Calculus
& MATH 240-0	and Linear Algebra
or MATH 228-1	Multivariable Differential Calculus for Engineering
& MATH 228-2	and Multivariable Integral Calculus for Engineering
& GEN_ENG 205-1	and Engineering Analysis I
or ES_APPM 252-1	Honors Calculus for Engineers
& ES_APPM 252-2	and Honors Calculus for Engineers
& GEN_ENG 206-1	and Honor Engineering Analysis
or MATH 281-1	Accelerated Mathematics for ISP. First Year
& MATH 281-2	and Accelerated Mathematics for ISP. First Year
& MATH 281-3	and Accelerated Mathematics for ISP. First Year
or MATH 285-1	Accelerated Mathematics for MMSS: First Year
& MATH 285-2	and Accelerated Mathematics for MMSS: First Year
& MATH 285-3	and Accelerated Mathematics for MMSS: First Year
or MATH 290-1	MENU: Linear Algebra and Multivariable Calculus
& MATH 290-2	and MENU: Linear Algebra and Multivariable Calculus
& MATH 290-3	and MENU: Linear Algebra and Multivariable Calculus
or MATH 291-1	MENU: Intensive Linear Algebra and Multivariable
& MATH 291-2	Calculus
& MATH 291-3	and MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus

Upper-level Courses

Students must complete 9 upper-level mathematics courses. Upper-level courses are courses at the 300 level or above.

The 9 upper-level courses must include at least 1 of these three-course sequences:

Course	Title
MATH 310-1	Probability and Stochastic Processes
& MATH 310-2	and Probability and Stochastic Processes
& MATH 310-3	and Probability and Stochastic Processes
MATH 311-1	MENU: Probability and Stochastic Processes
& MATH 311-2	and MENU: Probability and Stochastic Processes
& MATH 311-3	and MENU: Probability and Stochastic Processes
MATH 320-1	Real Analysis
& MATH 320-2	and Real Analysis
& MATH 320-3	and Real Analysis
MATH 321-1	MENU: Real Analysis
& MATH 321-2	and MENU: Real Analysis
& MATH 321-3	and MENU: Real Analysis
MATH 330-1	Abstract Algebra
& MATH 330-2	and Abstract Algebra
& MATH 330-3	and Abstract Algebra
MATH 331-1	MENU: Abstract Algebra
& MATH 331-2	and MENU: Abstract Algebra
& MATH 331-3	and MENU: Abstract Algebra

The 9 upper-level courses must include at least 1 of these courses:

Course	Title
MATH 334-0	Linear Algebra: Second Course
MATH 311-1	MENU: Probability and Stochastic Processes
MATH 320-1	Real Analysis
MATH 321-1	MENU: Real Analysis
MATH 330-1	Abstract Algebra
MATH 331-1	MENU: Abstract Algebra

With prior approval from the Director of Undergraduate Studies (https://www.math.northwestern.edu/undergraduate/advising/), the 9 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, minor, or program.

Honors in Mathematics

The Department of Mathematics (https://www.math.northwestern.edu) nominates outstanding mathematics majors to graduate with honors in the major. Mathematics majors interested in pursuing honors should consult with the Director of Undergraduate Studies (https://www.math.northwestern.edu/undergraduate/advising/) before the end of their junior year. To be eligible for nomination a student must:

- complete 1 of the following course sequences:

Course	Title
MATH 320-1	Real Analysis
& MATH 320-2	and Real Analysis
& MATH 320-3	and Real Analysis
or MATH 321-1	MENU: Real Analysis
& MATH 321-2	and MENU: Real Analysis
& MATH 321-3	and MENU: Real Analysis

- complete 1 of the following course sequences:

Course	Title
MATH 330-1	Abstract Algebra
& MATH 330-2	and Abstract Algebra
& MATH 330-3	and Abstract Algebra
or MATH 331-1	MENU: Abstract Algebra
& MATH 331-2	and MENU: Abstract Algebra
& MATH 331-3	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 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 contact the Director of Undergraduate Studies (https://www.math.northwestern.edu/undergraduate/advising/), and see Honors in the Major under Academic Options and Support (p. 201).

Graduate Study in Mathematics

The following courses and course sequences are essential for students intending to pursue graduate study in mathematics:

Course	Title
MATH 321-1	MENU: Real Analysis
& MATH 321-2	and MENU: Real Analysis
& MATH 321-3	and MENU: Real Analysis
or MATH 320-1	Real Analysis
& MATH 320-2	and Real Analysis
& MATH 320-3	and Real Analysis

MATH 331-1	MENU: Abstract Algebra
& MATH 331-2	and MENU: Abstract Algebra
& MATH 331-3	and MENU: Abstract Algebra
or MATH 330-1	Abstract Algebra
& MATH 330-2	and Abstract Algebra
& MATH 330-3	and Abstract Algebra
MATH 344-1	Introduction to Topology
& MATH 344-2	and Introduction to Topology
MATH 325-0	Complex Analysis

Well-prepared students pursuing graduate study in mathematics should also consider taking the following graduate course sequences:

Course	Title
MATH 410-1	Analysis
& MATH 410-2	and Analysis
& MATH 410-3	and Introduction to Modern Analysis
MATH 470-1	Algebra
& MATH 470-2	and Algebra
& MATH 470-3	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 (p. 120) program in the School of Education and Social Policy (SESP) (p. 103) by the fall of the 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.)

The mathematics minor consists of basic courses and 6 upper-level courses.

Basic Courses

Students may count basic courses toward the requirements of more than one major, minor, or program.

Course	Title
MATH 220-1	Single-Variable Differential Calculus
& MATH 220-2	and Single-Variable Integral Calculus
or MATH 218-1	Single-Variable Calculus with Precalculus
& MATH 218-2	and Single-Variable Calculus with Precalculus
& MATH 218-3	and Single-Variable Calculus with Precalculus
MATH 226-0	Sequences and Series
MATH 230-1	Multivariable Differential Calculus
& MATH 230-2	and Multivariable Integral Calculus
& MATH 240-0	and Linear Algebra
or MATH 228-1	Multivariable Differential Calculus for Engineering
& MATH 228-2	and Multivariable Integral Calculus for Engineering
& GEN_ENG 205-1	and Engineering Analysis I
or ES_APPM 252-1	Honors Calculus for Engineers
& ES_APPM 252-2	and Honors Calculus for Engineers
& GEN_ENG 206-1	and Honor Engineering Analysis
or MATH 281-1	Accelerated Mathematics for ISP. First Year
& MATH 281-2	and Accelerated Mathematics for ISP. First Year
& MATH 281-3	and Accelerated Mathematics for ISP. First Year
or MATH 285-1	Accelerated Mathematics for MMSS: First Year
& MATH 285-2	and Accelerated Mathematics for MMSS: First Year
& MATH 285-3	and Accelerated Mathematics for MMSS: First Year
or MATH 290-1	MENU: Linear Algebra and Multivariable Calculus
& MATH 290-2	and MENU: Linear Algebra and Multivariable Calculus
& MATH 290-3	and MENU: Linear Algebra and Multivariable Calculus
or MATH 291-1	MENU: Intensive Linear Algebra and Multivariable
& MATH 291-2	Calculus
& MATH 291-3	and MENU: Intensive Linear Algebra and Multivariable Calculus and MENU: Intensive Linear Algebra and Multivariable Calculus

Upper-level Courses

Students must complete 6 upper-level mathematics courses. Upper-level courses are courses at the 300 level or above.

The 6 upper-level courses must include at least 1 of the following two-course sequences:

Course	Title
MATH 310-1	Probability and Stochastic Processes
& MATH 310-2	and Probability and Stochastic Processes
MATH 311-1	MENU: Probability and Stochastic Processes
& MATH 311-2	and MENU: Probability and Stochastic Processes
MATH 320-1	Real Analysis
& MATH 320-2	and Real Analysis
MATH 321-1	MENU: Real Analysis
& MATH 321-2	and MENU: Real Analysis
MATH 330-1	Abstract Algebra
& MATH 330-2	and Abstract Algebra
MATH 331-1	MENU: Abstract Algebra
& MATH 331-2	and MENU: Abstract Algebra
MATH 344-1	Introduction to Topology
& MATH 344-2	and Introduction to Topology

With prior approval from the Director of Undergraduate Studies (https://www.math.northwestern.edu/undergraduate/advising/), 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. 27) and the degree requirements of their home school.

Students who have completed all of the requirements for the Integrated Science Program (ISP) (p. 309) major will satisfy the requirements for an additional major in mathematics by completing 1 of the following course sequences:

Course	Title
MATH 320-1	Real Analysis
& MATH 320-2	and Real Analysis
& MATH 320-3	and Real Analysis
or MATH 321-1	MENU: Real Analysis
& MATH 321-2	and MENU: Real Analysis
& MATH 321-3	and MENU: Real Analysis

or MATH 330-1	Abstract Algebra
& MATH 330-2	and Abstract Algebra
& MATH 330-3	and Abstract Algebra
or MATH 331-1	MENU: Abstract Algebra
& MATH 331-2	and MENU: Abstract Algebra
& MATH 331-3	and MENU: Abstract Algebra

Students may not substitute INTG_SCI 398-0 for any mathematics course in the ISP curriculum.

See the Mathematics Major (p. 333) 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. 27) 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. 325) but *not* a major in a social science must satisfy the ordinary requirements for the mathematics major (p. 333) 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. 325) *and* a major in a social science will satisfy the requirements for an additional major in mathematics by

- completing

Course	Title
MATH 226-0	Sequences and Series

- completing 1 of the following course sequences:

Course	Title
MATH 320-1	Real Analysis
& MATH 320-2	and Real Analysis
& MATH 320-3	and Real Analysis
or MATH 321-1	MENU: Real Analysis
& MATH 321-2	and MENU: Real Analysis
& MATH 321-3	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
or MATH 344-2	Introduction to Topology
or MATH 360-1	MENU: Applied Analysis
or MATH 360-2	MENU: Applied Analysis
or MATH 366-0	Mathematical Models in Finance
or MATH 368-0	Introduction to Optimization

Students may not count any 300 level mathematics course toward both the MMSS adjunct major and the mathematics major.

See the Mathematics Major (p. 333) 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. 325) will satisfy the requirements for a mathematics minor by

- completing

Course	Title
MATH 226-0	Sequences and Series

- and completing 1 of the following course sequences:

Course	Title
MATH 320-1	Real Analysis
& MATH 320-2	and Real Analysis
& MATH 320-3	and Real Analysis
or MATH 321-1	MENU: Real Analysis
& MATH 321-2	and MENU: Real Analysis
& MATH 321-3	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 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. 339)
- Middle East and North African Studies Minor (p. 340)

See below for Arabic Courses (p. 337), Hebrew Courses (p. 338), Persian Courses (p. 339), Turkish Courses (p. 339). *Please note that all language courses are administered by the* MENA Languages Program *(*https://mena-languages.northwestern.edu*).*

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. 198*) 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. Prerequisite: None or placement exam results.

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. Prerequisite: ARABIC 111-1 or equivalent.

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. Prerequisite: ARABIC 111-2 or equivalent.

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, writing, 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 211-1 or equivalent.

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

ARABIC 216-0 Language and Culture (1 Unit) In this course students will study important cultural themes in Arab society. In-depth exploration of a variety of historical and cultural topics from various sources help students build a comprehensive vocabulary as well as expand their reading knowledge and cultural understanding. The course will engage both, the MSA "frame" of narration as well as the spoken Arabic dialogue. Prerequisite: ARABIC 121-3 or permission of the instructor.

ARABIC 245-0 Current Events in the Middle East: Arab Society through Online News Media (1 Unit) This course focuses on current events in the Middle East through in#depth exploration of online News Media sources such as foreign newspaper articles and videos. Students will gain respect for alternative ideas and diversity of views as expressed in Arab news. The course focuses on reading, listening, discussion as well as building a comprehensive vocabulary in MSA and dialect. Prerequisite: ARABIC 121-3 and ARABIC 125-0 or permission of the instructor. May be repeated for credit with different topic.

ARABIC 304-0 Translation in Practice: A Bridge to the Future (1 Unit) This unique foundational courses introduces students to translation skills to provide them with a competitive edge on the job market. Honing grammatical as well as stylistic facility in Arabic, the course promotes higher-level linguistic analysis and interpretation by following a problem-solving approach in translation. Prerequisite: Strong performance in two or average performance in three 200-level Arabic courses, or based on test placement or instructor permission.

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 311-1 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 311-2 or equivalent.

ARABIC 316-1 Reading Arabic Poetry (1 Unit) Development of Advanced Modern Standard Arabic through reading and analyzing Arabic Poetry. Content varies. May be repeated for credit with different topic. Open to heritage speakers. Prerequisite: ARABIC 311-2 or equivalent. *Literature Fine Arts Distro Area*

ARABIC 316-2 Reading Classical Arabic Texts (1 Unit) Development of Advanced Modern Standard Arabic through reading and analyzing classical Arabic texts. Content varies. May be repeated for credit with different topic. Open to heritage speakers. Prerequisite: ARABIC 311-2 or equivalent. *Literature Fine Arts Distro Area*

ARABIC 316-3 Reading Modern Arabic Prose (1 Unit) Development of Advanced Modern Standard Arabic through reading and analyzing Modern Arabic prose. Content varies. May be repeated for credit with different topic. Open to heritage speakers. Prerequisite: ARABIC 311-2 or equivalent. *Literature Fine Arts Distro Area*

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) This sequence offers students a systematic introduction to mainly conversational Hebrew language and culture. Emphasizes the four modalities-speaking, listening comprehension, reading, and writing. Prerequisite: None or one year of high-school Hebrew or placement exam results.

HEBREW 111-2 Hebrew I (1 Unit) This sequence offers students a systematic introduction to mainly conversational Hebrew language and culture. Emphasizes the four modalities-speaking, listening comprehension, reading, and writing. Prerequisite: HEBREW 111-1 or equivalent.

HEBREW 111-3 Hebrew I (1 Unit) This sequence offers students a systematic introduction to mainly conversational Hebrew language and culture. Emphasizes the four modalities-speaking, listening comprehension, reading, and writing. Prerequisite: HEBREW 111-2 or equivalent.

HEBREW 121-1 Hebrew II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing skills in Hebrew. Offers also insights into Hebrew culture and history. Uses authentic written and audiovisual materials, including newspapers, short stories, poems, television, film. Prerequisite: HEBREW 111-3 or equivalent.

HEBREW 121-2 Hebrew II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing skills in Hebrew. Offers also insights into Hebrew culture and history. Uses authentic written and audiovisual materials, including newspapers, short stories, poems, television, film. Prerequisite: HEBREW 121-1 or equivalent.

HEBREW 121-3 Hebrew II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing skills in Hebrew. Offers also insights into Hebrew culture and history. Uses authentic written and audiovisual materials, including newspapers, short stories, poems, television, film. Prerequisite: HEBREW 111-3 or equivalent.

HEBREW 211-0 Hebrew III: Language and Culture (1 Unit) Introduction to and practice of intermediate and advanced grammatical concepts in Hebrew through authentic cultural texts and current media sources. The course focuses on speaking, listening comprehension, reading, and writing skills. Prerequisite: HEBREW 121-3.

HEBREW 216-1 Hebrew III:Topics in Hebrew Literature (1 Unit) Hebrew language, literature, and culture. Review of more complex grammar including the development of reading, writing, and speaking. Material includes authentic written and audiovisual works and newspaper articles. Prerequisite: HEBREW 121-3 or equivalent. *Literature Fine Arts Distro Area*

HEBREW 216-2 Hebrew III: Topics in Hebrew Literature (1 Unit) Hebrew language, literature, and culture. Review of more complex grammar including the development of reading, writing, and speaking. Material includes authentic written and audiovisual works and newspaper articles. Prerequisite: HEBREW 121-3 or equivalent. *Literature Fine Arts Distro Area*

HEBREW 216-3 Hebrew III: Topics in Hebrew Literature (1 Unit) Hebrew language, literature, and culture. Review of more complex grammar including the developemnt of reading, writing, and speaking. Material includes authentic written and audiovisual works and newspaper articles. Prerequisite: HEBREW 121-3 or equivalent. *Literature Fine Arts Distro Area*

HEBREW 245-0 Current Events in Israel: Israeli Society through Online News Media (1 Unit) This course focuses on current events in Israel through in-depth exploration of online news media sources such as foreign newspaper articles and videos. Students will gain respect for alternative ideas and diversity of views and learn how news and public opinion are chosen, disseminated, shared. The course focuses on reading, listening, discussion and on building a comprehensive Hebrew vocabulary. Prerequisite: HEBREW 121-3 or permission of the instructor. May be repeated for credit with different topic.

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) This sequence emphasizing speaking, listening comprehension, reading, and writing offering students a systematic introduction to formal Persian. Offers also exampoles of modern Tehrani dialect and insights into Persian history and culture. Print and audiovisual materials used to supplement textbook. Prerequisite: None or placement exam results.

PERSIAN 111-2 Persian I (1 Unit) This sequence emphasizing speaking, listening comprehension, reading, and writing offering students a systematic introduction to formal Persian. Offers also exampoles of modern Tehrani dialect and insights into Persian history and culture. Print and audiovisual materials used to supplement textbook. Prerequisite: PERSIAN 111-1 or equivalent.

PERSIAN 111-3 Persian I (1 Unit) This sequence emphasizing speaking, listening comprehension, reading, and writing offering students a systematic introduction to formal Persian. Offers also exampoles of modern Tehrani dialect and insights into Persian history and culture. Print and audiovisual materials used to supplement textbook. Prerequisite: PERSIAN 111-2 or equivalent.

PERSIAN 121-1 Persian II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing skills in formal Persian. Offers also insights into Persian culture and history. Uses authentic written and audiovisual materials, including newspapers, short stories, poems, television, film, and radio. Prerequisite: PERSIAN 111-3 or equivalent.

PERSIAN 121-2 Persian II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing skills in formal Persian. Offers also insights into Persian culture and history. Uses authentic written and audiovisual materials, including newspapers, short stories, poems, television, film, and radio. Prerequisite: PERSIAN 121-1 or equivalent.

PERSIAN 121-3 Persian II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing skills in formal Persian. Offers also insights into Persian culture and history. Uses authentic written and audiovisual materials, including newspapers, short stories, poems, television, film, and radio. 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) This sequence emphasizing the four modalities-speaking, listening comprehension, reading, and writing. Offers students a systematic introduction to Turkish language and culture. Print and audiovisual materials used to supplement textbook. Prerequisite: None or one year of high-school German or placement exam results.

TURKISH 111-2 Turkish I (1 Unit) This sequence emphasizing the four modalities-speaking, listening comprehension, reading, and writing. Offers students a systematic introduction to Turkish language and culture. Print and audiovisual materials used to supplement textbook. Prerequisite: TURKISH 111-1 or equivalent.

TURKISH 111-3 Turkish I (1 Unit) This sequence emphasizing the four modalities-speaking, listening comprehension, reading, and writing. Offers students a systematic introduction to Turkish language and culture. Print and audiovisual materials used to supplement textbook. Prerequisite: TURKISH 111-2 or equivalent.

TURKISH 121-1 Turkish II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing, through the use of printed and audiovisual materials in Turkish. Offers insights into modern Turkish culture. Prerequisite: TURKISH 111-3 or equivalent.

TURKISH 121-2 Turkish II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing, through the use of printed and audiovisual materials in Turkish. Offers insights into modern Turkish culture. Prerequisite: TURKISH 121-1 or equivalent.

TURKISH 121-3 Turkish II (1 Unit) This sequence further develops speaking, listening comprehension, reading, and writing, through the use of printed and audiovisual materials in Turkish. Offers 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. 27) 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. 201).

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.
- At most two courses from study abroad may count towards the MENA studies minor.
- 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

See Biological Sciences (p. 230).

Native American and Indigenous Studies

cnair.northwestern.edu

The mission of the Center for Native American and Indigenous Research (CNAIR) is to advance scholarship, teaching, learning, and artistic or cultural practices related to Native American and Indigenous communities, priorities, histories, and life ways. The goals of CNAIR include student engagement with:

- Concepts of sovereignty and self-determination; as well as how colonization impacted the individual, community, and political identities and health of Native American and Indigenous people.
- Native American and Indigenous Studies (NAIS) theories and methodologies.
- Scholarship about how indigenous land, identity, and values inform Native American and Indigenous experiences and expressions.
- Major events, social movements, artistic expression, and policies in Native American and Indigenous histories.
- The dynamics between urban, rural, and reservation Native American and Indigenous experiences and how those dynamics are communicated through mobility, storytelling, and oral traditions.
- Native American and Indigenous historical and contemporary experiences within a global context.

The minor in Native American and Indigenous Studies (NAIS) is designed for the student who is interested in understanding the identities and experiences, cultural practices, and life ways of Native American and Indigenous people. It requires six courses from across a variety of departments and includes explorations of creative expression, the social and natural worlds, and indigeneity within a global context. Individual classes may focus on Native literature, traditional ecological knowledge, tribal sovereignty and other topics. Questions may be directed to the director of the minor at cnair@northwestern.edu.

Program of Study

- Native American and Indigenous Studies Minor (p. 340)

Courses are drawn from a variety of departments. See the requirements for the minor, and the CNAIR webpage (https://cnair.northwestern.edu/academics/undergraduate/minor-nais.html) for the most up-to-date details.

Native American and Indigenous Studies Minor

The minor in Native American and Indigenous Studies (NAIS) requires six courses from across a variety of departments. Courses reflect four scholarly directions:

- Creative Expression (literature, dance, music, art, theater, ceremony)
- Social Worlds (history, anthropology, journalism, sociology, law, education, policy, media)
- Natural Worlds (science, traditional ecological knowledge, environmental psychology, political science, health, medicine)
- Global Indigeneity (intercultural, transnational, Latinx studies, Pacific Islands Studies)

Course	Title
Minor Requirements (6 units)	
1 foundational course chosen from:	
ENGLISH 274-0	Introduction to Native American and Indigenous Literatures
SOCIOL 277-0	Introduction to Native American Studies
2 courses from Creative Expression or Social Worlds	
Creative Expression:	
ART_HIST 228-0	Introduction to Pre-Columbian Art
ENGLISH 374-0	Topics in Native American and Indigenous Literatures
Social Worlds:	
AF_AM_ST 214-0	Comparative Race and Ethnic Studies
ANTHRO 311-0	Indians of North America
JOUR 367-0	Native American Environmental Issues and the Media
RELIGION 260-0	Introduction to Native American Religions
2 courses from Natural Worlds or Global Indigeneity	
Natural Worlds:	
GBL_HLTH 305-0	Global Health & Indigenous Medicine
POLI_SCI 349-0	International Environmental Politics
PSYCH 356-0	Native Americans and Environmental Decision Making
or ENVR_POL 356-0	Native Americans and Environmental Decision Making
Global Indigeneity:	
ANTHRO 328-0	The Maya
GNDR_ST 363-0	Postcolonial Studies and Gender and Sexuality
SPANISH 340-0	Colonial Latin American Literature
1 elective course [1]	

[1] One course elective at an advanced level (from any of NAIS's four scholarly directions), independent study, or capstone project in a contributing department or program and approved by the CNAIR curriculum committee.

In addition to the courses listed in the table above, classes taught under ANTHRO 390-0, ASIAN_AM 276-0, ENGLISH 313-0, ENGLISH 378-0, GBL_HLTH 390-0, HISTORY 200-0, HISTORY 300-0, HISTORY 393-0, HUM 210-0, JOUR 390-0, LEGAL_ST 376-0, POLI_SCI 395-0, and others may also be eligible to count towards the minor. For more details and an up-to-date listing of courses consult the CNAIR website (https://cnair.northwestern.edu/academics/undergraduate/minor-nais.html) or contact the director of the minor at cnair@northwestern.edu.

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

Students interested in neuroscience should complete the chemistry and math courses and BIOL_SCI 201-0 Molecular Biology listed under related courses in their first year. NEUROSCI 202-0 Cellular and Molecular Neuroscience is taken as early as fall of sophomore year followed by NEUROSCI 206-0 Systems and Behavioral Neuroscience before taking 300-level NEUROSCI courses. Students entering prior to 2021 should refer to prior year catalogs. 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 writing and journalism, patent law, science policy, education, and outreach, 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. 230).

Programs of Study

- Neuroscience Major (p. 343)
- Neuroscience Second Major for ISP Students (p. 347)

NEUROSCI 101-6 First-Year Seminar (1 Unit) WCAS First-Year Seminar. Open to first-year students in Weinberg College. This course does not satisfy major requirements in Neuroscience but does serve as a Weinberg first-year seminar. There will be several writing assignments on a science-related topic. *WCAS First-Year Seminar*

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. Prerequisites: Must be a neuroscience major, and BIOL_SCI 201-0 and either CHEM 132-0 or co-enrollment in CHEM 152-0 or CHEM 172-0. *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. 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 embryo and nervous system, neurogenesis, neuronal differentiation and cell fate specification, axon guidance and wiring of neural circuits, and activity-, experience-, and sex-dependent neurodevelopment.
Prerequisites: BIOL_SCI 215-0 or BIOL_SCI 201-0; and NEUROSCI 202-0 or NEUROSCI 311-0 or BIOL_SCI 302-0. May not receive credit for both BIOL_SCI 215-0 and BIOL_SCI 201-0.

NEUROSCI 311-0 Biophysical Analysis of Neurons for ISP (1 Unit)
This course provides an introduction to neurobiology from an electrophysiological perspective, with an emphasis on ion channel biophysics, quantitative electrical properties of neurons, synaptic physiology, and sensory transduction. Its goal is to provide a basis for understanding how information is encoded, transmitted, and decoded in brains, as well as offer an introduction to reading scientific literature.
Prerequisite: Open to all ISP students and available to Neuroscience Majors with permission of instructor or the Director of Undergraduate Studies in Neurobiology. Some facility with simple equations and graphing is suggested.

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.The importance of biological rhythms and sleep for human health and disease will be covered in the course. Prerequisites: NEUROSCI 202-0 or NEUROSCI 311-0 or BIOL_SCI 302-0.

NEUROSCI 325-0 Neurobiology of Stress, Adversity, and Resilience (1 Unit) This is a writing-intensive course based on class lectures and discussion that draws from primary literature on the neurobiology of stress, stress susceptibility and resilience, to explore biological mechanisms by which adversity can influence mental health and other outcomes. Prerequisites: NEUROSCI 202-0 and NEUROSCI 206-0; NEUROSCI 311-0 and NEUROSCI 206-0; or BIOL_SCI 302-0.

NEUROSCI 326-0 Neurobiology of Learning and Memory (1 Unit)
This course examines how brain cells and neural circuits process experience to produce lasting changes in behavior. In depth discussion of original research findings, with a focus on the latest molecular, neural physiology, and behavioral studies. 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 357-0 Neuroanatomy Laboratory (1 Unit) Comparative anatomy and dissection to understand the functions of brain regions by comparing their structures across the major vertebrate classes. Includes clinical anatomy and case studies to understand the functions of brain regions by drawing connections between neurological symptoms and the localization of lesions. 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 365-0 Neurobiology of Prediction (1 Unit) This course examines neurophysiological circuit mechanisms that allow prediction to emerge in brains of (mostly) non-human animals. Topics include probability and variance, anticipation of aversive and rewarding stimuli, temporal and spatial prediction, and how cellular-level studies inform complex questions of human prediction. Registration Requirements: Must be a neuroscience major; sophomore, junior, senior. Request for a permission number must be made to Dr. Indira Raman but will be issued by the neuroscience major.

NEUROSCI 370-0 Genetic and Circuit Analysis of Motivated Behavior (1 Unit) Animals are programmed to behave strongly towards activities that satisfy our basic needs and enhance our chances of survival. This includes eating, drinking, sex, and social interaction. Focusing on neurobiology of eating, we will read scientific articles, learn about cutting edge experimental techniques, discuss concepts, and hone oral presentation skills. Prerequisites: NEUROSCI 202-0 and NEUROSCI 206-0; or NEUROSCI 311-0 and NEUROSCI 206-0; or BIOL_SCI 302-0.

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. May be used to fulfill a Neuroscience Group B elective or serve as an Biology Allied Field course.

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. 27) 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. 343)
  - 2 courses with a primary focus on human behavior and the human brain (Group A Elective) (p. 343)
  - 2 courses with a primary focus on molecular, cellular, and systems-level mechanisms of brain function (Group B Elective (p. 343))
- 4 Allied Field units, at least 2 of which must be 300-level or above, 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 2 Allied Field courses may be double-counted with another major and none with a minor.
  - Biology (p. 343)
  - Chemistry (p. 344)
  - Computation and Systems Modeling (p. 344)
  - Human Behavior and Cognition (p. 345)
  - Language and Human Communication (p. 345)
  - Ad hoc Allied Field - some other area chosen with approval of the director of undergraduate studies
- Related Courses (units depend on math and science sequences taken)
  - BIOL_SCI 201-0 Molecular Biology
  - Calculus sequence (p. 346)
  - General Chemistry sequence (p. 346) with labs
  - 1 Computer Programming (p. 346) course from list of approved courses
  - General Physics sequence (p. 346) with labs
  - 1 Statistics course (p. 346) from list of approved courses
- Laboratory Experience (p. 345) 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 327-0	Brain and Cognition
CSD 310-0	Biological Foundations of Speech and Music
PSYCH 110-0	Introduction to Psychology
PSYCH 228-0	Cognitive Psychology
PSYCH 244-0	Developmental Psychology
PSYCH 248-0	Health Psychology
PSYCH 324-0	Perception
PSYCH 328-0	Brain Damage and the Mind
PSYCH 330-0	Special Topics in Cognition/Neuroscience
PSYCH 391-0	Advanced Seminar in Cognition or Neuroscience (With approval of the director of undergraduate studies)
PSYCH 392-0	Advanced Seminar in Psychology (With approval of the director of undergraduate studies)

Neuroscience Group B Electives (students choose 2):

Course	Title
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 325-0	Neurobiology of Stress, Adversity, and Resilience
NEUROSCI 326-0	Neurobiology of Learning and Memory
NEUROSCI 350-0	Advanced Neurophysiology Laboratory
NEUROSCI 355-0	Neurogenetics of Behavior Laboratory
NEUROSCI 357-0	Neuroanatomy Laboratory
NEUROSCI 360-0	Neuroscience of Brain Disorders
NEUROSCI 365-0	Neurobiology of Prediction
NEUROSCI 370-0	Genetic and Circuit Analysis of Motivated Behavior
NEUROSCI 377-0	Neurobiology of Sensation and Perception
NEUROSCI 390-0	Topics in Neuroscience (With approval of the director of undergraduate studies)
BIOL_SCI 303-0	Molecular Neurobiology
BIOL_SCI 307-0	Brain Structure, Function, and Evolution
ES_APPM 370-1	Introduction to Computational Neuroscience
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)

Allied Field Course Lists

Biology (any 4 units, at least 2 of which must be 300-level or above)

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 202-0	Cell Biology (or when taught as BIOL SCI 219)
BIOL_SCI 203-0	Genetics and Evolution (or when taught as BIOL SCI 215)
BIOL_SCI 232-0	Molecular and Cellular Processes Laboratory (0.34 units - also when taught as BIOL SCI 221)
BIOL_SCI 233-0	Genetics and Molecular Processes Laboratory (0.34 units - also when taught as BIOL SCI 220)
BIOL_SCI 234-0	Investigative Laboratory (0.34 units - also when taught as BIOL SCI 222)
BIOL_SCI 301-0	Principles of Biochemistry
BIOL_SCI 303-0	Molecular Neurobiology
BIOL_SCI 307-0	Brain Structure, Function, and Evolution
BIOL_SCI 310-0	Human Physiology
BIOL_SCI 315-0	Advanced Cell Biology
BIOL_SCI 319-0	Biology of Animal Viruses
BIOL_SCI 323-0	Bioinformatics: Sequence and Structure Analysis
BIOL_SCI 325-0	Animal Physiology
BIOL_SCI 328-0	Microbiology

BIOL_SCI 341-0	Population Genetics
BIOL_SCI 344-0	Anatomy of Vertebrates
BIOL_SCI 353-0	Molecular Biology Laboratory
BIOL_SCI 354-0	Quantitative Analysis of Biology
BIOL_SCI 355-0	Immunobiology
BIOL_SCI 356-0	Endocrinology
BIOL_SCI 358-0	Advanced Physiology Laboratory
BIOL_SCI 359-0	Quantitative Experimentation in Biology
BIOL_SCI 360-0	Principles of Cell Signaling
BIOL_SCI 361-0	Protein Structure and Function
BIOL_SCI 378-0	Functional Genomics
BIOL_SCI 380-0	Biology of Cancer
BIOL_SCI 381-0	Stem Cells and Regeneration
BIOL_SCI 390-0	Advanced Molecular Biology
BIOL_SCI 391-0	Developmental Biology
BIOL_SCI 393-0	Human Genomics
BIOL_SCI 395-0	Molecular Genetics
CHEM 215-1	Organic Chemistry I (or when taught as CHEM 210-1)
CHEM 215-2	Organic Chemistry II (or when taught as CHEM 210-2)
CHEM 215-3	Advanced Organic Chemistry (or when taught as CHEM 210-3)
CHEM 235-1	Organic Chemistry Lab I (0.34 units)
CHEM 235-2	Organic Chemistry Lab II (0.34 units - also when taught as CHEM 230-2)
CHEM 235-3	Advanced Organic Chemistry Lab (0.34 units - also when taught as CHEM 230-3)
The six 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 4 units, at least 2 of which must be 300-level or above)

Course	Title
CHEM 215-1	Organic Chemistry I (or when taught as CHEM 210-1)
CHEM 215-2	Organic Chemistry II (or when taught as CHEM 210-2)
CHEM 215-3	Advanced Organic Chemistry (or when taught as CHEM 210-3)
CHEM 235-1	Organic Chemistry Lab I (0.34 units)
CHEM 235-2	Organic Chemistry Lab II (0.34 units - also when taught as CHEM 230-2)
CHEM 235-3	Advanced Organic Chemistry Lab (0.34 units - also when taught as CHEM 230-3)
The six 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 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 4 units, at least 2 of which must be 300-level or above)

Course	Title
MATH 230-1	Multivariable Differential Calculus
MATH 230-2	Multivariable Integral Calculus
MATH 240-0	Linear Algebra
MATH 250-0	Elementary Differential Equations
The five 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 311-1	MENU: Probability and Stochastic Processes
MATH 311-2	MENU: Probability and Stochastic Processes
MATH 311-3	MENU: Probability and Stochastic Processes
MATH 325-0	Complex Analysis
MATH 334-0	Linear Algebra: Second Course
MATH 351-0	Fourier Analysis and Boundary Value Problems
MATH 353-0	Qualitative Theory of Differential Equations
MATH 354-0	Chaotic Dynamical Systems
MATH 360-1	MENU: Applied Analysis
MATH 360-2	MENU: Applied Analysis
MATH 368-0	Introduction to Optimization
MATH 381-0	Fourier Analysis and Boundary Value Problems for ISP
MATH 382-0	Complex Analysis 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	Advanced Physics Laboratory
PHYSICS 361-0	Classical Optics and Special Relativity
PHYSICS 371-0	Nonlinear Dynamics and Chaos
STAT 210-0	Introduction to Probability and Statistics
STAT 232-0	Applied Statistics
STAT 301-1	Data Science 1 with R
or STAT 303-1	Data Science 1 with Python
STAT 301-2	Data Science 2 with R
or STAT 303-2	Data Science 2 with Python
STAT 301-3	Data Science 3 with R
or STAT 303-3	Data Science 3 with Python
STAT 302-0	Data Visualization
STAT 320-1	Statistical Theory & Methods 1
STAT 320-2	Statistical Theory & Methods 2
STAT 320-3	Statistical Theory & Methods 3
STAT 328-0	Causal Inference
STAT 342-0	Statistical Data Mining
STAT 344-0	Statistical Computing
STAT 348-0	Applied Multivariate Analysis
STAT 350-0	Regression Analysis
STAT 352-0	Nonparametric Statistical Methods
STAT 354-0	Time Series Modeling and Forecasting
STAT 356-0	Hierarchical Linear Models
STAT 383-0	Probability and Statistics for ISP

Human Behavior and Cognition (any 4 units, at least 2 of which must be 300-level or above)

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	Brain and Cognition
or PSYCH 327-0	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 228-0	Cognitive Psychology
PSYCH 244-0	Developmental Psychology
PSYCH 248-0	Health Psychology
PSYCH 303-0	Psychopathology
PSYCH 324-0	Perception
PSYCH 328-0	Brain Damage and the Mind
PSYCH 330-0	Special Topics in Cognition/Neuroscience (With approval of the director of undergraduate studies)
PSYCH 336-0	Consciousness
PSYCH 370-0	Cognitive Development
PSYCH 372-0	Language and Cognition
PSYCH 374-0	Human Memory
PSYCH 378-0	Images of Cognition
PSYCH 392-0	Advanced Seminar in Psychology (With the approval of the director of undergraduate studies)

Language and Human Communication (any 4 units, at least 2 of which must be 300-level or above)

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 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 342-0	Structure of Various Languages
LING 350-0	Fundamentals of Laboratory Phonology
LING 360-0	Fundamentals of Syntax
LING 370-0	Fundamentals of Meaning
LING 371-0	Reference
LING 372-0	Pragmatics
LING 373-0	Implicature

Laboratory Experience, choose one option below (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
NEUROSCI 357-0	Neuroanatomy Laboratory
PSYCH 205-0	Research Methods in Psychology
BIOL_SCI 232-0	Molecular and Cellular Processes Laboratory (0.34 units - also when taught as BIOL SCI 221)
BIOL_SCI 233-0	Genetics and Molecular Processes Laboratory (0.34 units - also when taught as BIOL SCI 220)
BIOL_SCI 234-0	Investigative Laboratory (0.34 units - also when taught as BIOL SCI 222)
CHEM 235-1	Organic Chemistry Lab I (0.34 units)
CHEM 235-2	Organic Chemistry Lab II (0.34 units - also when taught as CHEM 230-2)

CHEM 235-3	Advanced Organic Chemistry Lab (0.34 units - also when taught as CHEM 230-3)
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 201-0	Molecular Biology

Calculus sequence chosen from:

Course	Title
MATH 220-1	Single-Variable Differential Calculus
MATH 220-2	Single-Variable Integral Calculus
or	
MATH 218-1	Single-Variable Calculus with Precalculus
MATH 218-2	Single-Variable Calculus with Precalculus
MATH 218-3	Single-Variable Calculus with Precalculus
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 161-0	Accelerated General Chemistry Laboratory 1 (0.34 units)
CHEM 152-0	Accelerated General Chemistry 2
CHEM 162-0	Accelerated General Chemistry Laboratory 2 (0.34 units)
or	
CHEM 171-0	Advanced General Inorganic Chemistry
CHEM 181-0	Advanced General Inorganic Chemistry Laboratory (0.34 units)
CHEM 172-0	Advanced General Physical Chemistry
CHEM 182-0	Advanced General Physical Chemistry Laboratory (0.34 units)

1 Computer Programming course chosen from:

Course	Title
COMP_SCI 110-0	Introduction to Computer Programming (or EECS 110-0)
COMP_SCI 111-0	Fundamentals of Computer Programming (or EECS 111-0)
ES_APPM 375-1	Quantitative Biology I: Experiments, Data, Models, and Analysis
ES_APPM 375-1 may be used to fulfill either the Statistics or the Computer Programming requirement, but not both.	

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.

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)
or for ISP students	
PHYSICS 125-1	General Physics ISP
PHYSICS 126-1	Physics for ISP Laboratory (0.34 units)
PHYSICS 125-2	General Physics for ISP
PHYSICS 126-2	Physics for ISP Laboratory (0.34 units)
PHYSICS 125-3	General Physics for ISP
PHYSICS 126-3	Physics for ISP 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 and Data Science
STAT 210-0	Introduction to Probability and Statistics
STAT 383-0	Probability and Statistics for ISP
ES_APPM 375-1	Quantitative Biology I: Experiments, Data, Models, and Analysis
ES_APPM 375-1 may be used to fulfill either the Statistics or the Computer Programming requirement, but not both.	
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 no later than 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 and 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 (https://www.neurobiology.northwestern.edu/undergraduate/honors-in-the-major/) and see Honors in the Major (p. 201).

Neuroscience Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 27) 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 in ISP 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. ISP students should take NEUROSCI 311-0 in their sophomore or junior year.

Course	Title
Required course:	
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 327-0	Brain and Cognition
CSD 310-0	Biological Foundations of Speech and Music
PSYCH 110-0	Introduction to Psychology
PSYCH 228-0	Cognitive Psychology
PSYCH 330-0	Special Topics in Cognition/Neuroscience (Brain and Language)
PSYCH 244-0	Developmental Psychology
PSYCH 248-0	Health Psychology
PSYCH 324-0	Perception
PSYCH 328-0	Brain Damage and the Mind
PSYCH 391-0	Advanced Seminar in Cognition or Neuroscience (Psychoneuroimmuniology)
PSYCH 392-0	Advanced Seminar in Psychology (With the approval of the director of undergraduate studies)
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 325-0	Neurobiology of Stress, Adversity, and Resilience
NEUROSCI 326-0	Neurobiology of Learning and Memory
NEUROSCI 350-0	Advanced Neurophysiology Laboratory
NEUROSCI 355-0	Neurogenetics of Behavior Laboratory
NEUROSCI 357-0	Neuroanatomy Laboratory
NEUROSCI 360-0	Neuroscience of Brain Disorders
NEUROSCI 365-0	Neurobiology of Prediction
NEUROSCI 370-0	Genetic and Circuit Analysis of Motivated Behavior
NEUROSCI 377-0	Neurobiology of Sensation and Perception
NEUROSCI 390-0	Topics in Neuroscience (With approval of the director of undergraduate studies)
BIOL_SCI 303-0	Molecular Neurobiology
BIOL_SCI 307-0	Brain Structure, Function, and Evolution
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 no later than 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 and 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 (https://www.neurobiology.northwestern.edu/undergraduate/honors-in-the-major/) and see Honors in the Major (p. 201).

Neuroscience

The Neuroscience Major (p. 343) is offered by the Department of Neurobiology (p. 341).

Persian

Persian is offered by the Middle East and North African Languages Program (https://mena-languages.northwestern.edu). For course listings in this catalog see Middle East and North African Studies (p. 336).

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. 350)
- Philosophy Minor (p. 351)

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 philosophical study of logical entailment and deduction. Systems of classical propositional and predicate logic; and their bearing on philosophical quandaries. 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 221-0 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 222-0 Introduction to Africana Philosophy (1 Unit) Conceptual and historical approaches to philosophical questions, topics, and figures belonging to the African Diaspora including political thought, ethical thought, aesthetics, hermeneutics, philosophy of identity, and epistemologies. *Ethics Values Distro Area*

PHIL 224-0 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 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 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 250-0 Elementary Logic II (1 Unit) Introduction to variations of classical logic, and their application to philosophical topics, among them necessity and possibility, obligation and permission, knowledge and truth. 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 257-0 Philosophy of the Universe (1 Unit) Methods for and approaches to philosophical inquiry about the ultimate nature of the universe. Topics include: emergence of the macroscopic world, laws of nature, the directionality of time, cosmological arguments for the existence of God, life, consciousness. No Prerequisites. *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 and cultures: the existence of God or divine-like forces, creation, miracles, the claims of faith versus the claims of reason, sin, free will, immortality, revelation, harmony of the universe, community of humanity and universe. May be repeated for credit with change of topic. *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 is 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. May also be taught as an introduction to the philosophy and theory of one or several of the arts, e.g. philosophy of film, philosophy of figurative art, etc. *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. May be repeated for credit with change of topic.

PHIL 321-0 Philosophy & Gender (1 Unit)
Survey of approaches to sex and gender throughout the history of philosophy. May be repeated for credit with change of topic.

PHIL 324-0 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 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 Topics in Philosophy of Medicine (1 Unit)
Introduces premed students to reasoning through 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? How does uncertainty and risk bear on medical decisions? *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. May be repeated for credit with change of topic.

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.

PHIL 350-0 Advanced Logic (1 Unit)
Alternating topics. Metalogic: Formal semantics, soundness, completeness, and compactness of predicate logic; Nonstandard models of arithmetic and the Lowenheim-Skolem theorems. Incompleteness: Recursive functions, the incompletability of arithmetic and undecidability of predicate logic. Definability and undefinability of provability, consistency, and truth in arithmetic. Third quarter of PHIL 150-0/ PHIL 250-0/PHIL 350-0 sequence.
Prerequisite: PHIL 150-0.

PHIL 351-0 Advanced Topics in Philosophical Logic (1 Unit)
Advanced application of methods of modern formal logic to a variety of questions in metaphysics, philosophy of logic, philosophy of language, and philosophy of mathematics.
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. May be repeated for credit with change of topic.

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. May be repeated for credit with change of topic.

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. May be repeated for credit with change of topic.

PHIL 370-0 Philosophy & Literature (1 Unit)
Issues involving the relationship between philosophy and literature. May be repeated for credit with change of topic.

PHIL 373-1 The Brady Scholars Program: The Civically Engaged Life (0.5 Unit) Students in the Brady Scholars Program meet at least once each week, among themselves and with civic leaders, to plan their community service project, and to bring it to completion.

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. May also be taught as advanced topics in the philosophy and theory of one or several of the arts, e.g. in the philosophy of film, philosophy of figurative art, philosophy of music, etc. May be repeated for credit with change of topic.

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 PHIL 398-1. Prerequisite: consent of instructor.

PHIL 398-2 Senior Tutorial (1 Unit) Senior thesis. Grade of K given in PHIL 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. 27) 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	Elementary Logic I
or PHIL 250-0	Elementary Logic II
1 core course in moral or political philosophy: [2]	
PHIL 260-0	Introduction to Moral Philosophy
or PHIL 261-0	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: [4,5]	
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 coures 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. 277) towards the major may not petition to count another course offered outside the department towards the major.

5 Students in the Brady Program in Ethics and Civic Life (https://bradyprogram.northwestern.edu/) who have completed the sequence of PHIL 273-1, PHIL 273-2, & PHIL 273-3 may petition with their department advisor to substitute the core requirement to take one of PHIL 260-0 or PHIL 261-0 by the whole sequence. Approval of such replacement will be conditional on such students' counting at least one additional PHIL-course at the 200-level toward the major.

Honors in Philosophy

Majors with strong academic records (GPA in the major of 3.5) 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 Honors 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 (https://www.philosophy.northwestern.edu/) and Honors in the Major (p. 201).

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	Elementary Logic I
or PHIL 250-0	Elementary Logic II
PHIL 210-1	History of Philosophy - Ancient
PHIL 210-3	History of Philosophy - Early Modern
PHIL 260-0	Introduction to Moral Philosophy
or PHIL 261-0	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	The Brady Scholars Program: The Good Life
or PHIL 273-2	The Brady Scholars Program: The Moral Life
or PHIL 273-3	The Brady Scholars Program: The Good Society
Only in exceptional cases and upon petition to the director of undergraduate studies may 1 eligible PHIL 399-0 (no more) 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. Neither online-courses nor non-PHIL credits may be petitioned to count for the minor.	

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. 277) 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	Fundamentals of Physics and Fundamentals of Physics and Fundamentals of Physics
or PHYSICS 135-1 & PHYSICS 135-2 & PHYSICS 135-3	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. 120) 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 college-level physics course in high school may be eligible to place ahead in the introductory physics sequence in the ways listed below. For details please refer to the First-Year Focus (https://www.physics.northwestern.edu/undergraduate/first-year-focus.html) section of the departmental webpage.

- A score of 5 on the College Board Advanced Placement Physics C (Mechanics) examination posts as PHYSICS 135-1 General Physics and lab course credit.
- A score of 5 on the College Board Advanced Placement Physics C (Electricity & Magnetism) examination taken either before or after calendar year 2020 posts as PHYSICS 135-2 General Physics and lab course credit.
- A score of 5 on the College Board Advanced Placement Physics C (Electricity & Magnetism) examination taken in 2020 posts as 1.0 unit of PHYSICS 1XX and 0.34 units lab credit posted as PHYSICS 1XL. A sufficient score on the departmental assessment exam can convert these units to PHYSICS 135-2 General Physics and PHYSICS 136-2 General Physics Laboratory.
- A score of 5 on the College Board Advanced Placement Physics 1 exam posts as PHYSICS 130-1 College Physics and lab course credit.
- A score of 5 on the College Board Advanced Placement Physics 2 exam posts as PHYSICS 130-2 College Physics and lab course credit.
- 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. For more details see Transferring Credit from Other Colleges (https://www.weinberg.northwestern.edu/undergraduate/first-year-transfer/first-year/placement-and-credit/transfer-college-credit.html).

Programs of Study

- Physics Major (p. 355)
- Physics Minor (p. 356)
- Physics Second Major for ISP Students (p. 357)

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. 354).

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 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 130-SG-1 Peer-Guided Study Group: College Physics 1 (0 Unit) Peer-guided study group for students enrolled in PHYSICS 130-1. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

PHYSICS 130-SG-2 Peer-Guided Study Group: College Physics 2 (0 Unit) Peer-guided study group for students enrolled in PHYSICS 130-2. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

PHYSICS 130-SG-3 Peer-Guided Study Group: College Physics 3 (0 Unit) Peer-guided study group for students enrolled in PHYSICS 130-3. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

PHYSICS 135-1 General Physics (1 Unit) Calculus-based physics for science and engineering majors and premedical students. Mechanics. Prerequisites: MATH 220-1, MATH 220-2; concurrent enrollment in PHYSICS 136-1 and MATH 230-1. *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 135-SG-1 Peer-Guided Study Group: General Physics 1 (0 Unit) Peer-guided study group for students enrolled in PHYSICS 135-1. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

PHYSICS 135-SG-2 Peer-Guided Study Group: General Physics 2 (0 Unit) Peer-guided study group for students enrolled in PHYSICS 135-2. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

PHYSICS 135-SG-3 Peer-Guided Study Group: General Physics 3 (0 Unit) Peer-guided study group for students enrolled in PHYSICS 135-3. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

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 fundamental topics in classical mechanics for physics majors and minors and students with a strong interest in physics. Prerequisites: MATH 220-1, MATH 220-2; concurrent enrollment in PHYSICS 136-1 and MATH 230-1. *Natural Sciences Distro Area*

PHYSICS 140-2 Fundamentals of Physics (1 Unit) Introduction to fundamental 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 fundamental 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 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 230-1. *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 312-0 Scalar and Vector Field Methods in Physics (1 Unit) Physically contextualized introduction to the field concept, the associated methods of calculus, and the solution of key physical partial differential equations. Three lectures and one discussion per week. Prerequisites: PHYSICS 311-1, PHYSICS 311-2, or MATH 230-1, MATH 230-2, MATH 240-0, and MATH 250-0, or equivalents. *Natural Sciences Distro Area*

PHYSICS 330-1 Classical Mech (1 Unit) Newtonian mechanics, oscillations, the Lagrangian and Hamiltonian formalisms, central-force motion. Prerequisites: PHYSICS 135-1 or equivalent and MATH 230-2 and PHYSICS 311-1 and PHYSICS 311-2; or MATH 240-0, MATH 250-0; or equivalent.

PHYSICS 330-2 Classical Mechanics (1 Unit) Motion in a non-inertial reference frame, kinematics of rigid modes, systems with many degrees of freedom.

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 230-2 or equivalent.

PHYSICS 333-1 Advanced Electricity & Magnetism (1 Unit)
Electrostatics and magnetostatics, multipole expansion, solutions of Laplace's equation, images, analytic functions. Prerequisites: PHYSICS 135-1, PHYSICS 135-2, and PHYSICS 135-3 and MATH 230-2 and PHYSICS 311-1 and PHYSICS 311-2; or MATH 240-0, MATH 250-0; or equivalent.

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 230-2 and PHYSICS 311-1 and PHYSICS 311-2; or MATH 240-0, MATH 250-0; 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); COMP_SCI 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 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 Advanced Physics Laboratory (1 Unit) Modern experimental techniques and data analysis methods. Both classic and modern experiments in atomic/nuclear physics, electricity and magnetism, optics, condensed matter physics, and nonlinear dynamics. This laboratory emphasizes independent work. This course consists primarily of two four-hour sessions per week, which may have lecture and laboratory periods. Prerequisites: PHYSICS 239-0 or PHYSICS 339-1, and PHYSICS 333-1, or permission 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 390-0 Topics in Physics (1 Unit)
This is a special topics course, and each time it is offered could be a completely different topic. Although the topic can change, it is expected that independent of the content, this is an advanced physics course that builds on core physics knowledge. Prerequisites vary by offering. It would generally require knowledge of at least one core physics course (Physics 330, 332, 333, 339) or the equivalent mathematics or Permission from Instructor.

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 220-1 Introduction to Astrophysics I: Life Cycle of Stars and Planets (1 Unit) The course will explore the origin and evolution of star/planet systems, focusing on underlying physical processes and observational techniques. We will discuss the recent discovery of thousands of planets orbiting stars other than our Sun - a.k.a. "exoplanets". We will also discuss stellar remnant black holes. (Prerequisites: PHYSICS 135-1, PHYSICS 135-2 (concurrent registration in PHYSICS 135-2 is acceptable. Students who have taken ASTRON 220-0 should not take this course and take ASTRON 220-2 instead). *Natural Sciences Distro Area*

ASTRON 220-2 Introduction to Astrophysics II: Galactic Evolution and Cosmology (1 Unit) The course will explore modern cosmology, including dark matter, the Big Bang, curved space-time, the origin and evolution of the first stars and galaxies, cosmic acceleration, and dark energy. In all cases, the focus will be on the underlying physical processes and the observational techniques used. (Prerequisites: ASTRON 220-1 or all of PHYSICS 135-1, PHYSICS 135-2, and PHYSICS 135-3.) *Natural Sciences Distro Area*

ASTRON 305-0 Basics of Radio Astronomy (1 Unit) Radio astronomy is the study of natural radio emission from the sky, providing important clues about the history of the universe. Topics include how a radio telescope receives invisible signals, how dramatically the radio sky differs from the optical sky, and interferometry. Prerequisites: PHYSICS 135-1, PHYSICS 135-2, PHYSICS 135-3 (or equivalent) or PHYSICS 332-0; MATH 220-2 or equivalent. *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 220-1, or ASTRON 220-2.

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 220-1, or ASTRON 220-2.

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 220-1, or ASTRON 220-2.

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. Prerequisites: PHYSICS 135-1, PHYSICS 135-2, & PHYSICS 135-3, or equivalent.

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. 27) 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 220-1	Single-Variable Differential Calculus
& MATH 220-2	and Single-Variable Integral Calculus
or MATH 218-1	Single-Variable Calculus with Precalculus
& MATH 218-2	and Single-Variable Calculus with Precalculus
& MATH 218-3	and Single-Variable Calculus with Precalculus
PHYSICS 140-1	Fundamentals of Physics
& PHYSICS 140-2	and Fundamentals of Physics
& PHYSICS 140-3	and Fundamentals of Physics
& PHYSICS 136-1	and General Physics Laboratory
& PHYSICS 136-2	and General Physics Laboratory
& PHYSICS 136-3	and General Physics Laboratory
or 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
or PHYSICS 125-1	General Physics ISP
& PHYSICS 125-2	and General Physics for ISP
& PHYSICS 125-3	and General Physics for ISP
& PHYSICS 126-1	and Physics for ISP Laboratory
& PHYSICS 126-2	and Physics for ISP Laboratory
& PHYSICS 126-3	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: [1]	
MATH 230-1	Multivariable Differential Calculus
& MATH 230-2	and Multivariable Integral Calculus [1]
PHYSICS 311-1	Mathematical Tools for the Physical Sciences
& PHYSICS 311-2	and Mathematical Tools for the Physical Sciences
or MATH 240-0	Linear Algebra
& MATH 250-0	and Elementary Differential Equations
& MATH 351-0	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 359-0	Electronics
PHYSICS 360-0	Advanced 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. 356)	
Astronomy (p. 356)	
Flexible (p. 356)	

[1] PHYSICS 312-0 Scalar and Vector Field Methods in Physics may be used in place of MATH 230-2 Multivariable Integral Calculus with department permission.

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 359-0	Electronics
PHYSICS 360-0	Advanced 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 312-0	Scalar and Vector Field Methods in Physics
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 220-1	Introduction to Astrophysics I: Life Cycle of Stars and Planets
or ASTRON 220-2	Introduction to Astrophysics II: Galactic Evolution and Cosmology
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 327-0	Magnetic Resonance Imaging
CHEM 307-0	Materials and Nanochemistry
ELEC_ENG 360-0	Introduction to Feedback Systems
ELEC_ENG 381-0	Electronic Properties of Materials
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
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 312-0	Scalar and Vector Field Methods in Physics
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 or PHYSICS 399-0 Independent Study 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. 201).

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 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus
or MATH 218-1 & MATH 218-2 & MATH 218-3	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
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)	

Core mathematics and mathematical tools courses listed below or equivalent courses approved by the department: [1]	
MATH 230-1 & MATH 230-2	Multivariable Differential Calculus and Multivariable Integral Calculus [1]
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
Core physics courses	
PHYSICS 239-0	Foundations of Modern Physics
PHYSICS 330-1	Classical Mech
PHYSICS 333-1	Advanced Electricity & Magnetism
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 312-0	Scalar and Vector Field Methods in Physics
PHYSICS 398-0	Independent Thesis Research
PHYSICS 399-0	Independent Study
ASTRON 398-0	Honors Independent Study
ASTRON 399-0	Independent Study

[1] PHYSICS 312-0 Scalar and Vector Field Methods in Physics may be used in place of MATH 230-2 Multivariable Integral Calculus with department permission.

Physics Second Major for ISP Students

Students must also complete the Undergraduate Registration Requirement (p. 27) 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
PHYSICS 339-1 & PHYSICS 339-2	Quantum Mechanics and Quantum Mechanics
PHYSICS 339-3	Particle and Nuclear Physics
or PHYSICS 337-0	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 359-0	Electronics
PHYSICS 360-0	Advanced 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 312-0	Scalar and Vector Field Methods in Physics
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	Particle and Nuclear Physics
or PHYSICS 337-0	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 or PHYSICS 399-0 Independent Study 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. 201).

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 relations, and political theory—in addition to methods of research and analysis. 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 (two or more courses, usually completed during study abroad) or through the substantial use of foreign language materials in a thesis or other independent study–type (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 one additional 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), independent study 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. 120) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students interested in this option 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. 362)
- Political Science Minor (p. 364)

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. 198) *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 212-0 Evaluating Evidence (1 Unit) Introduction to evaluation of qualitative and quantitative evidence across science, politics, society, health, education, and industry. POLI_SCI 212-0 and COG_SCI 202-0 are taught together; may not receive credit for both courses. *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. 198)

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. 198)

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. 198) *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 308-0 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. Note: students cannot receive credit for both POLI_SCI 308-0 (Evanston) and POLI_SCI 308-SA (study abroad).

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 freedom of religion. 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 336-0 Immigration Politics and Policy (1 Unit) Introduction to immigration politics in the U.S. with a focus on policies, public opinion, participation, and mobilization. Emphasis on relationships between nativity, citizenship status, legal status, and race/ethnicity. *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 352-0 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. SOCIOL 317-0 and POLI_SCI 352-0 are taught together; may not receive credit for both courses. *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. Note: students cannot receive credit for both POLI_SCI 361-0 (Evanston) and POLI_SCI 361-SA (study abroad).
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. Note: students cannot receive credit for both POLI_SCI 361-0 (Evanston) and POLI_SCI 361-SA (study abroad). *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, & 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. *Social Behavioral Sciences Distro Area*

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. POLI_SCI 380-0 and LEGAL_ST 380-0 are taught together; may not receive credit for both courses. *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. 198) *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 384-0 International Responses to Mass Atrocities (1 Unit) How the international community can respond to mass atrocities and human rights violations. *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 394-LK Professional Linkage Seminar (1 Unit)

POLI_SCI 395-0 Political Research Seminar (1 Unit) Required of all political science majors; ordinarily taken during junior or 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. 27) 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 are encouraged to begin the major with 200-level courses, which provide a general introduction to subfields of political science, as well as important background for 300-level courses. Majors should choose 200-level courses from at least two subfields: American politics, comparative politics, international relations, 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. For instance, students might design concentrations around themes such as race, ethnicity, and politics; global transformation; representation and law; social and economic inequalities; conflict 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 one 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 or senior year. Those who plan to pursue honors should 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 212-0	Evaluating Evidence
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 one unit of Chicago Field Studies (chosen from CFS 391-0, CFS 394-0, 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:

- A maximum of two courses per quarter from study abroad may count toward the Political Science major. More courses may be accepted toward the major for longer study abroad programs.
- Courses taken P/N cannot be counted toward the major (this is a Weinberg College rule; for details see Grade Requirements (p. 198)).
- 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 12 courses 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 receiving 5's on the AP exams in both American Government and Comparative Politics can place out of both equivalent 200-level courses and thus need to take two additional 300-level courses. Students wishing to use their AP credit in this fashion must contact the Director of Undergraduate Studies and place the request.
- For students completing the MMSS major, MATH 385-0 fulfills the POLI SCI methodology requirement, and MMSS 311-2 double-counts as a 300-level political science course (for triple major limitations see MMSS Adjunct Major (p. 326)).

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 in the spring quarter of their junior year. Interested students should complete at least seven of the courses required for the major, including the methodology and research seminar requirements, before senior year. Accepted students enroll in the two-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. 201).

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
POLI_SCI 335-0	Political Psychology
POLI_SCI 336-0	Immigration Politics and Policy

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 352-0	Global Development
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 356-0	Constitutional Challenges in Comparative Perspective
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 361-SA	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, & 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 Relations 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
POLI_SCI 384-0	International Responses to Mass Atrocities

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 304-0	Human Rights Between East and West
POLI_SCI 306-0	American Political Thought
POLI_SCI 307-0	Deportation Law and Politics
POLI_SCI 308-0	Critical Theory and the Study of 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 212-0	Evaluating Evidence
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 394-LK	Professional Linkage Seminar
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, economics majors may want to focus on political economy courses, history majors may study contemporary politics in their area of focus, and philosophy majors 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 department advisor to develop an individual program of study.

Course	Title
Minor Requirements (6 units)	
At least two 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
Four additional political science courses, including at least three at the 300 level [1]	

[1] At most one unit of Chicago Field Studies (chosen from CFS 391-0, CFS 394-0, 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. 198)).
- 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 6 courses 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 receiving 5's on the AP exams in both American Government and Comparative Politics can place out of both equivalent 200-level courses and thus need to take two additional 300-level courses. Students wishing to use their AP credit in this fashion must contact 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
POLI_SCI 335-0	Political Psychology
POLI_SCI 336-0	Immigration Politics and Policy

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 352-0	Global Development
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 356-0	Constitutional Challenges in Comparative Perspective
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 361-SA	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, & 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 Relations 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
POLI_SCI 384-0	International Responses to Mass Atrocities

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.

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POLI_SCI 302-0	Subjects, Citizens, Revolutionaries: Early Modern Political Thought
POLI_SCI 303-0	Modernity and Its Discontents
POLI_SCI 304-0	Human Rights Between East and West
POLI_SCI 306-0	American Political Thought
POLI_SCI 307-0	Deportation Law and Politics
POLI_SCI 308-0	Critical Theory and the Study of 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 212-0	Evaluating Evidence
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 394-LK	Professional Linkage Seminar
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. 391) is offered by the Department of Spanish and Portuguese (p. 384).

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 cognition, psychobiology, clinical psychology, health psychology, developmental 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. 368)
- Psychology Minor (p. 369)

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: some college mathematics recommended. *Formal Studies 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 213-0 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 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 221-0 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. Neuroscience majors may not take PSYCH 221-0. Students may not take PSYCH 221-0 after they have taken NEUROSCI 202-0. *Natural 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 244-0 Developmental Psychology (1 Unit) Development of cognitive, social, and other psychological functions. Prerequisite: PSYCH 110-0. *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. 198*) 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 308-0 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 310-0 Special Topics in Social/Clinical/Personality (1 Unit) Topic to be announced. Prerequisites vary. May be repeated for credit with different topic.

PSYCH 311-0 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 213-0. *Social Behavioral Sciences Distro Area*

PSYCH 313-0 Relationship Science (1 Unit) Social-psychological analysis of close relationships, with an emphasis on romantic relationships. Interpersonal processes associated with relationship formation, development, and dissolution. *Social Behavioral Sciences Distro Area*

PSYCH 317-0 The Holocaust: Psychological Themes & Perspectives (1 Unit) This course will be an exploration of how particular psychological theories and concepts can inform our understanding of the events of the Holocaust at both a group and individual level. Material from the fields of Social and Clinical Psychology will be a particular focus of the course. 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. 198*) Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 327-0 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. *Interdisciplinary Distro* - See Rules (p. 198*) Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 328-0 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 221-0, or COG_SCI 210-0. *Interdisciplinary Distro* - See Rules (p. 198*) Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 330-0 Special Topics in Cognition/Neuroscience (1 Unit) Topic to be announced. Prerequisites vary. May be repeated for credit with different topic.

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 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. 198*) Natural Sciences Distro Area 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.
Prerequisite: PSYCH 110-0. Taught with LEGAL_ST 350-0; may not receive credit for both courses.
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 345-0 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 345-0 and COG_SCI 345-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

PSYCH 348-0 Psychology of Sex and Gender Differences (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 350-0 Special Topics in Psychology (1 Unit)
Topic to be announced. Prerequisites vary. May be repeated for credit with different topic.

PSYCH 356-0 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 356-0 and PSYCH 356-0 are taught together; may not receive credit for both courses. Prerequisite: PSYCH 110-0. *Social Behavioral Sciences Distro Area*

PSYCH 360-0 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 364-0 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 213-0, PSYCH 215-0, or PSYCH 244-0. *Social Behavioral Sciences Distro Area*

PSYCH 366-0 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 213-0, PSYCH 205-0. *Social Behavioral Sciences Distro Area*

PSYCH 367-0 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 244-0 or PSYCH 303-0. *Social Behavioral Sciences Distro Area*

PSYCH 369-0 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 213-0, PSYCH 215-0, or PSYCH 303-0. *Social Behavioral Sciences Distro Area*

PSYCH 370-0 Cognitive Development (1 Unit) Cognitive development in infancy, childhood, and adolescence. Focus on theoretical explanations for cognitive change and development in core domains, including language, space, number, time, and social relations. Prerequisites: PSYCH 205-0; PSYCH 244-0 or PSYCH 228-0. *Social Behavioral Sciences Distro Area*

PSYCH 372-0 Language and Cognition (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 373-0 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 374-0 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 328-0, PSYCH 378-0, or consent of instructor. *Interdisciplinary Distro* - See Rules (p. 198) *Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 378-0 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 221-0, PSYCH 228-0, PSYCH 320-0, PSYCH 328-0; COG_SCI 210-0) or consent of instructor.
Interdisciplinary Distro - See Rules (p. 198) *Natural Sciences Distro Area Social Behavioral Sciences Distro Area*

PSYCH 380-0 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 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 244-0. *Social Behavioral Sciences Distro Area*

PSYCH 383-0 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. Students conduct original research. Prerequisite: 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 390-0 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 391-0 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 392-0 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 397-1 Advanced Supervised Research 1 (1 Unit) Design, implementation, and reporting of a psychology research project. Prerequisites: PSYCH 205-0 and consent of instructor; PSYCH 397-2 must be taken with the same professor as PSYCH 397-1. Weinberg College limits on 398 and 399 enrollments also apply to 397.

PSYCH 397-2 Advanced Supervised Research 2 (1 Unit) Design, implementation, and reporting of a psychology research project. Prerequisites: PSYCH 205-0 and consent of instructor; PSYCH 397-2 must be taken with the same professor as PSYCH 397-1. Weinberg College limits on 398 and 399 enrollments also apply to 397.

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. 27) and the degree requirements of their home school.

Course	Title
Department Courses (11 units)	
3 core courses:	
PSYCH 110-0	Introduction to Psychology
PSYCH 201-0	Statistical Methods in Psychology (or approved substitute)
PSYCH 205-0	Research Methods in Psychology
8 additional courses:	
At least 2 must be personality, clinical, or social psychology (PSYCH courses numbered 212-219, 300-319, 360-369, 390). See list below.	
At least 2 must be cognitive psychology or neuroscience (PSYCH courses numbered 220-239, 320-339, 370-379, 391, or approved COG SCI courses). See list below.	
At least 1 must be cross-cutting or integrative (PSYCH courses numbered 240-259, 340-359, 380-389, 392). See list below.	
At least 1 must be upper-level research (PSYCH courses numbered 360-392, 397-2, 398-1,2,3). See 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 quantitative courses: EITHER two 200-level Mathematics courses OR one 200-level Mathematics course and one advanced Statistics course (STAT 232 or higher)	
3 additional units of credit chosen from the following:	
Any 200-level mathematics course	
COG_SCI 202-0	Evaluating Evidence
COG_SCI 207-0	Introduction to Cognitive Modeling
COMP_SCI 110-0	Introduction to Computer Programming
COMP_SCI 111-0	Fundamentals of Computer Programming
COMP_SCI 130-0	Tools and Technology of the World-Wide Web
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5
Any statistics course at the 232 level or higher	
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 380-0 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. Students may not count both courses.
- Only 1 quarter total of PSYCH 397-2 or PSYCH 398-x may count toward the major. Students may not count both courses.
- See Weinberg College rules about Independent Study and Undergraduate Seminars (p. 201) 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.
- For students with an adjunct major in MMSS: MATH 385-0 Probability and Statistics for MMSS counts in place of PSYCH 201-0 (for triple major limitations see MMSS Adjunct Major (p. 326)); the five related courses for the Psychology Major are fulfilled by MATH 285-1, MATH 285-2, MATH 285-3, MATH 386-1, and MATH 386-2.

Personality, Clinical, or Social Psychology Courses

Course	Title
PSYCH 213-0	Social Psychology
PSYCH 215-0	Psychology of Personality
PSYCH 303-0	Psychopathology
PSYCH 306-0	Introduction to Clinical Psychology
PSYCH 308-0	Cognitive Behavior Therapy

PSYCH 310-0	Special Topics in Social/Clinical/Personality
PSYCH 311-0	Psychology of Attitudes
PSYCH 313-0	Relationship Science
PSYCH 317-0	The Holocaust: Psychological Themes & Perspectives
PSYCH 360-0	Personality Research
PSYCH 364-0	Social and Personality Development
PSYCH 366-0	Stereotyping & Prejudice
PSYCH 367-0	Child Psychopathology
PSYCH 369-0	Psychological Tests & Measures
PSYCH 390-0	Advanced Seminar in Personality, Clinical, or Social Psychology

Cognitive Psychology or Neuroscience Courses

Course	Title
PSYCH 221-0	Introduction to Neuroscience
PSYCH 228-0	Cognitive Psychology
PSYCH 324-0	Perception
PSYCH 327-0	Brain and Cognition
PSYCH 328-0	Brain Damage and the Mind
PSYCH 330-0	Special Topics in Cognition/Neuroscience
PSYCH 333-0	Psychology of Thinking
PSYCH 336-0	Consciousness
PSYCH 370-0	Cognitive Development
PSYCH 372-0	Language and Cognition
PSYCH 373-0	Decision Making
PSYCH 374-0	Human Memory
PSYCH 378-0	Images of Cognition
PSYCH 391-0	Advanced Seminar in Cognition or Neuroscience
COG_SCI 210-0	Language and the Brain
COG_SCI 211-0	Learning, Representation & Reasoning

Cross-Cutting or Integrative Courses

Course	Title
PSYCH 244-0	Developmental Psychology
PSYCH 248-0	Health Psychology
PSYCH 249-0	Buddhist Psychology
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 345-0	Presenting Ideas & Data
PSYCH 348-0	Psychology of Sex and Gender Differences
PSYCH 350-0	Special Topics in Psychology
PSYCH 356-0	Native Americans and Environmental Decision Making
PSYCH 380-0	Advanced Statistics & Experimental Design
PSYCH 381-0	Children & the Law
PSYCH 383-0	Psychology and Food
PSYCH 387-0	Consumer Psychology and Marketing Research
PSYCH 392-0	Advanced Seminar in Psychology

Upper-level Research Courses

Course	Title
PSYCH 360-0	Personality Research
PSYCH 364-0	Social and Personality Development
PSYCH 366-0	Stereotyping & Prejudice
PSYCH 367-0	Child Psychopathology
PSYCH 369-0	Psychological Tests & Measures
PSYCH 370-0	Cognitive Development
PSYCH 372-0	Language and Cognition
PSYCH 373-0	Decision Making
PSYCH 374-0	Human Memory
PSYCH 378-0	Images of Cognition
PSYCH 380-0	Advanced Statistics & Experimental Design
PSYCH 381-0	Children & the Law
PSYCH 383-0	Psychology and Food
PSYCH 387-0	Consumer Psychology and Marketing Research
PSYCH 390-0	Advanced Seminar in Personality, Clinical, or Social Psychology
PSYCH 391-0	Advanced Seminar in Cognition or Neuroscience
PSYCH 392-0	Advanced Seminar in Psychology
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 year-long research project; one Senior Thesis Seminar credit 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 (https://www.psychology.northwestern.edu/undergraduate/research/honors-in-psychology.html) and Honors in the Major (p. 201).

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 two central methods courses (PSYCH 201-0 Statistical Methods in Psychology and PSYCH 205-0 Research Methods in Psychology), and at least one course from each of the two main content areas defined for the major. Note that first-year seminars do not count towards the minor. **In addition to the courses specifically listed below, all other psychology department courses numbered 200-391 can also count toward the 4 additional courses for the minor.**

Course	Title
Minor Requirements (7 units)	
3 core courses:	
PSYCH 110-0	Introduction to Psychology

PSYCH 201-0	Statistical Methods in Psychology (or approved substiture)
PSYCH 205-0	Research Methods in Psychology
4 additional courses:	
At least 1 personality, clinical, or social psychology course from: [1]	
PSYCH 213-0	Social Psychology
PSYCH 215-0	Psychology of Personality
PSYCH 303-0	Psychopathology
PSYCH 310-0	Special Topics in Social/Clinical/Personality
PSYCH 313-0	Relationship Science
PSYCH 317-0	The Holocaust: Psychological Themes & Perspectives
PSYCH 364-0	Social and Personality Development
PSYCH 367-0	Child Psychopathology
At least 1 cognitive psychology or neuroscience course from: [1]	
PSYCH 221-0	Introduction to Neuroscience
PSYCH 228-0	Cognitive Psychology
PSYCH 324-0	Perception
PSYCH 327-0	Brain and Cognition
PSYCH 328-0	Brain Damage and the Mind
PSYCH 330-0	Special Topics in Cognition/Neuroscience
PSYCH 336-0	Consciousness
PSYCH 370-0	Cognitive Development
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 only count one quarter of EITHER PSYCH 399-0 Independent Study or PSYCH 397-1 Advanced Supervised Research 1. May not count both courses toward the minor.

Religious Studies

religious-studies.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. 373)
- Religious Studies Minor (p. 373)
- Catholic Studies Minor (p. 373)

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 172-0 Introduction to Religion, Media, and Culture (1 Unit) Integrating multimedia modes of learning and engaging students in skill-developing mediamaking assignments, this course offers undergraduates an introduction to studying the phenomena of religion in relationship to dynamics of media, society, and culture. No prerequisites required. *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. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro* - See Rules *(*p. 198*)*

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. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro* - See Rules *(*p. 198*)*

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. 198*)*

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 295-0 Ahimsa: Nonviolence in South Asia and Beyond (1 Unit) Theory and practice of nonviolence in human action, taking into account ethics as well as efficacy. Emphasis on both spiritual and practical approaches to nonviolence and its usefulness in effecting spiritual development and social change. *Ethics Values Distro Area*

RELIGION 301-0 Hindu Epics: Mahābhārata (1 Unit) Immersion in the ancient Sanskrit epic in translation and modern retellings, focusing on classical Hindu myth and theology as well as issues of justice, war, gender, and violence. *Ethics Values Distro Area Interdisciplinary Distro* - See Rules *(*p. 198*)* *Literature Fine Arts Distro Area*

RELIGION 302-0 Hindu Epics: Rāmāya#a (1 Unit) Immersion in the ancient Sanskrit epic in translation and modern retellings, focusing on classical Hindu myth and theology as well as issues of justice, violence, gender, and love. *Ethics Values Distro Area*

RELIGION 305-1 Introductory Readings in Sanskrit I (1 Unit) This course is the first of a two quarter sequence that provides instruction in the Sanskrit language for beginners. No prior knowledge is required. It begins a comprehensive introduction to the Sanskrit language, while engaging students from the beginning in the practice of translation.

RELIGION 305-2 Introductory Readings in Sanskrit II (1 Unit) This course is the second of a two quarter sequence that provides instruction in the Sanskrit language for beginners. Students continue a comprehensive introduction to the Sanskrit language through study of its forms and through translation. Prerequisite: RELIGION 305-1.

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) An exploration of where, why, and how Buddhist practices, ideas, and iconography are spreading and being reinterpreted in the modern world. *Ethics Values Distro Area*

RELIGION 315-0 Buddhist Auto/biography (1 Unit) An exploration of Buddhist narratives of the self, including Sanskrit and Tibetan-language biographies and autobiographies in English translation, in conversation with literary theory. *Ethics Values Distro Area Interdisciplinary Distro* - See Rules *(*p. 198*)* *Literature Fine Arts Distro Area*

RELIGION 316-0 Religion and the Body in China (1 Unit) Explores the place of the body in Chinese religion, from the ancient period to the present day. Touches on dying and the afterlife, food and drink, health and medicine, gender and family, and other themes. *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. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198)

RELIGION 364-0 American Teenage Rites of 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. 198)

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. 198)

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. 198)

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. 27) and the degree requirements of their home school.

Major Requirements (12 units)

- 1 introductory course: RELIGION 170-0 Introduction to Religion or RELIGION 172-0 Introduction to Religion, Media, and Culture.
- 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. In years when the seminar cannot run for whatever reason, students work with the Director of Undergraduate Studies to schedule independent studies and/or participation in another department's thesis-writing workshop during the senior year. More details on the Senior Thesis Honors Program (https://religious-studies.northwestern.edu/undergraduate/major/senior-thesis-honors-program.html) page.

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. 201).

Religious Studies Minor

Course	Title
Minor Requirements: Religious Studies (6 units)	
RELIGION 170-0	Introduction to Religion
or RELIGION 172-0	Introduction to Religion, Media, and Culture
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	Global Catholicism in the Contemporary World
or RELIGION 382-0	Catholicism & Making of the Modern World
or RELIGION 383-0	Catholic Social Ethics
5 additional courses:	
Must be chosen with the department adviser from:	
RELIGION 381-0	Global Catholicism in the Contemporary World
RELIGION 382-0	Catholicism & Making of the Modern World
RELIGION 383-0	Catholic Social Ethics
RELIGION 384-0	Soundings in the Catholic Tradition
RELIGION 385-0	Topics in United States Catholicism
RELIGION 386-0	Topics in Latin America Catholicism
Or other relevant courses in religious studies and other departments.	

Russian

See Slavic Languages and Literatures (p. 376).

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 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 246-0	Intro to Health Communication
COMM_ST 343-0	Advanced 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 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

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 336-0	The Climate Crisis, Policies, and Society
ENVR_POL 340-0	Global Environments and World History
ENVR_POL 356-0	Native Americans and Environmental Decision Making

Global Health

Course	Title
GBL_HLTH 201-0	Introduction to Global Health
GBL_HLTH 302-0	Global Bioethics
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 251-0	The Politics of Disaster: A Global Environmental History
HISTORY 275-1	History of Early Modern Science and Medicine
HISTORY 275-2	History of Modern Science and Medicine
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	Topics in 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 340-0	Psychology and Law
PSYCH 356-0	Native Americans and Environmental Decision Making

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	The Climate Crisis, Policies, and Society
SOCIOL 355-0	Medical Sociology

Programs of Study

- Science in Human Culture Adjunct Major (p. 375)
- Science in Human Culture Minor (p. 375)

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. 27) and the degree requirements of their home school.

Adjunct Major Requirements (10 units)

- Courses are chosen from the list of Eligible Courses (p. 373) or the approved list on the program website and generally 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 251-0	The Politics of Disaster: A Global Environmental History
HISTORY 275-1	History of Early Modern Science and Medicine
HISTORY 275-2	History of Modern Science and Medicine
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	Topics in Philosophy of Medicine
SOCIOL 220-0	Health, Biomedicine, Culture, and Society
SOCIOL 319-0	Sociology of Science
SOCIOL 355-0	Medical Sociology

- 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. 201).

Science in Human Culture Minor

Minor Requirements (7 units)

- Courses are chosen from the list of Eligible Courses (p. 373) or from the approved list on the program website and generally relate to a theme developed with the program director.

- One (1) course must be a 300-level course.
- Up to two (2) courses can double-count 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 without a language prerequisite.

The department strongly recommends that students study abroad. Programs take place in Prague, Belgrade, Sarajevo, Moscow, St. Petersburg, and Almaty. Students should consult the undergraduate adviser in the department or an adviser in the Global Learning Office (https://www.northwestern.edu/abroad/) to learn more about study abroad options.

Programs of Study

- Slavic Languages and Literatures Major (p. 378)
- Russian and East European Studies Minor (p. 380)

See below for Russian Courses (p. 377) and Polish Courses (p. 378).

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 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 222-0 Language, Politics, & 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. LING 222-0 and SLAVIC 222-0 are taught together; may not receive credit for both courses. *Ethics Values Distro Area Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198)

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 participating in NU-Sponsored study abroad programs. *Historical Studies Distro Area*

SLAVIC 260-0 Economics and the Humanities: Understanding Choice (1 Unit) A conversation among disciplines, especially economics and literary studies. Explores social, ethical, and political big questions. *Ethics Values Distro Area Literature Fine Arts Distro Area*

SLAVIC 261-0 Heart of Europe: Poland in the Twentieth Century (1 Unit) Study of key developments in Polish history, literature, and thought by way of texts drawn from literature, history, politics, journalism, memoirs, essays, and film. Poland as a microcosm for recent European history and culture. *Historical Studies Distro Area*

SLAVIC 267-0 Czech Culture: Film, Visual Arts & Music (1 Unit) Czech culture represented in film and visual arts. *Literature Fine Arts Distro Area*

SLAVIC 267-SA Czech Culture (1 Unit)

SLAVIC 278-1 Visual Art in the Context of Russian Culture (1 Unit) Introduction to the history of Russian art: survey of major trends in Russian visual art in the dual contexts of Russian culture and European visual art. Focus on interconnections among visual arts, literature, and political history. Russian art from the medieval period to the beginning of the 20th century. *Literature Fine Arts Distro Area*

SLAVIC 278-2 Visual Art in the Context of Russian Culture (1 Unit) Introduction to the history of Russian art: survey of major trends in Russian visual art in the dual contexts of Russian culture and European visual art. Focus on interconnections among visual arts, literature, and political history. Russian art of the 20th century.

SLAVIC 310-0 Tolstoy (1 Unit)
This course is devoted to a careful consideration of one book, Tolstoy's War and Peace, as we come to appreciate why it is often considered the world's greatest novel.

Literature Fine Arts Distro Area

SLAVIC 311-0 Dostoevsky (1 Unit)
Introduction to Dostoevsky's life and works: Notes from the Underground, Crime and Punishment, Brothers Karamazov.
Literature Fine Arts Distro Area

SLAVIC 314-0 Chekhov (1 Unit)
Introduction to the fiction and plays of Anton Chekhov, father of the modern short story. His writing in its Russian cultural context and his influence on English-language drama, fiction, and film. Readings include The Cherry Orchard, The Seagull, Uncle Vania, and short stories.
Literature Fine Arts Distro Area

SLAVIC 322-0 Making a Dictionary: The Northwestern Project (1 Unit) Creation of an online dictionary of Northwestern language. Learning about the connection between language, society, and identity; sociolinguistic fieldwork; lexicography; politics of dictionaries. LING 363-0 and SLAVIC 322-0 are taught together; may not receive credit for both courses. *Social Behavioral Sciences Distro Area*

SLAVIC 341-0 Structure of Modern Russian (1 Unit)
Theories and methods of linguistics as applied to the description of modern Russian. Phonetics, morphology, and other topics.
Formal Studies 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 20thcentury 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 realism). *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 traditions of Russia from the 19th century through Russian modernism to contemporary theater. Dramas by Gogol, Ostrovsky, Gorky, Chekhov, Blok, Mayakovsky, and others.
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.
Historical Studies Distro Area Interdisciplinary Distro - See Rules *(*p. 198*) Literature Fine Arts Distro Area*

SLAVIC 392-0 East European Literature and Visual Arts (1 Unit) 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. 198*) Literature Fine Arts Distro Area*

SLAVIC 396-0 Topics in Literature and Arts (1 Unit) Content varies. May be repeated for credit. *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.

Russian Courses

RUSSIAN 101-1 Elementary Russian (Prior to 2019 taught as SLAVIC 101-1) (1 Unit) Russian language and culture. Basic reading, writing, listening, and speaking. No prerequisite.

RUSSIAN 101-2 Elementary Russian (Prior to 2019 taught as SLAVIC 101-2) (1 Unit) Russian language and culture. Basic reading, writing, listening, and speaking. Prerequisite: RUSSIAN 101-1 (or equivalent).

RUSSIAN 101-3 Elementary Russian (Prior to 2019 taught as SLAVIC 101-3) (1 Unit) Russian language and culture. Basic reading, writing, listening, and speaking. Prerequisite: RUSSIAN 101-2 (or equivalent).

RUSSIAN 102-1 Intermediate Russian (Prior to 2019 taught as SLAVIC 102-1) (1 Unit) Russian language and culture. Reading, writing, listening, and speaking. Prerequisite: RUSSIAN 101-3 (or equivalent).

RUSSIAN 102-2 Intermediate Russian (Prior to 2019 taught as SLAVIC 102-2) (1 Unit) Russian language and culture. Reading, writing, listening, and speaking. Prerequisite: RUSSIAN 102-1 (or equivalent).

RUSSIAN 102-3 Intermediate Russian (Prior to 2019 taught as SLAVIC 102-3) (1 Unit) Russian language and culture. Reading, writing, listening, and speaking. Prerequisite: RUSSIAN 102-2 (or equivalent).

RUSSIAN 302-1 Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-1) (1 Unit) Conversation, listening comprehension, reading, and composition. Contemporary readings on Russian culture and society. Combined third-and fourth-year multi-skill course. Prerequisite: RUSSIAN 102-3 or consent of language director.

RUSSIAN 302-2 Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-2) (1 Unit) Conversation, listening comprehension, reading, and com-position. Contemporary readings on Russian culture and society. Combined third-and fourth-year multi-skill course. Prerequisite: RUSSIAN 102-3 or consent of language director.

RUSSIAN 302-3 Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-3) (1 Unit) Conversation, listening comprehension, reading, and com-position. Contemporary readings on Russian culture and society. Combined third-and fourth-year multi-skill course. Prerequisite: RUSSIAN 102-3 or consent of language director.

RUSSIAN 303-1 Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-1: Modern Russian reading (1 Unit) Conversation, listening comprehension, reading, and composition. Exploration of modern Russian language and culture through readings, video, and

film. Combined third-and fourth-year multi-skill course. Prerequisite: RUSSIAN 102-3 or consent of language director.

RUSSIAN 303-2 Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-2: Modern Russian reading) (1 Unit) Conversation, listening comprehension, reading, and composition. Exploration of modern Russian language and culture through readings, video, and film. Combined third-and fourth-year multi-skill course. Prerequisite: RUSSIAN 102-3 or consent of language director.

RUSSIAN 303-3 Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-3: Modern Russian reading) (1 Unit) Conversation, listening comprehension, reading, and composition. Exploration of modern Russian language and culture through readings, video, and film. Combined third-and fourth-year multi-skill course. Prerequisite: RUSSIAN 102-3 or consent of language director.

RUSSIAN 304-1 Adv Contemp Russian (1 Unit) Russian for advanced speakers, including heritage speakers. Stress on skills in speaking, reading, and writing in professional and formal environments. Taught entirely in Russian. Prerequisite: RUSSIAN 302-3 or RUSSIAN 303-3 (or equivalent).

RUSSIAN 304-2 Adv Contemp Russian (1 Unit) Russian for advanced speakers, including heritage speakers. Stress on skills in speaking, reading, and writing in professional and formal environments. Prerequisite: RUSSIAN 302-3 or RUSSIAN 303-3 (or equivalent).

RUSSIAN 359-0 Russian Prose (Prior to 2019 taught as SLAVIC 359-1 or 359-2) (1 Unit)
Selected works of Russian masters. Lecture, readings and discussion in Russian. Russian modernist prose, socialist realism and 1940s to the present. Content varies. May be repeated for credit.
Prerequisite: RUSSIAN 302-3 or RUSSIAN 303-3 (or equivalent).
Literature Fine Arts Distro Area

Polish Courses

POLISH 108-1 Elementary Polish (1 Unit) Polish language and culture. Basic reading, writing, listening, and speaking. No prerequisite.

POLISH 108-2 Elementary Polish (Prior to 2019 taught as SLAVIC 108-2) (1 Unit) Polish language and culture. Basic reading, writing, listening, and speaking. Prerequisite: POLISH 108-1 (or equivalent).

POLISH 108-3 Elementary Polish (Prior to 2019 taught as SLAVIC 108-3) (1 Unit) Polish language and culture. Basic reading, writing, listening, and speaking. Prerequisite: POLISH 108-2 (or equivalent).

POLISH 208-1 Intermediate Polish: Language and Culture (Prior to 2019 taught as SLAVIC 208-1) (1 Unit) Reading on topics in Polish culture and society. Prerequisite: POLISH 108-3 (or equivalent).

POLISH 208-2 Intermediate Polish: Language and Culture (Prior to 2019 taught as SLAVIC 208-2) (1 Unit) Reading on topics in Polish culture and society. Prerequisite: POLISH 208-1 (or equivalent).

POLISH 208-3 Intermediate Polish: Language and Culture (Prior to 2019 taught as SLAVIC 208-3) (1 Unit) Reading on topics in Polish culture and society. Prerequisite: POLISH 208-2 (or equivalent).

POLISH 358-1 Polish for Advanced and Native Speakers (Prior to 2019 taught as SLAVIC 358-1) (1 Unit) Polish for advanced speakers, including those who grew up in the United States. Stress on advanced levels of reading and writing as well as speaking. Taught entirely in Polish. Content varies; may be repeated for credit. Prerequisite: POLISH 208-3 (or equivalent). *Literature Fine Arts Distro Area*

POLISH 358-2 Polish for Advanced and Native Speakers (1 Unit) Polish for advanced speakers, including those who grew up in the United States. Stress on advanced levels of reading and writing as well as speaking. Taught entirely in Polish. Content varies; may be repeated for credit. Prerequisite: POLISH 208-3 (or equivalent). *Literature Fine Arts Distro Area*

Slavic Languages and Literatures Major

Students must also complete the Undergraduate Registration Requirement (p. 27) 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	
RUSSIAN 102-1 & RUSSIAN 102-2 & RUSSIAN 102-3	Intermediate Russian (Prior to 2019 taught as SLAVIC 102-1) and Intermediate Russian (Prior to 2019 taught as SLAVIC 102-2) and Intermediate Russian (Prior to 2019 taught as SLAVIC 102-3)
or equivalent Russian proficiency	
Department Courses (12 units)	
3 courses in advanced Russian language chosen from:	
RUSSIAN 302-1	Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-1)
RUSSIAN 302-2	Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-2)
RUSSIAN 302-3	Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-3)
RUSSIAN 303-1	Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-1: Modern Russian reading
RUSSIAN 303-2	Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-2: Modern Russian reading)
RUSSIAN 303-3	Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-3: Modern Russian reading)
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	
1 Slavic first-year seminar	
SLAVIC 360-0	Survey of 19th Century Russian Poetry
or SLAVIC 361-0	Survey of 20th Century Russian Poetry
4 additional 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; 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 POLISH 358-1 Polish for Advanced and Native Speakers (Prior to 2019 taught as SLAVIC 358-1), POLISH 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
3 of the following:	
RUSSIAN 302-1	Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-1)
RUSSIAN 302-2	Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-2)
RUSSIAN 302-3	Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-3)
RUSSIAN 303-1	Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-1: Modern Russian reading
RUSSIAN 303-2	Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-2: Modern Russian reading)
RUSSIAN 303-3	Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-3: Modern Russian reading)

- 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
    - 1 Slavic first-year seminar
    - 1-2 courses in a second Slavic language
  - 3 Slavic courses at the 300 or 400 level
  - 2 electives from outside the department

Related Courses

- 2 additional 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. 201).

Courses

Courses in Language and Linguistics

Course	Title
Russian courses:	
RUSSIAN 101-1	Elementary Russian (Prior to 2019 taught as SLAVIC 101-1)
RUSSIAN 101-2	Elementary Russian (Prior to 2019 taught as SLAVIC 101-2)
RUSSIAN 101-3	Elementary Russian (Prior to 2019 taught as SLAVIC 101-3)
RUSSIAN 102-1	Intermediate Russian (Prior to 2019 taught as SLAVIC 102-1)
RUSSIAN 102-2	Intermediate Russian (Prior to 2019 taught as SLAVIC 102-2)
RUSSIAN 102-3	Intermediate Russian (Prior to 2019 taught as SLAVIC 102-3)
RUSSIAN 302-1	Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-1)
RUSSIAN 302-2	Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-2)
RUSSIAN 302-3	Advanced Russian in Conversations (Prior to 2019 taught as SLAVIC 302-3)
RUSSIAN 303-1	Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-1: Modern Russian reading
RUSSIAN 303-2	Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-2: Modern Russian reading)
RUSSIAN 303-3	Advanced Russian Language and Culture (Prior to 2019 taught as SLAVIC 303-3: Modern Russian reading)
RUSSIAN 304-1	Adv Contemp Russian
RUSSIAN 304-2	Adv Contemp Russian
SLAVIC 341-0	Structure of Modern Russian
RUSSIAN 359-0	Russian Prose (Prior to 2019 taught as SLAVIC 359-1 or 359-2)

Polish courses:	
POLISH 108-1	Elementary Polish
POLISH 108-2	Elementary Polish (Prior to 2019 taught as SLAVIC 108-2)
POLISH 108-3	Elementary Polish (Prior to 2019 taught as SLAVIC 108-3)
POLISH 208-1	Intermediate Polish: Language and Culture (Prior to 2019 taught as SLAVIC 208-1)
POLISH 208-2	Intermediate Polish: Language and Culture (Prior to 2019 taught as SLAVIC 208-2)
POLISH 208-3	Intermediate Polish: Language and Culture (Prior to 2019 taught as SLAVIC 208-3)
POLISH 358-1	Polish for Advanced and Native Speakers (Prior to 2019 taught as SLAVIC 358-1)
POLISH 358-2	Polish for Advanced and Native Speakers

Courses with Readings and Discussion in English

Course	Title
SLAVIC 210-1	Introduction to Russian Literature
SLAVIC 210-2	Introduction to Russian Literature
SLAVIC 210-3	Introduction to Russian Literature
SLAVIC 211-1	20th-Century Russian Literature
SLAVIC 211-2	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	Visual Art in the Context of Russian Culture
SLAVIC 278-2	Visual Art in the Context of Russian Culture
SLAVIC 310-0	Tolstoy
SLAVIC 311-0	Dostoevsky
SLAVIC 314-0	Chekhov
SLAVIC 322-0	Making a Dictionary: The Northwestern Project
SLAVIC 367-1	Russian Film
SLAVIC 367-2	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 is proficiency equivalent to completion of third year Russian. This could be demonstrated by successful completion of one of the following: RUSSIAN 302-3, RUSSIAN 303-3, RUSSIAN 304-1, RUSSIAN 304-2, courses taken abroad, or through a placement test. Consent of the instructor is required.

Course	Title
RUSSIAN 359-0	Russian Prose (Prior to 2019 taught as SLAVIC 359-1 or 359-2)
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)

- 4 courses at the 200 level
- 4 courses at the 300 level
- The following courses may also count toward the minor:
  - 1 Slavic first-year seminar
  - 3 courses from outside the department, chosen with the consent of the undergraduate adviser
  - 3 East European (or German) language courses 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.

Programs of Study

- Sociology Major (p. 383)
- Sociological Research Minor (p. 384)
- Sociological Studies Minor (p. 384)

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 and the influence of society on law. Courts, the legal profession, law enforcement, inequality, and social change. 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. Taught with HUM 220-0; may not receive credit for both courses. *Ethics Values Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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 221-0 and ANTHRO 221-0 taught together, may not receive credit for both.

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. SOCIOL 227-0 and LEGAL_ST 207-0 are taught together; may not receive credit for both courses. Prerequisite: LEGAL_ST 206-0 or SOCIOL 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. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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. SOCIOL 317-0 and POLI_SCI 352-0 are taught together; may not receive credit for both courses. *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. 198) *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. 198) *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 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 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 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 The Climate Crisis, Policies, 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 392-0 Seminars (1 Unit) Close focus on key issues in sociology. In-depth analyses of a range of current social issues from a sociological perspective with focus on development of critical thinking and research skills. *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. 27) 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 [2]
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 [3]	
Related Courses (4 units)	
4 related courses [4]	

1 This does not include SOCIOL 101-6 First-Year Seminar and SOCIOL 226-0 Sociological Analysis.

2 Students taking MATH 385-0 for the adjunct major in MMSS may double-count this class in place of SOCIOL 303-0 (for triple major limitations see MMSS Adjunct Major (p. 326)).

3 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. 244) unit of credit or 1 Global Engagement Studies Institute (https://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.

[4] 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. Students doing the adjunct major in MMSS may use four MMSS classes to complete the related course requirement. 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 (SOCIOL 398-1 and SOCIOL 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. 201).

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	
SOCIOL 226-0	Sociological Analysis
SOCIOL 303-0	Analysis and Interpretation of Social Data (or equivalent)
SOCIOL 329-0	Field Research and Methods of Data Collection
2 sociology courses at the 300 level [2]	

[1] This does not include SOCIOL 101-6 First-Year Seminar and SOCIOL 226-0 Sociological Analysis.

[2] The following applies:

- SOCIOL 399-0 Independent Study may be taken more than once, but only 1 unit may count toward the minor.
- SOCIOL 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. 244) (CFS) or 1 Global Engagement Studies Institute (https://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	
SOCIOL 226-0	Sociological Analysis
4 sociology courses at the 300 level, approved by the director of undergraduate studies [2]	

[1] This does not include SOCIOL 101-6 First-Year Seminar or SOCIOL 226-0 Sociological Analysis.

[2] The following applies:

- SOCIOL 399-0 Independent Study may be taken more than once, but only 1 unit may count toward the minor.
- SOCIOL 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. 244) (CFS) or 1 Global Engagement Studies Institute (https://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 Global Learning Office (https://www.northwestern.edu/abroad/).

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. 120) 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 201-0	Advanced Spanish I: Current Topics through Media
SPANISH 202-0	Conversation on Current Topics
SPANISH 204-0	Advanced Spanish II: Artivism in Times of Political Change
SPANISH 205-0	Spanish for Professions: Health Care
SPANISH 206-0	Spanish for Professions: Business
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 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 342-0	Race and Representation in Latin America
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 Latina/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 Latina/o 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 (Taught in English)
SPANISH 225-0	Nationalism, Borders, and Immigration in Spain
SPANISH 231-0	The "New" Latin American Narrative (Taught in English)
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. 390)
- Spanish Minor (p. 391)
- Portuguese Language and Lusophone Cultures Minor (p. 391)

Spanish Courses

SPANISH 101-1 Elementary Spanish (1 Unit) First course of a three-quarter sequence in introductory Spanish, designed for students who have never studied Spanish or studied Spanish less than two years in high school. Students will learn Spanish in order to use it beyond the classroom in meaningful and authentic ways at the Novice level of

proficiency. This means that students will be able to communicate short messages on everyday topics that affect them directly.

SPANISH 101-2 Elementary Spanish (1 Unit) Second course of a three-quarter sequence in introductory Spanish. Students will learn Spanish in order to use it beyond the classroom in meaningful and authentic ways at the Novice High-Intermediate Low level of proficiency. This means that students will be able to communicate short messages on everyday topics that affect them directly. Prerequisite: SPANISH 101-1.

SPANISH 101-3 Elementary Spanish (1 Unit) Third course of a three-quarter sequence in introductory Spanish. Students will learn Spanish in order to use it beyond the classroom in meaningful and authentic ways at the Intermediate Low level of proficiency. This means that students will be able to communicate messages on everyday topics that affect them directly. Prerequisite: SPANISH 101-2.

SPANISH 105-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

SPANISH 115-1 Accelerated Elementary Spanish (1 Unit) First course of a two-quarter sequence in introductory Spanish designed for students with previous experience in Spanish. Students will learn Spanish in order to use it beyond the classroom in meaningful and authentic ways at the Novice High-Intermediate Low level of proficiency. This means that students will be able to communicate short messages on everyday topics that affect them directly. Offered in winter. Prerequisite: sufficient score on Spanish Language Placement Exam.

SPANISH 115-2 Accelerated Elementary Spanish (1 Unit) Second course of a two-quarter sequence in introductory Spanish designed for students with previous experience in Spanish. Students will learn Spanish in order to use it beyond the classroom in meaningful and authentic ways at the Intermediate Low level of proficiency. This means that students will be able to communicate messages on everyday topics that affect them directly. Offered in spring. Prerequisite: SPANISH 115-1.

SPANISH 121-1 Intermediate Spanish (1 Unit) First course in a three-quarter sequence in Intermediate Spanish. Further development of communicative proficiency with an emphasis on the functional use of Spanish and cultural content and reflection. Prerequisite: SPANISH 101-3, SPANISH 115-2, or sufficient score on Spanish Language Placement Exam.

SPANISH 121-2 Intermediate Spanish (1 Unit) Second course in a three-quarter sequence in Intermediate Spanish. Further development of communicative proficiency with an emphasis on the functional use of Spanish and cultural content and reflection. Prerequisite: SPANISH 121-1.

SPANISH 121-3 Intermediate Spanish (1 Unit) Third course in a three-quarter sequence in Intermediate Spanish. Further development of communicative proficiency with an emphasis on the functional use of Spanish and cultural content and reflection. Prerequisite: SPANISH 121-2.

SPANISH 125-0 Accelerated Intermediate Spanish (1 Unit) Accelerated course in Intermediate Spanish. Further development of grammar, vocabulary, speaking, and writing skills through readings and films. 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) The main purpose of this course is to build upon the language knowledge that students bring to the classroom and advance their proficiency of Spanish for multiple contexts. The course content will generate opportunities for students to hone their oral and written skills, to become acquainted with more formal registers of Spanish and to deepen their sense of pride in their linguistic and cultural heritage in order to communicate more effectively and more confidently in the target language. Offered in fall only. Prerequisite: AP score of 3 or or sufficient score on Spanish Language Placement Exam.

SPANISH 190-SA Intermediate Spanish Grammar (1 Unit) Development of grammar, vocabulary, and writing skills through emphasis on cultural content and functional use of language in Spanish-speaking countries. Restricted to students participating in Northwestern study abroad programs. Prerequisites: SPANISH 101-3, SPANISH 115-2, or sufficient score on Spanish Language Placement Exam.

SPANISH 191-SA Intermediate Spanish Conversation (0 Unit) Development of speaking strategies and structures through examination of cultural topics and daily life in Spanish-speaking countries. Emphasis on accurate formal and informal conversation and specialized vocabulary. Restricted to students participating in Northwestern study abroad programs. Prerequisites: SPANISH 101-3, SPANISH 115-2, or sufficient score on Spanish Language Placement Exam.

SPANISH 199-SA Language in Context: Contemporary Spain (1 Unit) An introduction to the culture and sociopolitical issues of contemporary Spain is the basis for reviewing and solidifying communicative functions that pose certain challenges to Spanish learners, and for fully integrating all language skills in Spanish. Restricted to students on Northwestern study abroad programs. Prerequisite: SPANISH 121-3, SPANISH 125-0, AP score of 4, or sufficient score on Spanish Language Placement Exam.

SPANISH 200-0 Language in Context: Latinx, Language and Culture (1 Unit) An introduction to the socio-political and linguistic richness of Spanish-speaking communities in the US is the basis for the development of an academic written and oral discourse of heritage learners. Students will also learn to critically analyze a text, and write short academic essays. Prerequisite: SPANISH 127-0, AP score of 4, or sufficient score on Spanish Language Placement Exam.

SPANISH 201-0 Advanced Spanish I: Current Topics through Media (1 Unit) This course is designed to develop all communication modes in Spanish through the interpretation and analysis of current topics in Spain and Latin America. The analysis of media will serve as an entry point for students to individually explore how past events have shaped current circumstances of Spanish-speaking countries. Prerequisite: SPANISH 121-3, SPANISH 125-0, SPANISH 199-0, AP4, Departmental Placement (Online Placement Test and Reassessment).

SPANISH 202-0 Conversation on Current Topics (1 Unit) Development of speaking strategies and structures through examination of culturally related topics in the Spanish-speaking world. Emphasis on formal conversation and specialized vocabulary. Restricted to students on Northwestern study abroad programs. Prerequisite: SPANISH 201-0, AP score of 5, or sufficient score on Spanish Language Placement Exam.

SPANISH 202-SA Conversation on Current Topics (1 Unit) Development of speaking strategies and structures through examination of culturally related topics in the Spanish-speaking world. Emphasis on formal conversation and specialized vocabulary. Restricted to students on Northwestern study abroad programs. Prerequisite: SPANISH 201-0, AP score of 5, or sufficient score on Spanish Language Placement Exam.

SPANISH 204-0 Advanced Spanish II: Artivism in Times of Political Change (1 Unit) This course is designed to develop all communication modes through the interpretation and analysis of multimodal texts centered around politically and socially engaged art. The course will explore the role of the creative arts in the political and social sphere in 20th-century Spain and Latin America while connecting these movements to current times. Prerequisite: SPANISH 197-0, SPANISH 200-0, SPANISH 201-0, SPANISH 203-0, SPANISH 207-0, AP score of 5, or Departmental Placement (Online Placement Test and Reassessment).

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 197-0, SPANISH 200-0, 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, comprehension of cultural nuances, analytical writing skills and project-based assignments. Prerequisite: SPANISH 197-0, SPANISH 200-0, SPANISH 201-0 or AP score of 5.

SPANISH 208-0 Spanish and the Community (1 Unit) The main objective of this course is the development of advanced Spanish communication skills, as well as a thorough and personal cultural knowledge of the Hispanic communities in the Chicagoland, through readings, discussions, writing, and interviews. Prerequisite: SPANISH 200-0, SPANISH 201 (NEW only), SPANISH 203-0 or SPANISH 207-0.

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 Studies in Ibero-American Culture and Society (1 Unit) Issues and debates in society, such as those around gender, race, and class, and their representation in music, architecture, visual arts, and fiction. Restricted to students on Northwestern study abroad programs. Prerequisites: SPANISH 199, Ap score of 4, or sufficient score on Spanish Language Placement Exam.

SPANISH 223-0 Cervantes (Taught in English) (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 (Taught in English) (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 religious and cultural history. Prerequisite (may be taken concurrently): SPANISH 220-0 or SPANISH 204-0. *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 or SPANISH 204-0. *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 or SPANISH 204-0. *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 or SPANISH 204-0. *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, and sociolinguistic and pragmatic elements specific to Spanish language. Prerequisite: SPANISH 204-0 or equivalent.

SPANISH 281-0 Spanish Phonetics and Phonology (1 Unit) Introduction to the theory and practice of Spanish sounds and phonology. Articulation and production, classification and description, combination and syllabification, sonority sequencing, and prevalent dialects. Introduction to basic principles of ethnographic research, data collection, and analysis. 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 301-SA 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) An advanced course designed to polish and improve language usage through in-depth study and development of grammar knowledge and skills, focusing on items most problematic for non-native speakers of Spanish. Offered in winter only. Prerequisite: SPANISH 204-0 or equivalent.

SPANISH 302-SA Advanced Grammar (1 Unit) An advanced course designed to polish and improve language usage through in-depth study and development of grammar knowledge and skills, focusing on items most problematic for non-native speakers of Spanish. Offered in winter only. 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: 1 course from 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: 1 course from 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, Cervantes, and Calderón de la Barca.
Prerequisite: 1 course from 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: 1 course from 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.

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: 1 course from SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0.

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: 1 course from 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: 1 course from 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 rastacuero, cosmopolitanism, the modern city, and exoticism.
Prerequisite: 1 course from SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0.
Literature Fine Arts Distro Area

SPANISH 342-0 Race and Representation in Latin America (1 Unit)
Analysis of the history and materials concerning the representation of race in Latin American literatures and cultures. Possible topics include indigenismo, negritude, afro-latinidad, indigeneity, critical race theory, decolonial theory, etc. Prerequisites: 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: 1 course from 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: 1 course from 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: 1 course from 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: 1 course from 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: 1 course from SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0.
Literature Fine Arts Distro Area

SPANISH 350-0 Visual Culture in Latina/o America and Spain (1 Unit)
History and materials of Latin American, Spanish, or US Latina/o visual cultures. Possible topics: photography, exhibitions, video practice, and visual production in popular culture.
Prerequisite:1 course from 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: 1 course from SPANISH 220-0, SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0.
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: 1 course from SPANISH 220-0, SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0.
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 Latina/o Literary and Cultural Studies (1 Unit)
Analysis of diverse literary and/or cultural productions by and about US Latina/os. 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: 1 course from SPANISH 220-0, SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0.
Interdisciplinary Distro - See Rules (p. 198) *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: 1 course from SPANISH 220-0, SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *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: 1 course from SPANISH 220-0, SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0.
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: 1 course from SPANISH 220-0, SPANISH 250-0, SPANISH 251-0, SPANISH 260-0, or SPANISH 261-0. *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: 1 course from 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: 1 course from 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 (Taught in English).
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 in Spanish 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: PORT 115-1.This course is equivalent to PORT 121-3.

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. Prerequisite: PORT 121-2 or Placement. There is no P/N allowed. First class is mandatory.

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 cronicas, 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. *Historical Studies Distro Area Interdisciplinary Distro* - See Rules (p. 198) *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 Principe, 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. 27) and the degree requirements of their home school.

Course	Title
Prerequisite	
SPANISH 121-3	Intermediate Spanish
or SPANISH 125-0	Accelerated Intermediate Spanish
or SPANISH 127-0	Accelerated Intermediate Spanish for Heritage Language Learners
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 (http://www.spanish-portuguese.northwestern.edu/undergraduate/language-placement/spanish/online-placement-test.html))	
Major in Spanish Requirements (15 units)	
2 courses:	
SPANISH 201-0	Advanced Spanish I: Current Topics through Media
SPANISH 204-0	Advanced Spanish II: Artivism in Times of Political Change
3 literature courses at the 200-level 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
7 300-level courses in the department chosen from: [1]	
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 342-0	Race and Representation in Latin America
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 Latina/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 Latina/o 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
3 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

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. 201).

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 121-3	Intermediate Spanish
or SPANISH 125-0	Accelerated Intermediate Spanish
or SPANISH 127-0	Accelerated Intermediate Spanish for Heritage Language Learners
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 (http://www.spanish-portuguese.northwestern.edu/undergraduate/language-placement/spanish/online-placement-test.html))	
Minor in Spanish Requirements (8 units) [1]	
Up to 5 courses at the 200 level chosen from: [2]	
SPANISH 201-0	Advanced Spanish I: Current Topics through Media
SPANISH 204-0	Advanced Spanish II: Artivism in Times of Political Change
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 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
At least 3 courses at the 300 level chosen from:	
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 342-0	Race and Representation in Latin America
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 Latina/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 Latina/o 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.

2 SPANISH 202-SA (and SPANISH 215-SA) can be counted towards the minor in Spanish.

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 (http://www.spanish-portuguese.northwestern.edu/undergraduate/language-placement/portuguese.html))	
Minor Requirements (6 units, at least 3 must be at the 300-level)	
2 courses:	
PORT 201-0	Reading and Speaking Portuguese
PORT 202-0	Reading and Writing Portuguese
2 of the following courses, one or both at the 300 level:	
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
2 electives, at least 1 at the 300 level. Choose from:	
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 and Data Science

statistics.northwestern.edu

Statistics and Data Science are closely related scientific disciplines that deal with the collection, organization, analysis, interpretation, and reporting of data. As data becomes more abundant and readily accessible, the need for methods and techniques for extracting information from data has greatly increased. The wide range of applications of Statistics and Data Science methods include finance, engineering, medicine, sports, law, and biological, social, and physical sciences. Indeed, it is hard to think of any discipline nowadays that does not call upon the use of statistical methods and approaches.

Statistical methods are widely used in observational studies and for the design and analysis of experiments, sample surveys, and censuses. Such analysis involves diverse fields as clinical trials, political polling, actuarial science, and the design of financial instruments.

Data Science methods are widely used in settings with large amounts of data with a focus on computer analysis, efficiency in terms of both compute time and memory demands, and prediction in aid of decision-making. Entire new fields based on these methods have sprung up such as deep learning, artificial intelligence, and bioinformatics.

Programs of Study

- Data Science Major (p. 396)
- Data Science Minor (p. 399)
- Statistics Major (p. 395)
- Statistics Minor (p. 395)

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

STAT 201-0 Introduction to Programming for Data Science (1 Unit) This course is an introduction programming for Data Science. It will prepare students to use essential programming methods as implemented in either Python or R as a tool in the subsequent data science courses including STAT 301-1, STAT 301-2, STAT 301-3, STAT 303-1, STAT 303-2, STAT 303-3, STAT 304-0, STAT 305-0, STAT 362-0, and STAT 390-0, etc. *Formal Studies Distro Area*

STAT 202-0 Introduction to Statistics and Data Science (1 Unit) Data collection, summarization, correlation, regression, sampling, confidence intervals, tests of significance. Introduction to data analysis techniques using R programming, no prior programming experience required. 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 202-SG Peer-Guided Study Group: Introduction to Statistics and Data Science (0 Unit) Peer-guided study group for students enrolled in STAT 202-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

STAT 210-0 Introduction to Probability and Statistics (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 210-SG Peer-Guided Study Group: Introduction to Probability and Statistics (0 Unit) Peer-guided study group for students enrolled in STAT 210-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

STAT 228-0 Series and Multiple Integrals (1 Unit) Sequences and series, and convergence tests. Power series, Taylor polynomials and error. Double integrals, triple integrals, and change of variables. Students may receive credit for only one of MATH 235#0, MATH 226#0, or STAT 228#0. Prerequisite: MATH 218#3 or MATH 220#2, and MATH 228#1 or MATH 230#1 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*

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 220-1. *Formal Studies Distro Area*

STAT 301-1 Data Science 1 with R (1 Unit)
First course in Data Science, with focus on data management, manipulation, and visualization skills and techniques for exploratory data analysis. The course also introduces the R programming language in the context of Data Science. Students may not receive credit for both this course and STAT 303-1.
Prerequisite: STAT 202-0 or STAT 210-0 or consent of the instructor. *Formal Studies Distro Area*

STAT 301-2 Data Science 2 with R (1 Unit)
Introduction to supervised machine/statistical learning with a focus on application using R. Course covers essential concepts in machine learning while surveying standard machine learning models such as linear and logistic regression. Course provides a foundation for learning

more machine learning methods. Students may not receive credit for both this course and STAT 303-2.
Prerequisite: STAT 301-1 or consent of instructor.
Formal Studies Distro Area

STAT 301-3 Data Science 3 with R (1 Unit)
An intermediate course that covers machine learning methods in R, including supervised and unsupervised learning. It provides the knowledge and skills necessary to tackle real world problems with machine learning. Students may not receive credit for both this course and STAT 303-3.
Prerequisite: STAT 301-2 or consent of the 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 303-1 Data Science 1 with Python (1 Unit)
First course in Data Science, with focus on data management, manipulation, and visualization skills and techniques for exploratory data analysis. The course also introduces the Python programming language in the context of Data Science. Students may not receive credit for both this course and STAT 301-1.
Prerequisite: STAT 202-0 or STAT 210-0 or consent of the instructor.
Formal Studies Distro Area

STAT 303-2 Data Science 2 with Python (1 Unit)
Introduction to supervised machine/statistical learning with a focus on application using Python. Course covers essential concepts in machine learning while surveying standard machine learning models such as linear and logistic regression. Course provides a foundation for learning more machine learning methods. Students may not receive credit for both this course and STAT 301-2.
Prerequisite: STAT 303-1 or consent of the instructor.
Formal Studies Distro Area

STAT 303-3 Data Science 3 with Python (1 Unit)
An intermediate course that covers machine learning methods in Python, including supervised and unsupervised learning. It provides the knowledge and skills necessary to tackle real world problems with machine learning. Students may not receive credit for both this course and STAT 301-3.
Prerequisite: STAT 303-2 or consent of the instructor.
Formal Studies Distro Area

STAT 304-0 Data Structures and Algorithms for Data Science (1 Unit)
This course will introduce students to the design, implementation, analysis, and proper application of abstract data types, data structures, and their algorithms. Python will be used to implement and explore various algorithms and data structures. Students should be prepared for a significant amount of hands-on programming. Prerequisites: STAT 202-0 or STAT 210-0 or STAT 232-0, and COMP_SCI 110-0 or COMP_SCI 111-0. *Formal Studies Distro Area*

STAT 305-0 Information Management for Data Science (1 Unit)
This course aims to give students an extensive data processing and visualization skillset using various Python libraries. It will also focus on relational databases and queries in SQL. Students will learn data scraping from online sources and mobile applications as well as a brief introduction to statistical and predictive analysis after the data is clean and ready to use. Prerequisites: STAT 202-0 or STAT 210-0 or STAT 232-0, and COMP_SCI 110-0 or COMP_SCI 111-0. *Formal Studies Distro Area*

STAT 320-1 Statistical Theory & 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, ELEC_ENG 302-0, or IEMS 202-0.
Co-requisites: STAT 202-0 or STAT 210-0, MATH 226-0, and MATH 230-2.
Formal Studies Distro Area

STAT 320-2 Statistical Theory & 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 Theory & 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 230-1 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.

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, and STAT 350-0.
Formal Studies Distro Area

STAT 350-0 Regression Analysis (1 Unit)
Simple linear regression and correlation, multiple regression, residual analysis, model building, variable selection, multi-collinearity and shrinkage estimation, nonlinear regression. Prerequisite or co-requisite: STAT 320-1.
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 353-0 Advanced Regression (1 Unit)
This course covers modern regression methods, including: (1) generalized linear models (binary, categorical, and count data), (2) random effects, mixed effects, and nonlinear models, and (3) model selection. The course emphasizes both the theoretical development of the methods, as well as their application, including the communication of models and results both verbally and in writing.
Prerequisites: STAT 320-2 or 420-2 or MATH 310-2 and a first course in regression is required at the level of STAT 350-0.
Formal Studies Distro Area

STAT 354-0 Time Series Modeling and Forecasting (1 Unit) Introduction to modern time series analysis. Autocorrelation, time series regression and forecasting, ARIMA and GARCH models. Prerequisites: STAT 320-1. Corequisite: STAT 350-0. *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 357-0 Introduction to Bayesian Statistics (1 Unit)
Introduction to basic concepts and principles in Bayesian inference such as the prior, likelihood, posterior and predictive distributions, as well as an introduction to a variety of computational algorithms for Bayesian inference. Students learn how to develop, describe, implement and critique statistical models from a Bayesian perspective.
Prerequisites: STAT 320-1, STAT 320-2, STAT 301-2 or 350-0, or consent of instructor.
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 362-0 Advanced Machine Learning for Data Science (1 Unit)
This course aims to focus on the theory and applications of advanced Machine Learning (ML) and Deep Learning (DL) topics. It also includes an introduction to Bayesian Modeling and Reinforcement Learning (RL). The students are expected to have a basic understanding of ML from STAT 301-1-2-3/303-1-2-3. The coding language for the homework projects is Python. Prerequisites: STAT 301-3 or STAT 303-3, and STAT 304-0 or COMP_SCI 214-0, and co-requisite MATH 240-0. *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; ELEC_ENG 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 390-0 Data Science Project (1 Unit) An opportunity to develop and create solutions for stakeholders with data needs. Students will work in teams to appropriately scope and solve data problems. Students should expect to spend significant amounts of time coordinating and working with team mates outside of class. Prerequisites: STAT 301-3 or STAT 303-3 or consent of instructor.

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. 27) and the degree requirements of their home school.

Course	Title
Department Courses (9 units)	
1 introductory course:	
STAT 202-0	Introduction to Statistics and Data Science
or STAT 210-0	Introduction to Probability and Statistics
or STAT 232-0	Applied Statistics
Or equivalent	
STAT 320-1 & STAT 320-2 & STAT 320-3	Statistical Theory & Methods 1 and Statistical Theory & Methods 2 and Statistical Theory & Methods 3
STAT 348-0	Applied Multivariate Analysis
or STAT 351-0	Design and Analysis of Experiments
or STAT 354-0	Time Series Modeling and Forecasting
STAT 350-0	Regression Analysis
3 additional 300-level courses offered by the department [1]	
Related Courses (Units depend on mathematics sequence taken.)	
MATH 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus
or MATH 218-1 & MATH 218-2 & MATH 218-3	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
MATH 226-0	Sequences and Series
For the following sequence options GEN_ENG 205-1 can be substituted for MATH 240-0	
MATH 230-1 & MATH 230-2 & MATH 240-0	Multivariable Differential Calculus and Multivariable Integral Calculus and Linear Algebra
or MATH 228-1 & MATH 228-2 & MATH 240-0	Multivariable Differential Calculus for Engineering and Multivariable Integral Calculus for Engineering 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.

The Statistics Major for Students in MMSS

For students completing the adjunct major in MMSS, STAT 202-0 Introduction to Statistics and Data Science is waived, MATH 385-0 Probability and Statistics for MMSS counts in place of STAT 320-1 Statistical Theory & Methods 1, and the combination of MATH 386-1 and MATH 386-2 Econometrics for MMSS count in place of STAT 350-0 Regression Analysis. Therefore students who are completing an adjunct major in MMSS will need to complete the following requirements (6 units) for the joint major in statistics (for triple major limitations see MMSS Adjunct Major (p. 326)):

Course	Title
STAT 320-2	Statistical Theory & Methods 2
STAT 320-3	Statistical Theory & Methods 3
STAT 348-0	Applied Multivariate Analysis
or STAT 354-0	Time Series Modeling and Forecasting
Three additional 300-level statistics courses.	

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. 201).

Relevant Courses in Other Departments

Industrial Engineering and Management Sciences

See McCormick School (p. 131).

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 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus

or MATH 218-1	Single-Variable Calculus with Precalculus
& MATH 218-2	and Single-Variable Calculus with Precalculus
& MATH 218-3	and Single-Variable Calculus with Precalculus
MATH 226-0	Sequences and Series
For the following sequence options GEN_ENG 205-1 can be substituted for MATH 240-0	
MATH 230-1	Multivariable Differential Calculus
& MATH 230-2	and Multivariable Integral Calculus
& MATH 240-0	and Linear Algebra
or MATH 228-1	Multivariable Differential Calculus for Engineering
& MATH 228-2	and Multivariable Integral Calculus for Engineering
& MATH 240-0	and Linear Algebra
or MATH 281-1	Accelerated Mathematics for ISP. First Year
& MATH 281-2	and Accelerated Mathematics for ISP. First Year
& MATH 281-3	and Accelerated Mathematics for ISP. First Year
or MATH 285-1	Accelerated Mathematics for MMSS: First Year
& MATH 285-2	and Accelerated Mathematics for MMSS: First Year
& MATH 285-3	and Accelerated Mathematics for MMSS: First Year
or MATH 290-1	MENU: Linear Algebra and Multivariable Calculus
& MATH 290-2	and MENU: Linear Algebra and Multivariable Calculus
& MATH 290-3	and MENU: Linear Algebra and Multivariable Calculus
or MATH 291-1	MENU: Intensive Linear Algebra and Multivariable Calculus
& MATH 291-2	and MENU: Intensive Linear Algebra and Multivariable Calculus
& MATH 291-3	and MENU: Intensive Linear Algebra and Multivariable Calculus
Minor Requirements (6 units)	
1 introductory course:	
STAT 202-0	Introduction to Statistics and Data Science
or STAT 210-0	Introduction to Probability and Statistics
or STAT 232-0	Applied Statistics
Or equivalent	
STAT 320-1	Statistical Theory & Methods 1
& STAT 320-2	and Statistical Theory & Methods 2
& STAT 320-3	and Statistical Theory & Methods 3
STAT 348-0	Applied Multivariate Analysis
or STAT 351-0	Design and Analysis of Experiments
or STAT 354-0	Time Series Modeling and Forecasting
STAT 350-0	Regression Analysis
or ECON 381-2	Econometrics

The Statistics Minor for Students in MMSS

For students completing the adjunct major in MMSS, STAT 202-0 Introduction to Statistics and Data Science is waived, MATH 385-0 Probability and Statistics for MMSS counts in place of STAT 320-1 Statistical Theory & Methods 1, and the combination of MATH 386-1 and MATH 386-2 Econometrics for MMSS counts in place of STAT 350-0 Regression Analysis. Therefore students who are completing an adjunct major in MMSS will need to complete the following requirements (4 units) for their minor in statistics:

Course	Title
STAT 320-2	Statistical Theory & Methods 2
STAT 320-3	Statistical Theory & Methods 3
STAT 348-0	Applied Multivariate Analysis
or STAT 354-0	Time Series Modeling and Forecasting
One additional 300-level statistics elective.	

Data Science Major

Students must also complete the Undergraduate Registration Requirement (p. 27) and the degree requirements of their home school.

Course	Title
Department Courses (11 units)	
4 foundational courses:	
STAT 202-0	Introduction to Statistics and Data Science
or STAT 210-0	Introduction to Probability and Statistics
or STAT 232-0	Applied Statistics
STAT 228-0	Series and Multiple Integrals
or MATH 226-0 & MATH 230-2	Sequences and Series and Multivariable Integral Calculus
STAT 320-1	Statistical Theory & Methods 1
STAT 320-2	Statistical Theory & Methods 2
6 data science core courses:	
STAT 301-1 & STAT 301-2 & STAT 301-3	Data Science 1 with R and Data Science 2 with R and Data Science 3 with R
or	
STAT 303-1 & STAT 303-2 & STAT 303-3	Data Science 1 with Python and Data Science 2 with Python and Data Science 3 with Python
NOTE! Students may receive credit for only one Data Science sequence: either Data Science with R (301 sequence), or Data Science with Python (303 sequence)	
STAT 304-0	Data Structures and Algorithms for Data Science
STAT 305-0	Information Management for Data Science
STAT 362-0	Advanced Machine Learning for Data Science
1 capstone experience course:	
STAT 390-0	Data Science Project
Required Related Courses (8 units)	
4 mathematics courses:	
MATH 220-1 & MATH 220-2	Single-Variable Differential Calculus and Single-Variable Integral Calculus
or MATH 218-1 & MATH 218-2 & MATH 218-3	Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
MATH 230-1	Multivariable Differential Calculus
or MATH 228-1	Multivariable Differential Calculus for Engineering
or MATH 281-1	Accelerated Mathematics for ISP. First Year
or MATH 285-2	Accelerated Mathematics for MMSS: First Year
or MATH 290-2	MENU: Linear Algebra and Multivariable Calculus
or MATH 291-2	MENU: Intensive Linear Algebra and Multivariable Calculus
MATH 240-0	Linear Algebra
or MATH 281-3	Accelerated Mathematics for ISP. First Year
or MATH 285-1	Accelerated Mathematics for MMSS: First Year
or MATH 290-1	MENU: Linear Algebra and Multivariable Calculus
or MATH 291-1	MENU: Intensive Linear Algebra and Multivariable Calculus
or GEN_ENG 205-1	Engineering Analysis I
1 computer science course:	
COMP_SCI 110-0	Introduction to Computer Programming
or COMP_SCI 111-0	Fundamentals of Computer Programming
2 courses chosen from approved Technical and Domain Science electives [1]	
1 approved Ethics elective course [2]	

[1] See list of approved Technical and Domain Science courses below. For updates please refer to department website list of Technical and Domain Science Electives (https://statistics.northwestern.edu/undergraduate/data_science_major/technical-and-domain-science-electives.html).

[2] See list of approved Ethics elective courses below. For updates please refer to department website list of Ethics electives (https://statistics.northwestern.edu/undergraduate/data_science_major/ethics-elective.html).

Technical and Domain Science Electives (students choose 2 courses; courses may be from different subject areas)

Anthropology

Course	Title
ANTHRO 322-0	Introduction to Archaeology Research Design & Methods
ANTHRO 324-0	Archaeological Survey Methods
ANTHRO 362-0	Advanced Methods in Quantitative Analysis
ANTHRO 389-0	Ethnographic Methods and Analysis

Biological Sciences

Course	Title
BIOL_SCI 323-0	Bioinformatics: Sequence and Structure Analysis
BIOL_SCI 338-0	Modeling Biological Dynamics
BIOL_SCI 341-0	Population Genetics
BIOL_SCI 378-0	Functional Genomics

Biomedical Engineering

Course	Title
BMD_ENG 311-0	Computational Genomics

Chemical and Biological Engineering

Course	Title
CHEM_ENG 379-0	Computational Biology: Analysis and Design of Living Systems

Communication

Course	Title
COMM_ST 352-0	Social Network Analysis
COMM_ST 371-0	Cultural Analytics

Computer Science

Course	Title
COMP_SCI 325-1	Artificial Intelligence Programming
COMP_SCI 336-0	Design & Analysis of Algorithms
COMP_SCI 339-0	Introduction to Database Systems
COMP_SCI 348-0	Introduction to Artificial Intelligence
COMP_SCI 352-0	Machine Perception of Music & Audio

Earth and Planetary Science

Course	Title
EARTH 323-0	Seismology and Earth Structure
EARTH 327-0	Geophysical Time Series Analysis
EARTH 340-0	Physics of Weather & Climate
EARTH 343-0	Earth System Modeling
EARTH 353-0	Mathematical Inverse Methods in Earth and Environmental Sciences
EARTH 360-0	Instrumentation and Field Methods
EARTH 361-0	Scientific Programming in Python
EARTH 362-0	Data Analysis for Earth and Planetary Sciences

Economics

Course	Title
ECON 381-1	Econometrics
ECON 381-2	Econometrics
ECON 383-0	Applied Econometrics

Engineering Sciences and Applied Mathematics

Course	Title
ES_APPM 346-0	Modeling and Computation in Science & Engineering
ES_APPM 370-1	Introduction to Computational Neuroscience
ES_APPM 375-1	Quantitative Biology I: Experiments, Data, Models, and Analysis
ES_APPM 375-2	Quantitative Biology II: Experiments, Data, Models, and Analysis

Global Health

Course	Title
GBL_HLTH 320-0	Qualitative Research Methods in Global Health

Industrial Engineering and Management Sciences

Course	Title
IEMS 308-0	Data Science and Analytics
IEMS 313-0	Foundations of Optimization
IEMS 315-0	Stochastic Models
IEMS 317-0	Discrete Event Systems Simulation
IEMS 340-0	Qualitative Methods in Engineering Systems
IEMS 341-0	Social Networks Analysis
IEMS 351-0	Optimization Methods in Data Science

Integrated Marketing and Journalism

Course	Title
IMC 302-0	Research for Marketing Communications
IMC 307-0	Digital, Social and Mobile Marketing
JOUR 377-0	Knight Lab: Data Analysis & Visualization

Linguistics

Course	Title
LING 334-0	Introduction to Computational Linguistics

Mathematics

Course	Title
MATH 306-0	Combinatorics & Discrete Mathematics
MATH 308-0	Graph Theory
MATH 310-2	Probability and Stochastic Processes
MATH 310-3	Probability and Stochastic Processes
MATH 311-2	MENU: Probability and Stochastic Processes
MATH 311-3	MENU: Probability and Stochastic Processes
MATH 366-0	Mathematical Models in Finance
MATH 368-0	Introduction to Optimization
MATH 386-1	Econometrics for MMSS
MATH 386-2	Econometrics for MMSS

Political Science

Course	Title
POLI_SCI 310-0	Methods of Political Inference
POLI_SCI 312-0	Statistical Research Methods

Psychology

Course	Title
PSYCH 380-0	Advanced Statistics & Experimental Design
PSYCH 387-0	Consumer Psychology and Marketing Research

Sociology

Course	Title
SOCIOL 303-0	Analysis and Interpretation of Social Data
SOCIOL 329-0	Field Research and Methods of Data Collection

Statistics and Data Science

Course	Title
STAT 302-0	Data Visualization
STAT 320-3	Statistical Theory & Methods 3
STAT 328-0	Causal Inference
STAT 342-0	Statistical Data Mining
STAT 344-0	Statistical Computing
STAT 348-0	Applied Multivariate Analysis
STAT 350-0	Regression Analysis
STAT 351-0	Design and Analysis of Experiments
STAT 352-0	Nonparametric Statistical Methods
STAT 353-0	Advanced Regression
STAT 354-0	Time Series Modeling and Forecasting
STAT 356-0	Hierarchical Linear Models
STAT 357-0	Introduction to Bayesian Statistics
STAT 365-0	Introduction to the Analysis of Financial Data

Ethics Elective (students choose 1 course)

African American Studies

Course	Title
AF_AM_ST 215-0	Introduction to Black Social & Political Life
AF_AM_ST 220-0	Civil Rights and Black Liberation
AF_AM_ST 319-0	Race, Ethnicity and the American Constitution

Entrepreneurship

Course	Title
ENTREP 360-0	Leadership, Ethics, and You

Global Health

Course	Title
GBL_HLTH 302-0	Global Bioethics
GBL_HLTH 324-0	Volunteerism and the Ethics of Help

Humanities

Course	Title
HUM 325-5	Humanities in the Digital Age

Integrated Marketing and Journalism

Course	Title
IMC 310-0	Integrated Marketing and Communication Law, Policy and Ethics
IMC 311-0	Data Governance: Critical Issues in Digital Marketing Communications
JOUR 303-0	Framed: Media and the Marginalized
JOUR 370-0	Media Law & Ethics

Latina and Latino Studies

Course	Title
LATINO 342-0	Latina and Latino Social Movements
LATINO 392-0	Topics in Latina and Latino Social and Political Issues

Performance Studies

Course	Title
PERF_ST 306-0	Performance and Race

Philosophy

Course	Title
PHIL 220-0	Introduction to Critical Theory
or COMP_LIT 207-0	Introduction to Critical Theory
PHIL 221-0	Gender, Politics, & Philosophy
or GNDR_ST 233-0	Gender, Politics, and Philosophy
PHIL 224-0	Philosophy, Race, and Racism
PHIL 240-0	Freedom and Responsibility
PHIL 262-0	Ethical Problems and Public Issues
PHIL 268-0	Ethics and the Environment
PHIL 269-0	Bioethics
PHIL 270-0	Climate Change and Sustainability: Economic and Ethical Dimensions
or ISEN 230-0	Climate Change and Sustainability: Ethical Dimensions
PHIL 273-2	The Brady Scholars Program: The Moral Life
PHIL 273-3	The Brady Scholars Program: The Good Society
PHIL 363-0	Kant's Moral Theory
PHIL 364-0	Business and Professional Ethics

Political Science

Course	Title
POLI_SCI 302-0	Subjects, Citizens, Revolutionaries: Early Modern Political Thought
POLI_SCI 303-0	Modernity and Its Discontents
POLI_SCI 304-0	Human Rights Between East and West
POLI_SCI 307-0	Deportation Law and Politics
POLI_SCI 309-0	Political Theories of the Rule of Law
or LEGAL_ST 309-0	Political Theories of the Rule of Law
POLI_SCI 347-0	Ethics in International Relations
POLI_SCI 382-0	Politics of Religious Diversity

Religious Studies

Course	Title
RELIGION 373-0	Religion and Bioethics

Slavic Languages and Literatures

Course	Title
SLAVIC 222-0	Language, Politics, & Identity
or LING 222-0	Language, Politics, and Identity
SLAVIC 260-0	Economics and the Humanities: Understanding Choice

Sociology

Course	Title
SOCIOL 220-0	Health, Biomedicine, Culture, and Society
or HUM 220-0	Health, Biomedicine, Culture, and Society
SOCIOL 321-0	Numbers, Identity & Modernity: How Calculation Shapes Who We Are & What We Know

The Data Science Major for Students in MMSS

Students majoring in both Data Science and MMSS will need to complete all requirements for the MMSS major and requirements for Data Science major are modified as follows (for triple major limitations see MMSS Adjunct Major (p. 326)):

- The introductory statistics course requirement (STAT 202-0, STAT 210-0, or equivalent) is waived
- STAT 228-0 is waived
- MATH 385-0 counts in place of STAT 320-1
- The 2 related Technical and Domain electives are automatically fulfilled by MATH 386-1 and MATH 386-2

All other data science major course requirements remain the same.

The Data Science Major for Students Majoring or Minoring in Statistics

For students who complete all requirements for Statistics major or minor, the requirements for the Data Science major are modified as follows:

- The introductory statistics course requirement (STAT 202-0, STAT 210-0, or equivalent) is waived.
- MATH 226-0 and MATH 230-2 are required in place of STAT 228-0. Statistics majors are NOT permitted to substitute STAT 228-0 or MATH 235-0, for MATH 226-0 and MATH 230-2.
- The 2 related Technical and Domain electives are automatically fulfilled by STAT 320-3 and STAT 350-0.
- STAT 320-1 and STAT 320-2 will be replaced with 2 elective courses approved by the Director of Data Science. These 2 elective courses may not be double-counted with any other Weinberg major or minor.

Note that there can be no double counting between the three 300 level elective courses required for the Statistics major and the required Data Science major courses including the elective courses designated as the STAT 320-1 and STAT 320-2 replacements.

All other Data Science major course requirements remain the same.

The Data Science Major for Students Majoring or Minoring in Weinberg Computer Science

For students who complete all requirements for the Weinberg Computer Science major or minor, the requirements for the Data Science major are modified as follows:

- STAT 304-0 will be replaced with 1 elective course approved by the Director of Data Science.

All other Data Science major course requirements remain the same.

Honors in Data Science

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 Data Science and see Honors in the Major (p. 201).

Data Science Minor

Students minoring in data science receive exposure to computational and applied statistical techniques. This minor provides a strong foundation for graduate work and academic preparation in the area.

Course	Title
Minor Requirements (6 units)	
STAT 202-0	Introduction to Statistics and Data Science
or STAT 210-0	Introduction to Probability and Statistics
or STAT 232-0	Applied Statistics
or approved introductory statistics course from another department	
STAT 301-1	Data Science 1 with R
& STAT 301-2	and Data Science 2 with R
& STAT 301-3	and Data Science 3 with R
or	
STAT 303-1	Data Science 1 with Python
& STAT 303-2	and Data Science 2 with Python
& STAT 303-3	and Data Science 3 with Python
NOTE! Students may receive credit for only one Data Science sequence: either Data Science with R (301 sequence), or Data Science with Python (303 sequence)	
STAT 302-0	Data Visualization
1 approved elective course relevant to the minor	

Courses used to fulfill the requirements for the minor in data science may not be used to fulfill the requirements for another major/minor except where permitted by Weinberg College double-counting rules (https://www.weinberg.northwestern.edu/undergraduate/degree/double-counting-faq.html). When necessary (for example when a student plans to complete a major in statistics and a minor in data science), students can consult the Director of Data Science in the Department of Statistics and Data Science (https://www.statistics.northwestern.edu/) about selection of replacement course(s) to satisfy the credit requirements of the data science minor.

The Data Science Minor for Students in MMSS

For students completing the adjunct major in MMSS, STAT 202-0 Introduction to Statistics and Data Science is waived. Therefore students who are completing an adjunct major in MMSS will need to complete the following requirements for the minor:

Course	Title
STAT 301-1	Data Science 1 with R
& STAT 301-2	and Data Science 2 with R
& STAT 301-3	and Data Science 3 with R
or	
STAT 303-1	Data Science 1 with Python
& STAT 303-2	and Data Science 2 with Python
& STAT 303-3	and Data Science 3 with Python
NOTE! Students may receive credit for only one Data Science sequence: either Data Science with R (301 sequence), or Data Science with Python (303 sequence)	
STAT 302-0	Data Visualization
1 approved elective course relevant to the minor	

Swahili

See African Studies (p. 208).

Turkish

Turkish is offered by the Middle East and North African Languages Program (https://mena-languages.northwestern.edu). For course listings in this catalog see Middle East and North African Studies (p. 336).

Urdu

See Asian Languages and Cultures (p. 223).

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. 267).

Yiddish

See Jewish Studies Program (p. 311).

INDEX

A

B

C

D

E

F

G

H

I

J

K

L

M

N

P

R

S

T

U

V

W

Y